# Living the Urban Experience:

## Implications for the Design of Everyday Computational Technologies

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## DEDICATED TO:

Everyone who is less fortunate than I am

# Declaration

I certify that the thesis I have presented for examination for the PhD degree of the London School of Economics and Political Science is solely my own work other than where I have clearly indicated that it is the work of others (in which case the extent of any work carried out jointly by me and any other person is clearly identified in it).

# Abstract

This dissertation addresses the challenges of designing computational technologies that are used in a variety of everyday occasions. Specifically, it focuses on urban computing, the study of, and design for, the experience of inhabiting and traversing urban environments. Using a phenomenological perspective to approach lived urban experiences in terms of their situated aspects and the ways in which they are understood by both designers and users, this dissertation seeks to create a categorisation of urban life that reflects its richness while reducing its complexity, in order to guide the design of new everyday computational technologies. The dissertation will show how such a theoretical standpoint leads to a study of researchers and designers directly engaging with a variety of urban experiences – *waiting in public places* in London, *being in transitional spaces* in Orange County, *visiting public toilets* in Amsterdam and *commuting* by the London Underground – through fieldwork and design. The hermeneutic phenomenology-inspired analysis of the data collected from such activities will support the emergence of a new categorisation of urban life called "in-between-ness". This categorisation reflects the tensions proper to the urban experience, and acts as an actionable tool for reflection, which identifies both sites for design - *awareness*, *engagement* and *legitimisation* - and potential design approaches to those sites - *integrate with*, *mirror* and *alter*. This dissertation will conclude with a discussion of the ways in which this new categorisation of in-between-ness presents a starting point for researchers to reflect on the variety of trends emerging within urban computing, and inspiration for the design of new everyday computational technologies.

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* Indicates that image has been captured, or created, by participants of the empirical study.

° Indicates that image has been captured by the workshop organisers.

# Indicates that image has been captured, or created, by myself.

# Chapter One – Introduction and Research Question

## 1.1 Technological Progress: Opportunities and Challenges

*21-07-06. I'm late for my meeting and I'm hurrying to catch the next Underground train. Before entering the station, I send a message to K telling her I'll be 15 minutes late, while I suddenly remember that I've run out of more money in my Oyster Card. So I queue for the ticket machine and I top it up using my ATM Card and by touching the RFID-enabled machine with my Oyster Card to add money. It's rush hour and all the trains are full. I squeeze into a carriage and take out my iPod. I select a fast, upbeat and loud track to keep the good mood, cancel the noises of the train under the tunnels, and forget about the uncomfortable position I have to keep for the next 20 minutes. (From research diary)*

This short description shows how during the span of few minutes of city life people interact with other people, often strangers, navigate the environment using the resources and knowledge they have available and use a variety of technologies throughout this process. In particular, computational technologies are increasingly becoming part of people's everyday lives. Part of it is an outcome of the miniaturisation of computational devices, which is allowing more and more technologies to become mobile and accompany people in a multiplicity of everyday situations. Networked technologies enable people to communicate with each other and to share digital resources both at a distance and in physical proximity. The concept of "ubiquitous computing" (Weiser 1991) indicates the omnipresence of computation, which has the potential to become increasingly invisible and embedded in most objects surrounding us. Since it was first introduced, the concept has also been used to

address research on how new everyday computational technologies can be designed and implemented to become integrated with a range of everyday activities.

In general terms, there is a close interrelation between people's activities, ubiquitous technologies and the context where the activities are performed and the technologies used. For instance, sensor technologies can trigger a response to people's movements within a particular space, while location-based applications can provide information about a certain place where people happen to be. Ubiquitous computational technologies can be thought of in terms of intelligent environments, or in terms of computation that is miniaturised and embedded in people's personal objects, such as Identity Cards or bus/train tickets (see Oyster Cards in London). Further, ubiquitous computing can be described as networked mobile personal devices such as wirelessly-enabled MP3 players, mobile game consoles and smart phones, constituting powerful multimedia tools that are interconnected, responsive and locative, and contributing to mediate people's perception of their surroundings (Green 2002). Abowd and Mynatt (2000) sustain that research into ubiquitous computing has focused on developing interfaces that allow a more "natural" interaction with computation, adapt and react to the context in which they are being used and finally capture, and give access to, people's everyday experiences.

A wide range of the social aspects of people's lives are then being affected by ubiquitous computational technologies, which are being increasingly used and designed to support communication and collaboration. Designers are confronted by the complexity of the setting in which these technologies are used, and this makes research in the field particularly challenging. Design for desktop applications, for example, mainly focuses on the relationship between the user and the computer or the user and a remote world as mediated by a computer. Designers of ubiquitous computing, however, have to take into consideration not only the interaction between the user and the computer, but also the relationship between many users and their surroundings as mediated by

a variety of computational devices. Despite the fact that technological progress has made the creation of ubiquitous technologies more feasible, comparatively few of them are already commercialised and adopted, while most of them are still in a research phase that demands further investigation. For instance, wearable computing has been discussed in popular media and researched within the community interested in ubiquitous computing for several decades already (Thorp 1998), but there are only a handful of such technologies already commercially available.

## 1.2 Motivations and Research Question

The challenges faced by the research community involved with the design of new everyday computational technologies, bringing together several established disciplines, are two deeply interrelated ones: a technical challenge, dealing with issues such as what are everyday computational technologies and how should they be built, and a social one, addressing the problem of how such technologies will be integrated with, and affect in turn, people's everyday lives. While over the past years most of the research has focused on the technical challenges, a few approaches and research projects have flourished to address the social challenges. Focus on either one or the other of these challenges has given rise to two distinct areas of research, which will be further explicated within this dissertation: one which takes a techno-centric approach, and the other which brings to the foreground social concerns.

For both the techno-centric and the social computing approaches, however, the notion of "everyday life" remains limited. The main aspects of everyday life that have been investigated are the experiences of being at work and being at home. Recently, a third aspect of everyday life has emerged as a topic of discussion, inhabiting and traversing urban environments, and this has given rise to a research domain called "urban computing". However, while research into being at work and being at

home is rather established and widely explored, urban computing is still a rather new and fragmented research domain. This dissertation, then aims to contribute to this emerging field, specifically by focusing on the following research question:

***How can the design of new computational technologies benefit from an improved understanding of urban life?***

In order to approach this complex question the dissertation will be aided by two sub-questions that will help laying the groundwork for the larger enquiry. First, the following sub-question will be addressed:

*How has urban life been approached so far for the purpose of designing new everyday computational technologies, and how might such approach be improved?*

Answering this sub-question will help identify a space within the current state of research that can be advanced and improved by this dissertation. Starting from broader enquiries into everyday life, the question leads the literature review to focus in particular on the existing work that has approached the understanding of urban life, with the aim of informing the design new ubiquitous computing. Once the ways in which urban life has been currently approached have been identified, so have the limitations of current research, the second sub-question will help this dissertation to choose a suitable conceptual framework and methodology for bringing forward enquiries within urban computing, by addressing:

*How do we create categories that reflect the complexity of urban life and can support the design of new everyday computational technologies?*

This sub-question will, then, aid the identification of a theoretical standpoint for approaching urban life, in a way that allows the emergence of both its richness and complexity, together with the aspects proper to it that most relate to and can be relevant for the design of new ubiquitous computing. This theoretical standpoint can then lead to define a

methodological approach which allows the empirically sound generation of a novel, and actionable, categorisation of urban life.

## 1.3 Research Objectives and Expected Contribution

In order to answer the main research question and the sub-questions proposed, this dissertation will explore, by using qualitative methods of analysis, a range of urban experiences, and specifically the ways in which these experiences are understood and rendered meaningful by researchers and designers, and can be potentially addressed by design. The main contribution of this dissertation will be to suggest a categorisation of urban life that can reflect the work already done within urban computing, and inform the design of new ubiquitous computational technologies.

In order to lead the exploration of urban life, a phenomenological conceptualisation of "lived urban experience" will be utilised. This conceptualisation will motivate the direct engagement of researchers and designers alike with the urban experience itself. One of the theoretical contributions of the dissertation emerging from this enquiry will be a new way of approaching urban life for design purposes, achieved by bringing together phenomenological concepts borrowed from the philosophical tradition (e.g. Heidegger 1962; Ihde 1990) and the phenomenologically-inspired side of social computing (e.g. Dourish 2001; Ciborra 2002). In addition, the dissertation will contribute to the ways in which urban life is categorised within urban computing, by introducing, describing and discussing the concept of "in-between-ness", which both provides suggestions for the design of new everyday computational technologies, and creates a dialogue between the techno-centric and the social computing sides of urban computing.

Indeed, in-between-ness will be presented as an actionable category which serves as sense-making tool for researchers and designers who

choose to address urban life, and this will constitutes the practical contribution of the dissertation. This contribution is not meant to provide requirements for specific systems, or to develop and test particular technologies; it is, instead, meant to produce knowledge able to support the initial phases of the design process, the ones that concern the understanding of aspects of human life (*inquiry*, Löwgren and Stolterman 2007) and the suggestion of a design space that encompasses various design opportunities (*exploration*, *ibidem*). The belief is that – because of its increasing complexity and challenges – the design of new everyday computational technologies can benefit not only from further knowledge of the circumstances in which new technologies will be used, but also from an ongoing dialogue on how the integration of such technologies within everyday life is achievable, and what are the potential consequences of such integration.

From a methodological perspective, this dissertation will contribute to the ways in which everyday life is empirically approached and investigated for the purpose of contributing to design. The phenomenologically-inspired methodology used within the empirical study of this dissertation – consisting of three workshops and a design project in which researchers and designers engaged with *inquiry* (*fieldwork* and *discussion*) and *exploration* (*design experimentation* and *design critique*) - has indeed the potential of being used for conducting further research that addresses not only urban life but also a wider range of everyday experiences.

## 1.4 Structure of the Dissertation

In order to show how the dissertation has approached the research question and sub-questions, and generated the previously mentioned contributions, this section outlines how the dissertation itself has been structured and will present its results. In particular, the seven chapters of the dissertation will be addressed below in turn.

Chapter Two will review the existing literature in attempt to answer the first sub-question of the dissertation:

*How has urban life been approached so far for the purpose of designing new everyday computational technologies, and how might such approach be improved?*

In order to do so, the chapter will first define the kind of technologies this dissertation addresses, ubiquitous and everyday computational technologies. Second, it will show the ways in which the design of such technologies is often approached, from both a techno-centric and a socio-oriented perspective. The latter, addressed in terms of social computing, will be described in terms of its variety of approaches that have increased the sensitivity towards the social dynamics involved with design and adoption of ubiquitous computing. Then, the chapter will describe how everyday life has been categorised thus far for the purpose of inspiring the design of new everyday computational technologies, mainly by focusing on the experiences of being at work and being at home. Urban life will be introduced as an emerging categorisation of everyday experiences which has given rise to the research domain of urban computing. Finally, the ways in which such categorisation has been approached within urban computing, both from a techno-centric and a socio-oriented perspective, will be reviewed, with the aim of highlighting the limitations of current research that will be addressed within this dissertation.

Chapter Three will then introduce and discuss the theoretical standpoint adopted for improving the current categorisation of urban life, in order to begin answering the second sub-question of the dissertation:

*How do we create categories that reflect the complexity of urban life and can support the design of new everyday computational technologies?*

In order to address such question, the chapter will first introduce

phenomenological concepts that allow the definition of what a lived urban experience consists of; such approach will then be presented as being able to allow the emergence of both the complexity and richness that characterise urban life. Specifically, a lived experience will be considered in terms of its situatedness, according to how people perceive and *understand* the experience, to the *actions* and *interactions* they perform, to the *dispositions* they have towards the experience and finally to how technologies are rendered as meaningful in the context of the experience itself. The chapter will then discuss the ways in which the understanding of lived urban experiences can become actionable in terms of design. The idea is to consider researchers and designers as human beings who understand and approach lived experiences as everyone else, except for the *design disposition* that they possess, the attitude of looking for opportunities for design within everyday life occurrences. The chapter will then demonstrate how focusing on researchers/designers experiencing urban life, instead of just users, allows the emerges of not only the meanings which are found within, and attributed to, the urban experiences, but also the ways in which these meanings can relate to design, and new meanings are generated through the design and development of new computational technologies.

Chapter Four will then outline the phenomenologically inspired methodology used for approaching different urban experiences, and continue addressing the second research sub-question, by demonstrating how the creation of a novel and actionable categorisation of urban life can be empirically achieved. The chapter will, in particular, present the planning of a series of engagements performed by researchers and designers with a variety of urban experiences: *public waiting* in London, *being in transitional spaces* in Orange County, *visiting public toilets* in Amsterdam and *commuting* by the London Underground. These engagements were practically conducted over the course of three workshops and a long-term design project, where researchers and designers were involved in both *inquiry* (through *fieldwork* and *discussion*) and *exploration* (through *design experimentation* and *design critique*) activities. The chapter will also describe how these activities and

the data collected (workshop transcripts, photographic documentation and research diary) have been analysed, through a reflexive approach and a hermeneutic phenomenological framework of analysis (Heidegger 1962; Creswell 1998), aimed at capturing the essence of the urban experiences and how this analysis has led to an actionable categorisation of urban life.

Chapter Five will present the analysis of the empirical data, focusing on how urban life has been understood throughout the *fieldwork* and *discussion* activities, and how it has been addressed during the *design experimentation* and *design critique* exercises. In particular, urban life will be described in terms of a series of ongoing tensions that need to be constantly negotiated and dealt with by people living the urban experiences, and which emerge from how the experiences are being perceived and *understood* (in terms of rules and affordances), how *actions* and *interactions* arise as a consequence of this understanding and affect it in return, and how *dispositions* arise and are manifested toward the experience. The chapter will then present a series of designs produced by researchers/designers within the empirical study, and analyse them in terms of how they address the tensions proper to urban life. This represents a foundation for the introduction of a novel categorisation of urban life, able to aid the design of new everyday computational technologies.

Such categorisation will then be presented by bringing the analysis to a higher level, focusing on the hermeneutic cycle created between the phases of *inquiry* and *exploration*, which has allowed the determination of a stronger link between the description of urban life and the design of new computational technologies that target it. The tensions proper to urban life will be then re-conceptualised in terms of sites for designs (*awareness*, *engagement* and *legitimisation*) that can be approached by researchers and designers in different ways, depending on the potential technologies have to *integrate with*, *mirror* or *alter* aspects of urban life. This represents the categorisation of urban life that has emerged from the empirical study conducted as part of this dissertation.

Chapter Six will then discuss this categorisation of urban life and address it in terms of "in-between-ness", which identifies urban instances that fall outside of the contexts of being at home and being at work, and are characterised by a series of tensions, some of which can be addressed by design in the ways that have been outlined in Chapter Five. In order to place in-between-ness in respect to the work already conducted within urban computing, the chapter will then show how both the designs produced within the empirical study and many projects and technologies emerged within urban computing, and introduced in Chapter Two, can be discussed in dialogue with each other and in the context of in-between-ness, in relation to its sites for designs and design approaches.

The chapter will also show the potential that in-between-ness has to advance the ways in which urban life has been approached and categorised so far within urban computing, both from a techno-centric and a socio-oriented perspective. In particular, the chapter will demonstrate how in-between-ness is able to reflect the complexity of urban life, reduce such complexity in a way to provide insights to the design process, and leave space for a variety of design approaches that address different aspects of urban life. In sum, in-between-ness is presented as an effort directed to further establishing the emerging field of urban computing, and creating a broader dialogue among its - often fragmented and seemingly antithetical - projects and perspectives.

Chapter Seven concludes the dissertation, by summarising the main points covered throughout it, providing an outline of its main contributions and suggesting opportunities for further research on the topic.

# Chapter Two – Literature Review

## 2.1 Introduction

This chapter will review the existing body of literature that has focused on the design of new computational technologies for everyday life. This review will define the field which this dissertation contributes to and seeks to expand, placed at the intersection of different disciplines and perspectives, and reflecting the increasing interdisciplinary nature of technology design research. In particular, this dissertation will be positioned as a contribution to the emergent field of urban computing, utilising a social computing perspective to approach the design of new everyday computational technologies.

This chapter, by means of this literature review, will serve to answer the first sub-question introduced in the previous chapter, Chapter One:

*How has urban life been approached so far for the purpose of designing new everyday computational technologies, and how might such approach be improved?*

In order to answer this sub-question, the chapter will begin by defining the kind of technologies that are addressed by this dissertation, ubiquitous and everyday computational technologies, created by researchers working in the field of technology design. Second, the chapter will demonstrate how the majority of research that focuses on the improvement of everyday computational technologies is techno-centric, that is, research which is focused on the technical challenges that implementation of new systems present, and does not take as its focus social issues related to the design and adoption of such systems. Third, the review will present and discuss an alternative perspective, the one of

"social computing", which has contributed to increase the sensitivity towards social issues within the research community interested in everyday computational technologies. Fourth, the chapter will discuss how a qualitative study of everyday life can benefit the design of new computational technologies, through the introduction of categories of experience. The debate about how categorisation both reduces the complexity of human experience and provides opportunities for design will be outlined, in support of the ultimately beneficial role of categorisation. Fifth, this chapter will show how mainly two categories of everyday life – home and work - have been addressed within the research community interested in everyday computing, both from a techno-centric and a social computing perspective. Once again, social computing will be presented as having increased the awareness of social issues, related to the description of what work and home experiences consist of. Urban life will then be introduced as a rather new topic of enquiry, which has given rise to the emerging field of urban computing. The review and analysis of how urban life has been so far approached for the purpose of designing new technologies will then help to answer the sub question presented above. Both the techno-centric and the social computing perspectives will be considered, in the attempt to outline a space for the contribution of this dissertation. Specifically, the chapter will conclude by discussing the ways in which the current categorisation of the urban experience leaves space for improvements.

## 2.2 Everyware in the World

The main research question of this study, presented in Chapter One, refers to the goal of improving the design of everyday computational technologies. It is important then to specify the kind of technologies considered and addressed within this dissertation, especially because these have been addressed in various and heterogeneous ways within the research community. First, a brief historical overview of the increasing diffusion of computation in everyday life will be presented, together with

the ways in which it has influenced technology-related research, and has presented new challenges to it. Second, the heterogeneity of terms that have been assigned to the diffusion of computation will be outlined, in relation to the correspondent fragmentation of the research efforts that address it. Last, it will be stated that the set of technologies targeted by this research will be alternatively called ubiquitous or everyday computational technologies (or computing), without a specific reference to the research trends that these terms address.

It was 1991 when a researcher from Xerox Park - Mark Weiser - first noted how the future of technological progress might have involved computational technologies becoming increasingly smaller, being integrated in a multitude of everyday objects and used in a variety of occasions, and becoming silently incorporated in the environment in which people act (Weiser 1991). This vision has taken hold in the research community, to the extent that ubiquitous computing has become a rather established and interdisciplinary field, aimed at understanding the shape and direction of technological advancements. Since 1991, computation has been progressively incorporated into a large number of artefacts; new powerful devices such as mobile phones and laptops have been introduced in the market, and the Internet has been enriched with new applications that cover a wide range of functionalities. Computers have become more and more adopted not only for work purposes, but also for leisure and communication. Even during the fast commercial rise and fall of the Internet-based business across the 20$^{th}$ and 21$^{st}$ century, technological progress has not stopped its course and has showed its power to push the diffusion and adoption of computation, around which new business models can be generated.

Since the beginning of the 21$^{st}$ century, socialisation has been increasingly fostered and mediated by computation, through multiplayer online games (MOOs and MUDs), social network websites allowing people to meet over distance (Friendster, MySpace and the recently successful Facebook), collaborative resource gathering applications (open source, wikis, peer-to-peer), and instant messaging and voice-over-IP (AIM,

Skype). Computational artefacts and systems have indeed affected human sociality and suggested a new model of interaction, compared to the one offered by traditional mass media. For instance, social software is being described in Wikipedia (which is, itself, an example of such software) as a "type of software that seem to facilitate 'bottom-up' community development, in which membership is voluntary, reputations are earned by winning the trust of other members, and the community's mission and governance are defined by the community's members themselves"[1]. An increasing body of research within the social sciences during the 1980s and 1990s has studied these phenomena, exploring the concept of virtuality, cyberspace and online identity representation (Rheingold 2000; Turkle 1995). However, with time human relations have been increasingly mediated not only at a distance and through desktop computers, but also through mobile devices and in cases of users in physical proximity interacting with each other through computational technologies. This phenomenon has expanded the concept of virtuality (e.g. Pica 2006) and has been addressed also in terms of mixed-reality (Milgram and Kishino 1994), indicating the increasing overlap between the "real" and the "virtual" dimensions of technological interactions.

Not only social relations have been affected by the increasing ubiquitousness of computation, but also people's relationship with the environment they traverse and interact with. The concept of ambient intelligence mostly refers to the computation embedded in house appliances, which allows these to become proactive, communicate with each other and coordinate their activities in order to turn the household into a self-organising system of efficiency. The idea of locative, or location-based, media[2], relates, instead, to computational systems which mediate people's knowledge of what is available in the environment (in terms, for instance, of shops and restaurants), or allow people to leave digital signs in the environment, for various purposes (for instance tagging places with personal pictures).

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[1] Retrieved from: http://en.wikipedia.org/wiki/Social_software, February 2009
[2] See the special issue of the Leonardo Electronic Almanac on Locative Media, Vol 14 No 3 July 2006

Changes in the role that computation plays in people's everyday life, progress in the miniaturisation and powerfulness of computation, and the introduction of new networking techniques and technologies have also provided new challenges and opportunities for designers and researchers interested in developing new systems. Weiser's ubiquitous computing is now not just a vision or a dream, but is increasingly becoming part of an everyday reality that needs to be studied and analysed in order for designers and researchers to effectively take part and contribute to this process. Various studies have investigated the "escape" of computers from the house and the office to the outside world, to the streets, cafes and buses; it has become more and more important to understand what it means to use computational devices in mobile settings, and what mobility itself means (Kakihara 2003; Anderson and De Paula 2006; Brewer 2009). In parallel to the concept of ubiquitous computing, other terminology referring to a similar phenomenon were introduced, including tangible computing (Ishii and Ullmer 1997), pervasive computing (Hansmann et al.), nomadic computing (Bagrodia et al. 1995), invisible computing (Norman 1999), everyday computing (Abowd and Mynatt 2000) and everyware (Greenfield 2006). This wide range of terminologies reflects the complexity of the research field, and highlights aspects of it that researchers believed were worth focusing on (such as the integration of computation with physical objects in the case of tangible computing).

The variety of names attributed to ubiquitous computing mirrors the multiplicity of perspectives, approaches, methodologies and disciplines used to explore the topic. Within this dissertation, the terms ubiquitous and everyday computational technologies (or computing) will be used not to refer to a specific subset of research within the field, among the ones previously mentioned, but to the general increasing pervasiveness of computation, which is affecting people's everyday life in multiple ways.

## 2.3 A Techno-centric View of Design

This section will present the main ways in which the design of new ubiquitous technologies has been approached so far, demonstrating that the main focus has been the technical challenges of their implementation. Indeed, despite the fact that Weiser's original vision of ubiquitous computing attempted to maintain a balance between technology-oriented and social-oriented inquiries, the concept nowadays holds a rather strong techno-centric connotation, especially because it has been mainly approached by disciplines such as engineering, computer science and the cognitive-oriented branch of HCI (Human-Computer Interaction).

Technical challenges for the design of everyday computing involve the planning and implementation of systems where computation is miniaturised to be embedded into small devices or in the environment, is networked in a way that becomes easy to configure and adaptive to environmental changes, and is intelligent, responsive and easy to interact with. Conferences dedicated to the topic (such as UbiComp and Pervasive) usually have a quite high percentage of papers focused on the implementation of ubiquitous systems or on a quantitative, scientific-oriented evaluation of their performance; many European funded projects in the domain currently have an army of engineers and computer scientists researching the next generation of self figuring wireless networks[3]. Although such enquiries are necessary to bring forward the technological progress required by the ubiquitous computing vision, what is sometimes overlooked is the acknowledgement that social issues related to the use and adoption of new everyday computational technologies are important and that it would be beneficial to account for them even within technology-oriented research projects. The risk of this short-sighted view is a rather deterministic approach to ubiquitous computing that excessively exalts the technological factor and its potential, and loses a critical view of what new technologies are for, whether they are really useful and necessary, and their potential of

[3] See BIONETS, CASCADE, DAIDALOS and many more.

integrating with existing social dynamics and the everyday life of their users. Kakihara (2003) notes how within research on ubiquitous computing:

> The primal concerns are directed towards design and/or implementation of technical artefacts and complex systems based on these, rather than their social impacts on human lives. [...] It is rather surprising that in spite of the broad social implication of the original ideas of ubiquitous computing, there has been little collaboration between such technical people and social scientists such as economists, sociologists, and management science researchers (*ibidem*, p.26).

Especially when it comes to researching the design process that leads to the development of new everyday computational technologies, it is easy to only concentrate efforts on the technical feasibility and potential of the technology being designed. The problem lies in the fact that for ubiquitous computing, more than for desktop-bound technologies, the boundaries of design in terms of research effort become blurred, and the interdisciplinary nature of design itself more distinctive, so that it is extremely important to consider both social and technical aspects while designing new everyday computational technologies. Whether or not design itself should be considered as a scientific discipline, a humanistic one or one on its own represents an ongoing debate within the research community involved with the topic (Simon 1969; Archer 1981; Cross 2001). Without engaging in an ontological discussion on the nature of the design discipline, it is, however, evident that researchers and practitioners interested in the design of ubiquitous computing are becoming slowly but increasingly aware of the importance of considering and addressing the social side of everyday computing design.

This process has been facilitated by the evolution of social computing, which includes a series of approaches to the study of technology that have contributed not only to improve the understanding of how people use technologies and how these affect the everyday life of users, but also

of how designers can conduct a more socially-aware and socially-sensible design process. This dissertation will indeed utilise a social computing perspective, aimed at increasing the sensibility of researchers and designers toward issues that concern the potential integration of future technologies with the everyday life of people.

## 2.4 The Approach(es) of Social Computing

In order to better understand the contribution of social computing to the design of new everyday computational technologies, it is important to introduce and categorise the different approaches which have highlighted the social side of research on technology design. Dourish (2001) describes social computing as "the application of sociological understanding to the design of interactive systems" (*ibidem*, p.55); while this account mainly addresses the interconnection between sociological and technological issues, this dissertation will approach the concept of social computing in broader terms, as an umbrella-term under which a variety of approaches and schools of thought can fall in.

Below will follow a categorisation of the different approaches which this dissertation considers as being part of social computing. It includes studies that bring to the foreground social concerns, and which have either focused on *foundational* issues relating to the design of ubiquitous computing, provided *inspiration* for the design of new computational technologies, or *practically* contributed to providing knowledge about the design process itself. While certain social science studies conducted independently from the issues of designing new technologies have become highly inspirational for designers and researchers interested in everyday computing, few authors have specifically attempted to introduce and discuss new theoretical foundations that concern the relatively new field of ubiquitous computing design. Finally, other researchers have engaged in design processes and provided new – mostly interdisciplinary – methodological tools for conducting design,

together with inspirations for future commercial applications. The following sections will address these approaches more in depth.

### 2.4.1 Providing Theoretical Foundations to Everyday Computing

From a *foundational* perspective, Dourish (2001) introduces the phenomenology-inspired concept of "embodied interactions", stressing the need for research into everyday computing to focus on the situated aspect of human actions and interactions. Moving away from an abstract and cognitive-based way of considering users when planning new designs, Dourish calls for the need to acknowledge the fact that users' actions are tight to the real-world constraints of the time and place in which they happen. Drawing mainly from architecture, McCullough (2004) contributes to this argument by stressing how designers of ubiquitous computing need to consider the fact that place matters when planning new technological interventions; the concept of "digital ground" specifically refers to the fact that new pervasive and digital technologies need to be grounded in space and time, and be differentiated according to different use scenarios, instead of being considered as potentially used indistinguishably anytime and anywhere. Greenfield (2006) introduces the term "everyware" not only to address and group all kinds of ubiquitous and pervasive technologies, but also to consider and reflect on various social, ethical and logistical issues that concern their development and commercialisation. Such works have contributed to make researchers and designers realise that there was much more to explore and research than pure technological progress within the ubiquitous computing vision, and that a much larger range of factors and issues needed to be taken into account while designing and introducing new technologies into the world.

### 2.4.2 Providing Inspiration for the Design of Everyday Computing

From an *inspirational* perspective, studies that have affected designers and researchers interested in ubiquitous computing include the ones that focused on reaching an *understanding of people's actual use of technological artefacts.* Bijker et al. (1987) for instance acknowledge how the design of computational technologies implies that designers project a particular view of reality within their designs, but stress how such view is then creatively reinterpreted by people, who adopt and use computational technologies according to their everyday needs. The importance of technology adoption has then been stressed by studies such as the one conducted by Silverstone and Haddon (1996) on domestication, indicating the complex and active process of integrating technologies within domestic everyday practices. Through what they call the social shaping of technologies McKenzie and Wajcman (1985) challenge technological determinism, by reversing the question of how technology shapes society into the question of how society shapes technology. Considerations on the social changes provoked by an increasing use of mobile technologies led Rheingold (2002) to introduce the concept of smart mobs, to describe how the use of mobile technologies can support processes of self-organising social behaviours. The field of computer-supported cooperative work (CSCW; Suchman 1987) employs social science methods of enquiry in order to better understand the contextual aspects of work practices, and how the use of information systems varies within such practices. While these bodies of research mostly do not intend to contribute to the design process, or specifically to research on everyday computing, they have been increasingly acknowledged by designers, and, accordingly, they have influenced their work and can, consequently, be considered as part of the trend of social computing.

### 2.4.3 Providing Practical Guidelines for the Design of Everyday Computing

Studies that have more directly addressed the issue of designing specific technologies, or designing technologies for specific contexts and environments have been much more numerous and also varied. These works have contributed to adding knowledge about the world that can be used by researchers and designers to plan more sensible technologies for a certain context or population, introducing methodologies that can be used during the design process or in terms of evaluation and discussing practical design ideas that can be turned into commercial, human-centred applications and services. For instance, researchers and designers have used ethnography, ethnomethodology and conversation analysis to understand a wide range of everyday contexts of interaction with the aim of *producing guidelines for future designs*. According to Hammings and Crabtree, "the appeal of ethnography to design follows from the recognition by designers that the development of interactive technologies increasingly relies upon an appreciation of the social circumstances in which systems are deployed and used" (Hemmings and Crabtree 2002, p.122). Over the past few years multinational hi-tech corporations such as Intel, Microsoft and Hewelett Packard have hired social scientists to conduct ethnographic studies aimed at studying certain cultural contexts or social groups in order to provide new knowledge to designers. Traditional social science methodologies have been reinterpreted and creatively changed to adapt to the scope and timescale of design (e.g. Kjeldskov and Graham 2003).

Concerning design methodologies, designers and researchers have attempted to *improve the design process* by involving, directly or indirectly, future users in the process itself. For instance, user-centred design (UCD; Norman and Draper 1986) has introduced, over the past two decades, various techniques for increasing the understanding of future users and what are their needs that might be addressed by computational technologies. Even more extremely, participatory design (PD; Schuler and Namioka 1993) claims that users should become

designers themselves and contribute to the decision-making process that leads to the introduction of new technologies. The design methodology that uses "cultural probes" to inspire design considerations and critiques is also based on the idea that future users should be involved at an early stage of the design process (Gaver, Dunne, and Pacenti 1999); in this case, designers introduce in the real-world low-fi, often paper-based, prototypes that contain a provocative message and that are being left within a specific community of users, to be used and reflected upon over a certain period of time. When using cultural probes designers can obtain a view of how people react to "unexpected" forms of computation within an everyday settings (Bell, Blythe, and Sengers 2005). Such approaches represent an alternative view of the traditional marketing research that companies use to plan the design and commercialisation of new products, which usually does not give a voice to future users or rarely takes into account the complexity of their needs and desires.

Still in the context of the design process, social computing has contributed to the *dialogue on evaluation*, by employing social science methods to identify limitations and benefits of the technologies implemented, and to inform further iterations of the design. Qualitative studies have, for instance, stressed the importance of observing technology usage, and understanding the nuances of what it means to integrate a new technology within existing social practices (Monk and Gilbert 1995; Kjeldskov and Graham 2003).

This overview of social computing and its main approaches has served to show how such perspective has increased the sensitivity towards socially-relevant issues, which are increasingly acknowledged not only within technology design research in general, but also within the research community involved with the design of ubiquitous computational technologies in particular. However, it is important to also acknowledge the numerous challenges that social computing has to face. One of these challenges concerns the interdisciplinary nature of social computing, and the difficulty of generating knowledge that is both rich and descriptive in terms of everyday human dynamics, and which can, at the same time, be

relevant to guide the work of designers. To improve this process, it can be beneficial to create categories of human experiences that are able to reduce the complexity of everyday life, identify its nuances and highlight the aspects that can be addressed by new computational technologies.

## 2.5 The Importance of Categorisation for Technology Design

In order to begin exploring how everyday life has been approached within design-oriented research, it is then important to now discuss the role that categorisation plays within such research, especially because the issue has been the subject of various debates.

The reductive use of categories for the scope of design was, for instance, pointed out by Suchman (1993) in relation to the work of Winograd and Flores (1986). Suchman specifically challenges the approach used by Winograd and Flores for categorising human action, speech act theory, and the political and ideological implications that the use of categorisation holds, in this case reflected within the system Winograd and Flores consider, the COORDINATOR. According to Suchman, categories, when inscribed into designs, become a way for designers to impose a specific social order and structure. Winograd's answer to this critique (Winograd 1994) stirred a debate to which many researchers in the CSCW field have contributed (e.g. Orlikowski 1995; Randall 1995; Grudin and Grinter 1995). Both Orlikowski and Grudin & Grinter suggest that Suchman and Winograd adopt a different perspective on what categories are used or useful for. Grudin and Grinter claim that the debate can be brought back to a historical ethnography versus design debate, where the two hold opposite interpretations of reality, and in which the first usually maintains a critical view of technology interventions, while the second tends to highlight the positive aspects of such interventions. In a related argumentation, Orlikowski suggests that categories are both disabling, "in that their use restricts activity that does

not conform to the types recognized in the category system", and enabling, as "in their ordering and organizing of experience, categories [...] facilitate social action and shared meaning"; in the context of this debate, while Suchman focuses on the disabling aspect of categorisation, Winograd and Flores stress its enabling potential. Winograd himself (1994) gives a quite practical rational for creating categories of human action to aid the design of new systems:

> Suchman asks rhetorically "Why do computer scientists go about making up all these typologies of interaction?" The answer is relatively simple -- computer programs that we know how to construct can only work with fully - rationalized typologies (be they bits and bytes or knowledge bases). It is a bit like asking "Why do civil engineers go about making up all these typologies of construction materials and methods?" There may be much more to understanding architecture or homelessness, but one is bound to work with the materials at hand (*ibidem*, p.193).

While supporting this design-oriented perspective, the use of categorisation within this dissertation also differs from the one adopted by Winograd and Flores, which is directed toward the generation of rather specific categories of human action that can be directly inscribed into the design of the system, such as "request", "order" and "promise". Instead, this dissertation works toward a categorisation of urban life that is broader, less specific, leaving space for a wide variety of actions and interactions, and which is meant to constitute a tool for inspiration instead of providing guidelines for one of few designs. Categories of this kinds have already been introduced within social computing. For instance, the one of "home" is indeed a broad category, which if considered in abstract and general terms can lead to rather unspecific designs that fail to take into account the complexity of the home experience, but which can also be described in ways that both reflect its richness and become useful for the design of multiple computational technologies. Considering the home experience can then lead to studies that highlight the nuances

of it, such as the one conducted by Bell et al. (2005); the authors do not question the importance of seeing the domestic sphere as a useful category for the design of ubiquitous computing, but point out that home experience itself is varied and socially and culturally specific, and therefore needs to be approached as such. The role of the social computing studies previously described is indeed to show that the categorisation of human everyday experiences is a complex task that requires an interdisciplinary approach, together with the sensitivity of acknowledging both its social aspects and its relevance for technology design.

Continuing this tradition, this dissertation suggests that there is more to add and discover within everyday life, compared to what has been explored so far. In order to understand how to contribute to the generation of further knowledge in this direction, it is important at this stage to review how everyday experiences have been categorised for the purpose of designing new ubiquitous computing, both from a techno-centric and from a social computing perspective, and what is left out from existing research on the topic.

## 2.6 The Experiences of Being at Work and Being at Home

The most often considered categories of experiences appear to be the ones that are commonly understood and addressed by people in the very context of everyday life. People indeed often say that they are "going to work", or "coming back home", so that work and home end up representing rather commonly understood and meaningful categories of experiences. Home and work have been so far highly considered, not only by studies directed at improving technologies in general, but also by the ones interested in ubiquitous computational technologies.

### 2.6.1 Being at Work

How technologies are used in the context of work and how their designs can be improved have been topics widely explored within the research community, perhaps because the experience of work has been one of the first ones to be highly affected (especially in terms of productivity) by both the introduction and the increasing ubiquitous-ness of computational systems. Among the research fields falling into social computing, CSCW has been focusing since the late 1980s on the understanding of workplace dynamics, with the aim of improving the design of technologies targeted to work-related contexts. Chalmers (2004) notes how, compared to more techno-centric approaches concerning technological developments for the workplace:

> CSCW focuses on intersubjective aspects of context, constructed in and through the dynamic of each individual's social interaction, and defends against reductionism and objectification. In contrast, context–aware and ubiquitous computing often concentrate on computational representations of context that span and combine many senses and media- rather than the social construction of context in interaction" (*ibidem*, p.223).

One of the ways in which CSCW studies the work environment is by considering the situated aspect of work dynamics (Suchman 1987) and addressing its specificities and nuances.

The evolution of such work dynamics over the years, supported by the ubiquitous-ness of computation, has contributed to the emergence of phenomena such as "mobile work" or "work at a distance", which contribute to change the conception of traditional work and distribute it in space and time, together with making it become an experience that intertwines with other ones such as "being at home" or "travelling by train". Mobile work has been often approached from a techno-centric perspective, by addressing the need to access data anytime, anywhere

(Kleinrock 1996), which reflects the technological opportunity for people to be connected at any time and in any place to a variety of personal, shared and publicly available digital resources. In contrast with this approach which sometimes overlooks the variety of mobile work experiences and the contexts where these take place, a range of studies within information systems (IS) have addressed mobile work from a social computing perspective, attempting to unpack its nuances. For instance, Sørensen and Pica (2005) show how police work in the UK is characterised by different rhythms of interaction, where virtual and situated interactions alternate and are mediated by different kinds of mobile technologies. Considering these work-related interactions deeply affects the design of new ubiquitous technologies for the police, and makes these technologies suited for that particular work context. Additionally, Kakihara and Sørensen (2004) claim that the concept of mobility is far too generic to describe mobile work, and identified three different types of mobilities workers can engage with: locational, which has to do with geographical location, operational, related to work flexibility and interactional, addressing the fluidity of work-related human interactions. Social computing has then shown how ubiquitous technologies can support mobile work, only if designers consider first what it means to be a mobile worker.

### 2.6.2 Being at Home

Apart from work, research into everyday computing has often approached the home sphere as an exemplary venue for the deployment of new computational technologies. The home, however, is still considered in various instances as an abstract environment where activities can be potentially improved by increasing the computational power of the technologies already inhabiting it, and networking those technologies in order to make them become smart and proactive (e.g. Microsoft Kitchen of the Future, Kapoor 2004, and MIT Media Lab's CounterActive, Ju et al. 2001). However, social computing studies have

attempted to unpack, especially by using qualitative methods of analysis, the underlying dynamics of the home environment, and to suggest how new technologies could better fit with the specificities of the different types of homes. For instance, Bell et al. (2005) highlight how the "US home" presents several differences compared to the "UK home" and the "Asian home". The authors suggest that the efficiency-driven approach to the design of ubiquitous computing should be reconsidered in light of a much richer variety of "home experiences" that include play and other kinds of social relations. Dunne and Raby (2002), on the other hand, have created a series of "computational furniture" - named placebo objects – which looked familiar but presented unusual behaviours. For instance, a GPS-enabled table would display the words "I AM LOST" whenever it lost its satellite connection. After being placed in households and used by its inhabitants the researchers investigated what narratives were produced by people around these objects. This project was meant to challenge the everyday household dynamics and the commonly understood relationship between people and computational objects present in that environment.

Being at work (or being a worker) and being at home have been so far extensively considered within IS and social computing, and the fact that they constitute the main human experiences approached within research on ubiquitous computing suggests that they are considered to be highly important aspects of everyday life, worth considering for design purposes. While it is indisputable that people spend much of their time between home and work, there are a wide range of everyday places and situations that do not fall in these categories but still constitute an important part of people's daily life. In addition to this, the phenomenon of mobile work shows how the boundaries between various everyday experiences are increasingly becoming blurred and not constrained in time and space.

## 2.7 Being in the Urban Environment: the Rise of Urban Computing

The previous sections of this chapter have introduced and discussed one of the design challenges posed to research focused on the development of new everyday computational technologies: the understanding of everyday human experiences. A review of existing literature on the topic has shown how mainly two categories of experiences have been widely explored: home and work. Both of these categories have been approached mostly using a techno-centric perspective, even though studies coming from a social computing perspective have contributed to increase the sensibility of the research community towards the need of deeply engage with and address the nuances of what it means to work and be at home.

The literature review will now focus on a third, broader category of everyday experiences that has recently been considered, the one of inhabiting and traversing an urban environment. In particular, the sub-question introduced at the beginning of the chapter will be here specifically addressed:

*How has urban life been approached so far for the purpose of designing new everyday computational technologies, and how might such approach be improved?*

In attempt to answer this question, the ways in which both the techno-centric and the social computing perspectives have tackled the urban experience will be presented, together with efforts directed at categorising such experiences. This will serve to define a space for this dissertation's contribution to the topic.

From a humanistic perspective, the importance of considering the urban sphere as the focus of research enquiries comes perhaps from the evidence, stated by Borja and Castell (1997), that "'humanity is heading toward a world in which urbanization is the rule [...]. We are witnessing

the fastest and most wide-ranging urbanization process in history. In just few years most of the world population will be urban, and the vast majority of that urban population will be living in cities" (*ibidem*, p.1). From a more technology and design-oriented perspective, not only design projects, but also workshops and journal special issues have recently proliferated on the topic of urban computing. In their editors' introduction for the IEEE Pervasive special issue on Urban Computing, Kindberg et al. (2007) claim that one of the motivations for conducting research on the topic lies in the fact that a wide number of ubiquitous computational technologies are already widely used within urban environments, and an even larger number will be introduced over the next years. The authors state that:

> Despite the complexities, urban computing is, in a limited sense, already a mass phenomenon. Roughly half the world's population lives in urban environments. In addition to PDAs and laptops, most people have mobile phones, and most mobile phones have capabilities beyond simple voice calls. Connectivity is extensive. Mobile phones are increasingly equipped with Bluetooth for short-range communication, in addition to long-range cellular data connections. Wi-Fi networks are also commonplace (*ibidem*, p.18).

Urban environments are then considered as highly populated places already filled with all kinds of technologies, opening up a space for further studies and designs, where the heterogeneity of people and the activities they perform, together with the increasingly difficult and interdisciplinary task of designing new everyday computing provide new challenges for the research community.

### 2.7.1 The City as Homogeneous and Void: Data Access Anytime, Anywhere

From a techno-centric perspective, the city has been often considered as

a rather *homogeneous* environment, an indistinguishable and *void* social context that has the potential to be filled by new technologies that provide access anytime, anywhere. The opportunity for people to access digital information and content whenever and wherever they need it (Hansmann et al. 2001) presents multiple applications, spanning from mobile work, as previously mentioned, to mobile entertainment, for which mobile phones and PDAs allow now the functionalities of mobile music players, networked game consoles and Internet terminals. The problematic aspect of anytime, anywhere lies in the lack of consideration of the contextual characteristics (e.g. time, location, and social setting) related to the use of technologies. It also points to a limited set of ubiquitous systems that mainly extend current technologies and often do not take into account new opportunities for technological engagement provided by the richness of everyday life. The concept of anytime, anywhere can be reasonably applied to the technological side of everyday computing, which allows connectivity that is independent from time, place, and social context. If applied to the actual use of ubiquitous computing, anytime, anywhere seems to replicate the person-desk-computer approach in different contexts, without considering the variety of human experiences and the complexity of situated human-computer interactions.

### 2.7.2 Urban Mobility as Problematic

Allowing data access anytime, anywhere can be also seen as an attempt by urban computing to overcome one of the problems that being in a urban environment leads to: the disconnection from a stable work situation. Dourish et al. (2007) notes that disconnection, together with dislocation and disruption, represent rather common ways in which urban experiences are approached by researchers interested in ubiquitous computing, as a problem to be addressed by technological progress. In this context, the problem of dislocation often arises when traversing and attempting to find resources in an unfamiliar environment, and is

approached by the techno-centric side of urban computing by developing, for instance, way-finding applications and interactive guides, aimed at aiding people to find their way through that unfamiliar environment (e.g. Cheverst et al. 2000). Such applications introduce a specific link to the context where technologies are being used, and render such context as important to consider when designing new computational systems, but still present an efficiency-driven perspective towards the role that these systems play in everyday life. Belonging to this approach are also locative media that allow people to retrieve context-relevant information about the places visited, such as shops catalogues or offers, restaurants nearby and so on (see the Yelp application for the iPhone). The problem of disruption is also very context-related, and is indeed created by technologies themselves, when they cannot properly adapt to such context and end up causing "a sense of rupture between the technology and the setting in which it is deployed" (Dourish, Anderson, and Nafus 2007). Such problem is often addressed by increasing the ability of technologies to adapt to the context and be brought to the background instead of to the foreground in situations where user's attention needs to be focused elsewhere, so to decrease the interruptions caused by technologies (see Ho and Intille 2005).

### 2.7.3 From Homogeneous to Diverse: a Social Computing Perspective

So far it has been discussed how urban life has been mostly approached by urban computing in terms of traversing a *homogeneous* environment, a *void* to be filled by providing data access anytime, anywhere, or as causing *problems* that can be partially overcome by a rather efficiency-driven set of new computational systems. However, a social computing sensitivity is starting to affect the way the urban experience is approached and understood. Looking at the experience in terms of mobility, Dourish et al. (2007) suggest that adopting a cultural perspective towards urban life leads researchers and designers to consider mobility not just in terms of moving from a place to the next,

but also in terms of the diversity that the experience of "being mobile" embeds. Different groups of people, in different places, experience mobility in different ways, and such diversity needs to be unpacked and addressed by the design of ubiquitous computing. For instance, the studies previously mentioned on mobile workers and policemen (Kakihara and Sørensen 2004; Sørensen and Pica 2005) highlight the experience of urban mobility as lived by a specific population. Also, Brewer et al. (2008) stress the importance of considering the *aesthetic* aspects of travelling through the urban environment, relating to the creative, and subtle, performative and relational ways in which people approach their everyday journeys through the city. This view allows for an expansion of the functional approach to urban mobility which aims at improving the efficiency of travelling from one place to the next, and enriches the understanding of urban life in terms of a diversified set of experiences.

In other cases specific aspects of urban life have been taken into account within urban computing, sometimes as an inspiration for designing new computational systems that not only integrate with urban life, but also have the potential to change it. For instance, the high density of urban population has been considered as an *opportunity for socialisation* among co-located people. Eagle and Pentland (2005) have explored the idea of serendipitous match-matching, by developing a system called Serendipity which alerts mobile phone users whenever they are in proximity of someone sharing particular, self-declared, interests. A similar researcher project, DigiDress (Persson, Blom, and Jung 2005) has become a commercial application called Nokia Sensor, allowing proximal communication and match-making. Instead of relying on the explicit declaration of personal interests, other systems such as tunA (Bassoli, Moore, and Agamanolis 2006) attempt to find more subtle ways to connect people in proximity, in this case using music. Finding other people with similar tastes in music is thought of as an opportunity for creating social links and new urban sub-communities.

Specific urban experiences that have been identified through studies that do not directly relate to technology design research (conducted, for

instance, within social psychology and geography) have inspired the design of new computational systems. In relation to finding new opportunities for socialisation, for instance, Milgram's concept of the "familiar stranger" (Milgram 1977) has been adopted by researchers at Intel to reflect on serendipitous encounters within the city. The phenomenon of the familiar stranger happens when people share part of their daily routines with strangers and therefore see them regularly, without interacting with them except in exceptional occasions. By conducting further research on the topic, Paulos and Goodman have developed a mobile technology, Jabberwocky, aimed at increasing the awareness of encounters with familiar strangers (Paulos and Goodman 2004).

*Opportunities for playful and creative interactions* have also been identified within urban life, and have inspired new design projects. The urban environment has been, for instance, considered as an interface for mixed-reality games, such as "Can You See Me Now?" (Benford, Magerkurth, and Ljungstrand 2005; Crabtree et al. 2006) and "Uncle Roy All Around You" (Benford et al. 2004), where online players interact with players moving throughout the city. The idea of turning the urban environment into an interface has been exploited also by other research projects; for instance Gaye et al. (2003) have explored, by implementing and testing a system called Sonic City, the idea that environmental sounds could be collected by people traversing the city, and turned into music in real time. The study conducted by Bull (2000) on the use of the personal stereo within urban environments represents an inspirational aspect for the design of the Sonic City system. Instead of focusing on collective experiences, as the previously mentioned projects did, in this case urban life is approached in terms of individuality and personal experiences. Despite such difference, all these projects more or less explicitly acknowledge the aesthetic component of urban mobility that was previously mentioned in connection with the study Brewer et al. (2008) conducted.

In attempt to unpack and address specific instances of the urban

experience and highlight its diversity, social computing researchers have also focused on *socio-cultural differences* not only between cities, but also within the same city. For instance, Nisi et al. (2006) considered the city as a potential repository of video-recorded non-fiction stories created by disadvantaged and historical communities, and developed a system called "The Media Portrait of the Liberties". The system allows the access of such stories through handheld devices in specific locations of the neighbourhood of Dublin where they were created and to which they relate to. In order to generate multiple versions of the system the technology used will remain the same, while the content generated and accessed through it has to be adapted to the socio-cultural specificities of the neighbourhood where it is installed, through a grassroots process of collecting stories from locals. A number of tourism-oriented (e.g. REXplorer, Ballagas, Kuntze, and Walz 2008) and public authoring (e.g. Urban Tapestries, Silverstone and Sujon 2005) projects also focus on highlighting the socio-cultural and historical specificities within cities.

In sum, urban computing has been so far most commonly tackled by a techno-centric view which considers the urban experience as either *homogeneous*, a *void* to be filled with data access anytime, anywhere, or as being *problematic.* Social computing has contributed to changing such view, by stressing that urban mobility is a complex and *diverse* experience that presents not only an efficiency-driven but also an *aesthetic* side, by considering *specific types* of urban experiences (such as the one of mobile workers and policemen), by addressing the *potential for socialisation* that cities present (such as encounters with familiar strangers or strangers with common interests), by considering the city in terms of *opportunities for playful and creative interactions* and finally by focusing on *socio-cultural specificities* within cities. However, social computing efforts stay mostly isolated and address specificities of the urban experience, which remains highly fragmented in conceptual terms; this, then, points to the need for further investigations. As previously stated, it can beneficial to introduce new categories of everyday experiences in order to guide the design of new computational systems, and urban computing still awaits further work toward the generation of a

broader and more holistic categorisation of urban life. The following sections will explore existing attempts to categorise urban life, especially by finding insights within sociology and cultural geography, and reinterpreting concept such as Augé's idea of non-places (Augé 1995) and Oldenburg's notion of third place (Oldenburg 1991).

### 2.7.4 Insights from the Social Sciences

Some of the work presented so far within the socio-oriented side of urban computing has been, as already mentioned, influenced by studies conducted within other disciplines, in particular sociology and cultural geography. These studies more generally focus on the human experience of place and sociality (e.g., Lefebvre 1991; Tuan 1977), and are usually not directly concerned with the design of new computational technologies. The specific instances of these studies that revolve around the understanding of urban life have, in some cases, been useful in bringing insights to urban computing, while in other cases they have been overlooked, perhaps because labelled as being too difficult to relate to design issues.

It is important to point out that cultural geography itself, which is in many instances mentioned within this dissertation and related to its results, is a very broad field in itself. Over time, the field has received the contribution of a very diverse range of influential thinkers such as Foucault and Giddens, together with researchers that have also influenced technology-related research, such as Latour and Haraway (see: Hubbard, Kitchin, and Valentine 2004). Because of the broadness and variety of the field, this dissertation is not meant to address exhaustively, but it will only analyse and focus on the concepts and authors that have already been taken into account within the urban computing tradition, together the ones that are here considered to be relevant for and related to the research and argumentation carried on by this dissertation.

Within urban computing, it was previously discussed how specific experiences of urban environments discussed within sociology and cultural geography, such as the one of familiar strangers (Milgram 1977), have constituted the starting point for urban computing investigations (Paulos and Goodman 2004). It was also mentioned how the realisation within urban computing that mobility is a complex concept, reflecting the diversity and heterogeneity of urban life (Dourish, Anderson, and Nafus 2007), was highly influenced by work conducted within cultural geography (e.g. Massey 1993 and Thrift and French 2002). Other studies highlight the fact that social places, including urban environments, have to be considered not just homogeneous but heterogeneous and dynamic, perceived in different ways by inhabitants, who act and interact with each other and the environment in various ways, and perform different tactics, as a way of responding to institutional strategies and carving a space for themselves (De Certeau 1984; Jacobs 1961). The concept of tactics was indeed introduced by De Certeau to highlight the creative process of appropriating the urban space and responding in a variety of ways to the power relation imposed by the regulating authorities. These concepts, and the ways in which they have already influenced social computing, demonstrate the potential of engaging with disciplines that have already deepened the understanding of urban life, in order to expand and further inform the field of urban computing.

However, one of the reasons why studies conducted within sociology and cultural geography have not yet been fully incorporated within urban computing might be that they are often, as previously mentioned, not directly related to the design of computational technologies, although they do consider and discuss the role that technologies play in the production of the meanings that are attributed to places. Dourish et al. (2007) note how cultural geographers tend to consider technologies (such as maps, software in general and CCTV) as tools used to impose a certain view and experience of places (Graham 2005; Thrift and French 2002). Technologies are seen as being used by authorities to impose control and power, together with a specific representation of spatiality

that influences people's interpretation of the places they inhabit and traverse. This view seems to be shared among various researchers coming from the same tradition (e.g. Scott 1998 and Massey 1993); partially, it reflects a broader social science attitude of considering technological interventions as being problematic, as discussed in the section above related to categorisation (2.5). We can then see how the techno-centric side of urban computing tends to consider technologies as able to solve problems, while sociology and cultural geography tend, on the other hand, to see their implementation as being problematic.

In the large scale, from a cultural geography perspective, technologies become part of the tension that is generated from the relationship between city inhabitants and the regulating authority, attempting to impose control and order within the urban environment. While authorities use technologies to enact their strategies of control, people often respond to such strategies, according to De Certeau (1984), by performing tactics on an everyday basis. Dourish et al. (2007) note how computational technologies themselves can be used and interpreted in a tactical sense, becoming therefore not just a tool for control, but also a "site for creative engagement with space" (*ibidem*, p.7). This reflection shows how a fruitful knowledge exchange between cultural geography and urban computing can imply not only taking into account existing conceptualisations of urban life, but also expanding their reach, and adapting them to the scope, and the challenges, of designing new computational technologies.

### 2.7.5 Towards a Categorisation of Urban Life: Third Place and Non-places

While the adoption of themes and concepts from sociology and cultural geography is increasing but it remains sporadic, there are, however, two categorisations that emerged from non technology-related inquiries into urban life that seem to have been more broadly adopted within urban computing: Oldenburg's notion of third place (Oldenburg 1991) and

Augé's conception of non-places (Augé 1995).

Third places are named this way in opposition to home and work, as an attempt to categorise experiences that go beyond the ones of being at home and being at work; this perspective resonates well with the argument of this dissertation, which attempts to expand categories of everyday life already widely explored to inform the design of new computational technologies. In Oldenburg's account third places have, however, a rather political connotation, as they are considered to be socialising places that have the potential for community building, and to foster civic involvement and democracy. If we consider third places more extensively in terms of leisure-oriented places, such as restaurant and bars, there are a number of urban computing projects that can fit within this category. For instance, O'Hara et al. (2004) have conducted fieldwork at a local bar in Bristol, UK, to plan and evaluate a socialising music jukebox, named Jukola, that people could interact with using handheld devices and public displays. Similarly addressing collective participation in the third place, researchers at the MediaLab in Helsinki have developed a system, MobiLenin, installed in a bar environment that allows people to democratically choose, using their mobile phones, music videos that are then shown on a public display (Scheible and Ojala 2005).

On the other hand, non-places mostly relate to experiences of travelling, or better, to places created to allow people to move from one place to the next, such as highways, airports and train stations. Highlighting the existence and the increasing importance of such places is necessary to understand the condition of the contemporary human being, who is embedded within a phenomenon of globalisation where high mobility becomes part of everyday life. Non-places are described as very standardised places that exist only in virtue of their relation to what Augé calls "anthropological places" (Augé 1995), compared to which they constitute a sort of antithesis. Non-places constantly refer to the places they connect to or advertise through textual media, and often imply a high level of anonymity of their inhabitants, which can become enjoyable if interpreted as carrying a certain degree of freedom and the opportunity

for role-playing. However, non-places are mainly addressed by Augé in terms of their negative aspects, among which is the lack of history - which is proper to anthropological places - existing mainly because of their standardisation, and the fact that "the space of non-places creates neither singular identity nor relations: only solitude and similitude" (ibidem, p.103). In sum, Augé supports the argument that being in non-places represents a deeply solitary experience, and that ultimately it is solitude the main aspect of modern life, because of the increasing amount of time spent inhabiting and traversing non-places.

Within urban computing, research projects that address, mostly indirectly, non-places are the ones that consider technologies that are being or will be used in situations that can be commonly understood to be part of this categorisation, such as while people wait at the airport, for a train, commute from home to work and are in general in transition. Because it especially relates to commuting, even the experience of encountering familiar strangers can be seen as being proper to inhabiting and traversing non-places.

The adaptation of the categorisations of the third place and non-places within urban computing represents an attempt to improve the understanding of urban life for the purpose of designing new everyday computational technologies. The next sections will however show the aspects that have been so far overlooked by urban computing when addressing such categorisations, and examine how these efforts can then be further expanded upon.

## 2.8 Improving the Understanding of Urban Life

The review of the work conducted so far on urban computing shows how a prevalent techno-centric view of the topic has been contrasted with a social computing perspective, which aims to improve the understanding of urban life by addressing it in terms of a complex and nuanced

phenomenon. It is important now to see where lies an opportunity for improvements to the current categorisations of urban life.

### 2.8.1 Shortcomings of the Socio-oriented Side of Urban Computing

Urban computing studies that have taken into account existing categorisations of urban life, such as the one of third place and non-places, seem to have not yet strongly engaged with the richness that such categorisations have to offer. For instance, so far third place and non-places have been mostly considered either in terms of the specific places they refer to – such as restaurants, bars, airports or trains – or generically in terms of public places. Shklovski and Chang (2006) introduce the IEEE Computer special issue on urban computing by stating that:

> While much computing research has been concerned with home or work, the focus has recently been shifting toward "third places"—the spaces between home and work. These are complex spaces, as they are navigated both through physical movement and interpretations of social context. As computing blunders into our personal worlds—annoying, interrupting, or distracting us—it is potentially even more disruptive in public spaces, where friends and strangers alike navigate the complex social context of coexistence (*ibidem*, p.28).

In this account the third place refers somehow to the urban sphere in general, which is also addressed in terms of public space, in oppositions to work and home. Third places are then not conceived of in terms of leisure-oriented places that have a strong community building component, but are referred to as being generically public spaces, of which the main characteristic is the co-habitation of friends and strangers. When discussing the perception of technology access within a specific community of users, homeless people, Le Dantec and Edwards

(2008) refer to urban computing in the following terms:

> Based largely on Auge's notion of "non-space"—a space delimited by uniform access to information, mediated by interconnected technologies rather than physical realities—work in Urban Computing has begun to frame explorations of how exploiting wireless technology and the ubiquity of access reconfigure social relationships in public spaces (*ibidem*, p.33).

Through this statement, the authors claim that urban computing still indeed presents a strong techno-centric view, which has used the concept of non-place in terms of a new opportunity to provide technological access anytime, anywhere. At the same time, non-places are addressed, from a social computing perspective, in terms of public places, and therefore lose the specific characteristics that Augè had assigned to such places and to the experience of inhabiting them. Both non-places and third places are then conceptualised within urban computing generically as public places that connect home and work, where friends and strangers co-habit, and where technological access can be provided anytime, anywhere.

In this respect, urban computing has yet not fully engaged with the dynamics that contradistinguish and differentiate various kinds of urban experiences. The notions of third places and non-places can be a good starting point for introducing new categories of experiences within urban computing, but researchers need to engage with their peculiarities as they have been described by Oldenburg and Augé in more depth, and assess whether the dynamics that according to the authors characterise these experience are suited, or not, for inspiring and guiding the design of new computational technologies. These and new categories of experiences need to be extensively discussed, explored and tested in order to further establish the field of urban computing, and group the projects that it encompasses within a broader and more holistic view.

The table below (Table 1) summarises the two main approaches adopted

within urban computing to approach urban life and its categorisation. Starting from the work conducted thus far within urban computing and discussed in the previous sections, this chapter will now conclude by addressing the sub-question presented at the beginning, and suggesting ways in which the approach to urban life can be actually improved.

| | **Urban Life** | **Categorisation of Urban Life** |
|---|---|---|
| **Techno-centric View** | Homogeneous<br><br>Void<br><br>Problematic | Third Place and Non-places as potential for data access anytime, anywhere |
| **Social computing View** | Diverse and heterogeneous<br><br>Aesthetic<br><br>Opportunity for play and creative interactions<br><br>Potential for socialisation<br><br>Collection of socio-cultural specificities | Third place and non-places addressed by projects in terms of specific places<br><br>Third place and non-places addressed in terms of public places, in opposition to home and work |

Table 1 – Summary of approaches within urban computing

### 2.8.2 Suggestions for Moving Forward the Social Computing Agenda

The importance of categorising the everyday human experience was discussed in the previous sections of this chapter. Categorisations represent a reduction of the complexity and diversity of the everyday experience aimed at aiding the design of new computational technologies. The challenge, and potential for improvement, within urban computing lies in building categorisations that at the same time simplify

the urban experience and still grasp and convey its richness and what makes it unique and distinctive.

This dissertation supports the argument that it is important to engage more in depth with the existing literature within sociology and cultural geography, in order to enrich the understanding of urban life that can eventually contribute to the design of new computational technologies. At the same time, it claims that it is necessary to focus on the aspects of urban life that are related to, and can become relevant for, the design process. Finally, it supports the idea that it is beneficial for the emerging field of urban computing to attempt bringing together its often separated research efforts, perhaps under a sensible, and novel, categorisation of urban life.

Although a significant amount of work will be required to fulfil such a research agenda, this dissertation aims at constituting an incremental effort in this direction. While still taking into account the contributions coming from sociology and cultural geography, and the categories already addressed within urban computing, such as the ones of the third place and non-places, the dissertation is set to apply a fresh perspective to the understanding of urban life, by working towards a new categorisation where urban life is approached from a phenomenological perspective, and explicitly related to the design of new everyday computational technologies. The starting point will be to empirically engage with some, currently overlooked, instances of urban life, such as visiting public toilets while traversing the city, queuing at the ATM on the street, and stopping at the drive-through to buy a sandwich. The belief is that a more holistic categorisation of urban life needs to begin with the realisation that between work and home there are a multitude of everyday experiences, which seem as much varied and mundane as they are deeply interrelated and essential to build the overall meaningfulness of everyday life.

Before approaching the nuances of urban life from an empirical perspective, it is however necessary to build the basis for a

conceptualisation of the urban experience, able to guide the analysis of the empirical investigation and lead to the generation of new actionable categories for the design of everyday computational technologies. The next chapter, Chapter Three, suggests a theoretical framework that is based on phenomenological concepts, and directed towards the understanding of how a lived urban experience can be understood and designed for.

## 2.9 Summary of Chapter

This chapter has positioned the dissertation at the intersection between research aimed at improving the design of everyday computational technologies, studies that are concerned with the social issues surrounding the design of such technologies and investigations directed at categorising urban life for the purpose of aiding the design process. Specifically, the chapter addressed the first sub-question introduced in Chapter One:

*How has urban life been approached so far for the purpose of designing new everyday computational technologies, and how might such approach be improved?*

In order to answer the question, the literature review begun with specifying the technological domain tackled by the dissertation, the one of everyday and ubiquitous and computational technologies. Such technologies have been presented by providing a historical overview of how computation has increasingly become ubiquitous, how it has affected people's everyday life and finally how it has presented new challenges to technology-related research.

The chapter has then introduced and discussed the two main perspectives applied to the study and the design of everyday computational technologies: a techno-centric one, concerned with the

implementation challenges that the research domain present, and a social-oriented one, which has brought forward a sensitivity towards issues that relate to the human and social side of technology design and adoption. Social computing has been presented as an umbrella term that bring together a number of approaches that bring to the foreground social concerns, and have either addressed *foundational* issues that concern the spread of computation and its implications, provided *inspiration* for the design of new technologies, or contributed to provide knowledge about the design process from a more *practical* perspective. One of the main challenges faced by social computing, and due to its interdisciplinary nature, was shown to be the challenge of categorising the human everyday experience for the purpose of aiding the design of new computational technologies.

In order to stress the importance of creating categories of everyday experiences, this chapter then highlighted both the limitations and the benefits of categorisation, and showed the ways in which it can be ultimately considered a useful resource for design. The review of how everyday life has been approached so far in terms of categorisations has allowed the emergence of two main categories, work and home, which have been widely researched both from a techno-centric and from a social computing perspective. Social computing studies have been discussed in terms of their potential to highlight the nuances and the situated aspects of what it means to be at work and at home. Urban life has then been presented as a recent but increasingly important category of experience that has been addressed in terms of urban computing. A predominant techno-centric perspective towards urban computing has been shown to have considered the urban environment as rather *homogeneous*, as a *void* to be filled by data access anytime, anywhere, or as leading to *problems* that can be partially overcome by new computational systems. In opposition to this view, social computing has been presented in terms of considering the urban experience as being rich and *diverse*, as opposed to just *homogeneous*, void or *problematic*.

By addressing a *diverse* set of experiences (e.g. the aesthetic side of

urban life), focusing on *specific types* of experiences (e.g. the one of mobile workers), finding *opportunities for socialisation*, or for *playful and creative interactions*, and highlighting the *socio-cultural specificities* within cities, social computing studies have demonstrated how urban life is varied and potentially tackled by design in different ways. These emerging research efforts have been found to be, however, still disconnected, providing a view of urban life that is still fragmented and narrowly specific. While few categorisations have been introduced within urban computing, such as the one of the third place and non-places, these have often been utilised to in terms of the specific locations they refer to (e.g. restaurants or airports) or generically in terms of public places, and have not been engaged with in terms of the sociological meaning they hold.

After having shown how urban life has been approached so far for the purpose of designing new computational systems, this literature review has concluded with answering the second part of the sub-question posed at the beginning of the chapter, by suggesting that further work needs to be done to explore the dynamics of urban life, by more deeply engaging with the nuances of the urban experience, and producing a categorisation that both reflect the richness and complexity of this experience and reduce such complexity for the purpose of inspiring new designs. Such categorisation also needs to bring together and foster a dialogue between the often fragmented approaches of urban computing.

# Chapter Three – Phenomenology and the Lived Urban Experience

## 3.1 Introduction

This chapter will provide a theoretical foundation on which a categorisation of urban life will be developed, for the purpose of supporting the work of researchers and designers within urban computing. Coherently with the tradition of social computing, this dissertation will employ a humanistic theoretical perspective to account for people's everyday life experiences. Specifically, this dissertation will approach the topic through phenomenological lenses. This chapter will, in particular, explore how the philosophical tradition of phenomenology can be adopted to approach and understand the concept of lived urban experience, and used as a basis for selecting a suited methodology for the empirical study. This will be done in order to address the second sub-question introduced in Chapter One:

*How do we create categories that reflect the complexity of urban life and can support the design of new everyday computational technologies?*

In order to begin answering such a question, the chapter will first consider the ways in which the categorisations of urban life that have been used so far within urban computing, in particular the third place and non-places, can be deeply engaged with. The relationship between specific urban locations and the social and human dynamics that contradistinguish them will be presented as an important aspect that was foundational for the original description of such categorisations (Augé 1995; Oldenburg 1991), but which has often been lost in the process of applying the categorisations within urban computing. The relationship between location and its socio-cultural meaningfulness, stressed within social computing by the work of Harrison and Dourish (1996), will be

addressed through focusing on the "experiences of urban environments". The concept of experience is here considered not only as being able to reflect this deep relationship, but also as having the potential to expand the view of urban life solely as a collection of meaningful places, through the acknowledgement that while people can have multiple experiences of the same place, they could also have similar experiences of different places. For instance, people queuing at an ATM machine could feel differently about being in that specific situation, but some of them can be reminded of how it is to queue at a traffic light while travelling by car.

Then, in order to create a categorisation of urban life based on the notion of experience, this chapter will then introduce and discuss a phenomenologically inspired conceptual framework, focused on what constitutes a lived experience and how this can be understood and designed for. Concepts not only elaborated by the phenomenological tradition within philosophy, but also reinterpreted and used within social computing, will be presented and creatively combined in order to guide the analysis of the empirical study conducted as part of this dissertation. A lived experience will be specifically described as being deeply situated, in terms of people's *actions*, *interactions* and *dispositions*, *understood* and rendered as meaningful through perception and reflection, and *mediated* by technologies, which are rendered as meaningful because of an instinctive *technological disposition* people have towards the world.

While such a conceptualisation of a lived experience is meant to serve the purpose of generating a rich categorisation of urban life, the challenge remains to make such categorisation relevant for the design of everyday computational technologies. The chapter will then finally move onto grappling with this challenge, by suggesting how we might consider designers as human beings, who engage in design practices that are situated, who inscribe their *understanding* of lived experience into their designs and who finally plan technologies in terms of *mediations* and representations, as a consequence of their being-in-the-world and according to a *technological disposition* that can also be referred to in terms of *design disposition*. Considering designers as human being with a

*design disposition* suggests, then, that the generation of actionable categories of urban experiences can benefit from an active engagement of designers with such experiences, as they, even more than anyone else, can interpret and read the world in ways that are relevant for the design of new everyday computational technologies. The utilisation of concepts borrowed from phenomenology to approach lived urban experiences, and a direct and design-oriented engagement of researchers/designers with urban life represents the starting point for generating a categorisation that both reflects the complexity of urban life and becomes beneficial for the design of everyday computing.

## 3.2 Experience and the Interconnection Between Place and Sociality

The previous chapter, Chapter Two, identified a space for conducting further research on the emerging topic of urban computing. It was shown that social computing has already expanded the understanding of the urban experience in relation to the design of new computational technologies. However, from the literature review we also saw that social computing considers urban life mostly in terms of its specific instances, or in terms of categorisations adopted from other disciplines, such as the ones of third place and non-places, but often without deeply engaging with the sociological meanings that such categories present in their original conceptualisations. In order to identify a better-suited theoretical approach for further exploring urban life, Chapter Two concluded by suggesting the need to generate categories that are both able to reduce the complexity of human life, for the purpose of aiding the design process, and to convey its richness. It is then important to reflect on ways in which a new categorisation of urban life can be suggested.

Oldenburg (1991) and Augé (1995) introduced the categories of third place and non-places mostly, as the terms suggest, based on places that present similarities, not only from an architectural but also, and

especially, from a sociological perspective. These places are indeed described mainly in terms of the human dynamics that characterise them, such as communication and sharing of ideas for third places and solitude and lack of relations, in the case of non-places. In order to improve current urban computing approaches to the categorisation of urban life, it is then important to see how such a categorisation can be created to reflect both the spatial and the sociological characteristics of urban life. Within social computing, Harrison and Dourish (1996) attempt to create a link between such characteristics by pointing out the difference between space and place, through the claim that "space is the opportunity; place is the understood reality", indicating that while space is the container, place represents its content. What the concept of place constitutes is in fact the sum of meanings, values, behavioural appropriateness and cultural expectations that people attribute to a certain space. This acknowledgement has been of particular importance, and has pushed researchers to approach a place, or a series of places, not just in terms of location and the activities that are performed there, but also in terms of its sociological richness and the meanings assigned to "being there". However, instead of approaching urban life in terms of a collection of places, this dissertation adopts an approach that focuses on the experiences people have of places. By explicitly considering experiences instead of places, this dissertation moves away from the spatial and more towards the human as a basis for understanding urban life. The relevance that Harrison and Dourish's work assigns to the meanings and values emerged within places implies that it is important to consider how people experience places, and what it means to be in a certain place. Focusing on the experiential side of urban life also serves to highlight differences and commonalities otherwise difficult to identify; for instance, while the experiences of a place could be varied, the experience of different places can hold many similarities. Finally, this chapter will demonstrate that reaching an understanding of how people experience places requires taking into account both the spatial and the temporal, the individual and the social aspects of inhabiting an urban environment.

The attitude of approaching the experiential side of place-ness, although rather novel within urban computing, has been applied historically within the tradition of cultural geography. For instance, De Certeau approaches urban life in terms of people's everyday experiences, focusing on the tensions created through the development of tactics in opposition to the strategies applied by the regulating authorities. On the other hand, the seminal work of Tuan (1977) focuses on the human experience of place and space, which is comprised of perception, feeling and thoughts. Such a conceptualisation of human experience is closely tied, although not explicitly within this specific work, to a phenomenological view of lived experiences. Within this dissertation, phenomenology will be demonstrated as able to provide a sensitising tool for approaching the experiential side of urban life, able to guide the analysis of the empirical study of urban life. So far phenomenology has provided inspiration for many disciplines, including sociology, cultural geography and social computing. For instance, it has pushed further the work of social computing by allowing researchers to approach the context of work from a situated perspective (Suchman 1987; Orlikowski 1996). In addition, it has been used to generate conceptual foundations for the design of ubiquitous technologies (Dourish 2001). This suggests that phenomenology represents a theoretical perspective potentially useful also for understanding urban life, and guiding the creation of a new categorisation able to encompass aspects of it. Starting from this acknowledgement, the dissertation adopts, and presents within this chapter, a novel approach to the categorisation of urban life, by creatively combining concepts from phenomenology and applying this perspective specifically to urban computing.

By taking into account the ways phenomenology has been adopted so far within social computing, and by borrowing concepts elaborated within this philosophical tradition outside of research in technology design, the following sections of this chapter will introduce and discuss a novel way of conceptualising lived urban experiences, and understanding how to design for them.

## 3.3 Phenomenology and Lived Experience

Following the work of authors such as Husserl, Heidegger, Schutz and Merleau-Ponty, phenomenology has developed different philosophical interpretations of how humans experience the world. At the basis of this approach is the realisation that experience constitutes the starting point of people's knowledge of the world, and that thoughts and intentions arise as the consequences of being in the world instead of existing beforehand (Heidegger 1962), as the Cartesian approach also suggests (Descartes 1984). The practical aspect of existence and the individual's perception of it (Merleau-Ponty 1962) determine the way people are and act within the "lifeworld" (Husserl 1970). From a sociological perspective, Schutz explored not only how meaning is created through this experience, but also how it is shared between people (Schutz and Wagner 1970).

Phenomenology, a quite complex and multi-faced phenomenological approach, has influenced various fields of research, including social computing and research on ubiquitous computing (e.g. Dourish 2001 and Robertson 2007). Phenomenology has for instance contributed to raising the awareness that the use of computational technologies need to be considered as a situated phenomenon, in opposition to the techno-centric idea that technologies can be studied and designed independently of the context in which they are supposed to be used. Because its strong emphasis on the concept of experience and on the ways in which human experiences can be approached and understood, phenomenology, then, stands as a suited sensitising device for approaching and analysing the urban experience and its nuances.

What follows is not meant to constitute an extensive and exhaustive review of phenomenology; instead, specific concepts elaborated by phenomenology-oriented authors and revisited by social computing researchers will be introduced and discussed, in order to identify a specific way to grapple with urban life in order to inform the design of new everyday computational technologies. Urban life, then, will be

considered in terms of a phenomenologically conceived lived experience, which can be broken down into different aspects, able to guide the understanding of the experience itself and the ways in which it can be addressed by the design of new computational technologies. In particular, a lived experience will be considered in terms of how people's actions and their dispositions towards the lifeworld are situated, how technologies are understood in terms of enframing (*technological disposition*) and *mediate* people's perception of the lifeworld, and finally how a lived experience is *understood* and rendered as meaningful by, and for, people.

### 3.3.1 Embodied Actions and Interactions

An important aspect of a lived experience is the situatedness of the individual who is living the experience itself. A good starting point for understanding what constitutes a lived experience can be Heidegger's concept of befindlichkeit, which has been in most cases translated with "state of mind", but which more appropriately can be referred to as "situatedness" (Ciborra 2006). Ciborra explains how Heidegger's befindlichkeit "refers in its original meaning to both the ongoing or emerging circumstances of the surrounding world and the inner situation of the actor" (*ibidem*, p130). Situatedness is the way in which people find themselves, internally and externally, in the context a lived experience. Ciborra then claims that the idea of situatedness has been as much used within social computing as it has been left mostly unexplored. In particular, situatedness has been referred to people's actions, to the phenomena of learning and change, especially in the context of organisations, but very rarely it has been related to people's emotions and their disposition towards the lifeworld. In line with Ciborra's argumentation, this dissertation will consider the situatedness of a lived experience as involving two different, but complementary, aspects: one external, conceived of in terms of people's *actions* and *interactions* within and towards the lifeworld, and one internal, indicated by the *dispositions*

people have towards the lifeworld. These two aspects cannot be considered as separate when understanding the lived experience as a whole, as they co-constitute each other and ultimately represent the two sides of the same coin.

As Ciborra notes, a great deal of research within social computing has highlighted the importance of considering the external side of situatedness, that is to consider people's actions and interactions as situated within and towards the lifeworld in which they take place. For instance, in relation to work practices, Suchman (1987) considers the situated perspective in opposition to a more traditional Human-Computer Interaction cognitive approach (Card, Moran, and Newell 1983). While the latter considers individuals' plans as being an abstract sequence of sub-plans toward the achievement of a certain goal, Suchman argued that plans instead only arise within, and in response to, the specific circumstances of a situation. Still concerning the lived experience of work environments, Introna and Whittaker (2002) contribute to this dialogue by claiming that the evaluation of technology-enhanced work processes cannot neglect either the rational or the political side of an organisation, and that both need to be taken into account as being part of "skilful conversations". Such conversations can be representative of an organisation where individuals often find themselves improvising, and always have an embodied, situated understanding of the situation they find themselves dealing with. People make decisions and act, therefore, mostly in response to the contingencies that the work situation presents.

In reference to everyday life, and in relation to the design of new computational technologies, Dreyfus (1992) suggests that designers take into account the situated aspect of actions in terms of an "everyday expertise", the ongoing process of learning rules that are then applied by people mostly in an intuitive and implicit way. According to the author, people become experts within a specific situation by learning, recognising situational aspects and applying a variety of context-free rules. Because most of these rules are implicit, they are hardly recognised by the expert himself, and therefore they become also difficult to grasp for researchers

and designers. Specifically addressing the domain of Artificial Intelligence (AI), Dreyfus claims that true intelligent systems are difficult to build because computers lack that familiarity with the lifeworld able to turn them into experts of everyday life, as people instead are.

On the other hand, Dourish (2001) supports the phenomenological idea that individuals exist, act, produce and share meanings as physical entities located in space and time, and suggests that the concept of "embodied interactions" should be taken into account when designing new everyday computational technologies. This concept is in part inspired by the Heideggerian idea of being-in-the-world (dasein), according to which being and world cannot be considered as separate entities as they co-constitute each other; interactions then take place only as part of this being-in-the-world, and are therefore embodied within the lifeworld. People's actions also have a certain orientation towards the world, which becomes either the object of these actions or a medium through which they are accomplished. Actions and interactions are supported, and also constrained, by the "affordances" that the world presents, which are mostly technological constructs. According to Dourish the concept of affordances, introduced by Gibson (1977) within psychology and later adopted within HCI in reference to computational technologies (Norman 1998, Gaver 1991), is highly related to the phenomenological idea of situatedness. An affordance is a "property of the environment that affords action to appropriately equipped organisms", and therefore indicates a "three-way relationship between the environment, the organism and an activity" which is "centered on the notion of an organism acting in an environment: being in the world" (Dourish 2001, p.118).

Considering actions and interactions as being deeply intertwined with the context in which they occur supports the idea that a lived urban experience needs to be considered in terms of how such actions and interactions arise within, are affected, and affect in turn, the different urban places where they occur. This perspective allows us to advance the urban computing conceptualisation of the urban experience by focusing

on, and attempting to categorise, not merely places, but also how these places relate to the activities performed within them. Different urban places, then, become a stage for actions and interactions that are varied and heterogeneous, but at the same time interrelated and dependent on each other and on what the place itself offers in terms of affordances. Not only do people's actions respond to the environment, together with the people and other contingent factors that are part of it, but they also contribute to changing the environment itself and the situation, which cannot be capture with a static representation, but ought to be considered as an ongoing and ever changing phenomenon.

### 3.3.2 Dispositions Towards the Lifeworld

Situated actions and interactions constitute an important aspect of a lived experience that needs to be taken into account when attempting to understand it. However, as Ciborra (2006) points out, it is necessary to also consider its counter-part in order to fully engage with the idea of situatedness, that is the *disposition* people have towards the lifeworld. Instead of addressing the internal side of situatedness in terms of state of mind, this dissertation will indeed approach the concept in terms of *disposition*, in order to distance it from both a cognitive-oriented and a passive connotation. A *disposition* is in fact pre-theoretical instead of cognitive, in the sense that it is sensed or felt, rather than thought (Heidegger 1962). A *disposition* is also understood in an implicit and instinctive manner, unless captured and shared through language and communication. Finally, a *disposition* is active instead of passive, in the sense that it is not only a response to the circumstances present in the lifeworld, but is involved in the orientation people have towards the lifeworld, and is part of the *actions* and *interactions* performed in that context.

People's *dispositions* towards the lifeworld deeply influence the lived experience and the way it is perceived and *understood*. The

acknowledgement of a deep interconnection between the internal and the external side of the experience, from the perspective of the individuals living it, allows researchers to take into account the richness and diversity of what ultimately constitutes an urban experience. Indeed, not only the observable instances of urban life can be captured and understood, but also the ways in which such instances are being perceived by people, sometimes in a very personal, and some other times in a socially shared manner. The nuances of urban life then emerge from the combination of the variety of actions and interactions that people perform within the urban environment, and the variety of ways in which people perceive and understand these actions and interactions. In addition, this perspective allows to bring forward a research agenda often overlooked even within social computing, relating to the understanding of how people feel towards specific situations.

According to the perspective adopted by this dissertation, *actions*, *interactions* and *dispositions* all contribute to determining the situatedness of a lived experience. Once the main characteristics of a lived experience are being determined, it is important to consider how the experience can be read and interpreted. Heidegger (1962) claimed that the only access point for grasping and systematising this understanding from a research perspective is to start from the ways in which people themselves understand their lived experience. This dissertation shares this view, maintaining that it is necessary to conceptualise how experiences are perceived by people living them, and through perception and reflection they are *understood* and rendered as meaningful in the context of everyday life. The next section of this chapter will discuss how urban experiences can be understood from the perspective of people living them.

### 3.3.3 Perception and Reflection: Understanding the Lived Experience

Because it stresses the situatedness of a lived experience, a

phenomenological perspective also sees perception as playing an important role in the way people come to understand the experience and render it as meaningful. Ihde (1990), for instance, maintains that people's understanding of their lived experience can be seen as a consequence of two different but interconnected perceptions of the lifeworld. The first one, micro perception, is a sensory perception, while the second one, macro perception, is a cultural, or hermeneutic, perception. Even though the micro perception happens within a specific cultural context, it still affects, and contributes to differentiate, the interpretations people have of such context.

The perception of the lifeworld, in both its aspects of immediacy (micro), and pre-reflexive consciousness (macro) is usually followed by explicit reflectivity and recollection, from which the experience acquires meanings and becomes part of people's memories. Heidegger believes that meaning is something that is "found" in the lifeworld, and is interpreted according to the ways in which the individual and the lifeworld interact with each other. However, Schutz (1967) claims that a lived experience can acquire a meaning only once it is actually reflected upon. The author states that:

> Meaning does not lie in the experience. Rather, those experiences are meaningful which are grasped reflectively [...] It is, then, incorrect to say that my lived experiences are meaningful merely in virtue of their being experienced or lived through [...] The reflective glance singles out an elapsed lived experience and constitutes it as meaningful (*ibidem*, pp.69-71).

Burch (1990) noted how the relationship between lived and reflected upon experience is dialectic and mutually constructive, in that reflecting upon an experience involves restoring or altering meanings that were already implicit in their original sense, in the immediacy of the lived experience. Meaning is then both found and reflected upon within the experience itself, and is ultimately "incorporated back into the immediate

intelligibility of lived experience as we come to be guided more or less as a matter of course by the explicit narratives we have come to assume as our own" (*ibidem*). Lived experience needs then to be thought of as a "structural nexus which preserves the past as a 'presence' in the present" (Dilthey 1985 p.16).

According to Heidegger (1962), these past experiences constitute a subset of the resources people have ready-to-hand for understanding a present experience, others being their social and cultural backgrounds. People's social, cultural and historical backgrounds intersect with the ones proper to the world they encounter, and together they co-constitute the meaning and understanding of the lived experience. In sum, past experiences reflected upon support the macro perception of future lived experiences. Together with the social, cultural and historical aspects of the world, its physical configuration, the objects and people present in the space, all affect the lived experience and the way it is rendered as meaningful. People and the world can be seen, then, as a unity, as co-constituting each other moment-by-moment. According to Heidegger, the understanding of a lived experience can be achieved not only through combining micro and macro perception, as both immediate and reflected upon, but also through a process of cyclical interpretation of how the parts that constitute the experience related to its wholeness, and vice versa. In addition, such interpretation cannot be considered as something objective, as it incorporates and carries that social, cultural and historical component that is not detachable from the person who conducts the interpretation. This interpretative aspect of Heidegger's approach to the lived experience conceives of this experience not as an objective reality that can be unveiled by the person trying to understand it, but as one of the multiple realities that while being known are also being altered and mutually constructed though the interaction between the person and reality itself.

Although Heidegger's analysis focuses on the individual aspect of an experience, his view of how the individual comes to terms with his/her "selfness" is ultimately relational, in that self-consciousness takes place

only as a situated process in which the individual encounters and relates to the "otherness" and distinguishes himself/herself from it. The experience of otherness is, therefore, seen as a condition for the constitution of the self, and ultimately of the person's identity. The intersubjective aspect of the lived experience is further explored by Schutz (1967); people experience the world with and through others, and therefore such experience acquires meaning also as a result of these interactions. The experience itself is properly subjective, but when it becomes shared between people, although it keeps the subjective element, it also creates a common frame of references that allows communication, social interaction and the constitution of shared meanings.

In sum, people understand their lived experience through combining a micro (sensorial) and a macro (hermeneutic) perception of the lifeworld they inhabit, and by reflecting on the experience, which then supports their future macro perception. In addition, understanding is reached as an ongoing interpretation of how the parts that constitute the experience relate to its wholeness and vice versa. The ultimately subjective meanings that are assigned to the experience are then shared among people, so to create a common horizon of references that allow the orchestration of multiple experiences within the lifeworld. This phenomenology-oriented approach to the lived experience can be beneficial when approaching and understanding urban life, especially because of its heterogeneity, which is caused by the multiplicity of places that constitute the urban landscape, the multitude of people inhabiting and traversing it and the diversity of activities that are performed there by people. Lived experiences of the urban environment can be multiple, and so can the meanings assigned to them by people; this acknowledgement resonates with the social computing idea that the urban experience is not homogeneous but highly diversified (Dourish, Anderson, and Nafus 2007), and needs to be addressed as such by the design of new ubiquitous technologies.

People's perception of the lifeworld, together with their actions, interactions and even dispositions can be mediated, altered, supported and also constrained by technologies present, in and used, within the lifeworld. These technologies include ubiquitous computational systems, which are increasingly integrated in the lifeworld and contribute to determining those affordances that provide a horizon of opportunities and constraints for the lived experience. As this dissertation is focused on developing an understanding of how new technologies for the urban experience can be designed, it is necessary to discuss the role that technologies plays within the lived experience.

### 3.3.4 Technological Mediation and Enframing

When attempting to understand a lived experience for the purpose of informing the design of new technologies, it is then important to consider the role that technologies play in such experience. Not only computational technologies in particular, but technologies in general have been the focus of phenomenology-oriented studies over the past decades. Heidegger himself (1977) engages in the discussion by considering technologies for their instrumental value and creating a distinction between the functions of tools as being present-at-hand or ready-to-hand. When a tool is present-at-hand people acknowledge its existence as an external object that is part of the world, while when it is ready-to-hand, the tool becomes an extension of people's bodies and an instrument for them to act upon the world. While the disappearance of the tool as an external entity when it becomes ready-to-hand could suggest that the technology becomes neutral when it is being used to perform a certain activity, Ihde (1990) asserts that Heidegger's analysis of technologies implies, on the other hand, their non-neutrality. Heidegger, in fact, refers to technologies within a relativistic framework, meaning that technology is considered as part of and mediating a broader relationship happening between individuals and the lifeworld.

The previously mentioned dialectic between micro and macro perception that is at the basis of people's understanding of the lifeworld can be also applied to the use of technologies. While a view of the world is implicit in every computational technology, the way it is being used determines how this view is translated in terms of lived experience. Ihde's (1990) phenomenological analysis of technology usage provides an interesting approach for understanding more in depth the role of *mediation* that new technologies play in people's lives. The starting assumption of his analysis is the realisation of the non-neutrality of technologies that transform human experience. Ihde states that "for every revealing transformation there is a simultaneously concealing transformation of the world which is given through a technological mediation" (*ibidem*, p.49). According to the author, there are three main ways in which technologies mediate people's perception of the lifeworld, which he calls "existential relations"; these are *embodiment*, *hermeneutic* and *alterity*.

The first technological mediation, the one of *embodiment*, happens when technologies directly mediate people's micro perception of the world, the sensory perception. Technologies that create an *embodiment* relation include optical tools such as glasses and binoculars for visual perception, and, for instance, the telephone for auditory perception. Despite the fact that they can become almost invisible to users, these technologies create a magnification that suggests new trajectories for sensory experiences, and, again, reveal and conceal at the same time aspects of the lifeworld. The second existential relation is a *hermeneutic* one, taking place when technology mediates people's macro perception of the world, the cultural perception. Ihde suggests that language is probably the most common example of hermeneutic technology. Instruments such as thermometers and other indicators also reveal aspects of the world that offer more information about what people perceive, or do not perceive, through their senses. Finally, the third relation identified by Ihde is the one of *alterity*, which occurs when technologies become a "quasi-other"; when individuals use these technologies, the lifeworld mostly remains in the background and the relationship with the technology becomes the main focus of attention. Computers and visually engaging media such as

cinema and television are mentioned as examples of technologies that determine relations of *alterity*.

The mediating aspect of technologies can also be thought of in terms of representation (Kallinikos 1995); in this respect technologies become representations of the lifeworld, of which they help people reaching an understanding. According to Kallinikos (1995) these representations can only be partial descriptions and allow certain interpretations of the lifeworld, and cannot reflect all its richness and complexity. Ubiquitous computational technologies, which both constitute representations of the lifeworld, and provide mediations for the interpretation of its instances, are then quite complex technologies that end up playing an important role when it comes to understanding urban life. Technological convergence has allowed, for instance, new mobile phones to become devices that can be used for auditory and textual communication, but also to access a variety of multimedia content. In terms of existential relations, when used to make phone calls mobile phones provide an *embodiment* relation; the phone becomes indeed an extension of people's body in that it empowers their communication potential in terms of hearing and speaking, happening with people at a distance and not in physical proximity. On the other hand, sending SMS involves a process of interpretation that fosters a *hermeneutic* relation; writing and reading textual messages implies dealing with a cultural form of mediation. Finally, when used to access multimedia content, mobile phones are likely to foster a of *alterity*; the level of involvement and the attention required by the act of watching a video, even on a mobile phone screen, implies a temporary detachment from the surroundings. Instead, wearable computers can be seen as superimposing a *hermeneutic* relation on top of an *embodiment* one. Heads-up displays are an extension of the body as glasses are, but they can also supply information about what is being seen through text, so what individuals see is augmented through a cultural tool.

Not only do technologies mediate the perception of the lifeworld, but they also tap into the situated aspect of a lived experience. The technological

ensemble that the contemporary lifeworld presents can be thought of in terms of affordances, which support and constrain the range of actions and interactions people perform. In other terms, such an ensemble can be considered in terms of infrastructures, as Ciborra (2002) pointed out. The author states that infrastructures:

> Can be regarded as formative contexts, that is, not just as sets of hardware and software but as sets of pre-existing institutional arrangements, cognitive frames, and imageries that actors bring to, and routinely enact in, a situation of action. As such, they also constitute the background condition for action, enforcing constraints, giving directions and meaning, and setting the range of opportunities for undertaking new actions (*ibidem*, p.70).

Ubiquitous computational technologies, which are increasingly part of the lifeworld people inhabit, become, then, part of this infrastructure and become automatically meaningful because they are an integral part of people's lived experiences. Because, according to a phenomenological perspective, people and the lifeworld co-constitute each other, people and technologies are also linked by the same relationship, and are "each other's reciprocal and ongoing condition or possibility for being what they are" (Introna 2005). Conceiving technologies in terms of *mediations* is not intended to deprive them of any kind of agency, or give them a subsidiary role in the determination of what a lived experience ultimately is. Precisely because they contribute to the ways in which a lived experience is perceived, understood, felt and acted upon, technologies mediate such experience not in a passive but in an active manner. With or without a certain technology the same experience would not be the same, and such technology, once it becomes part of the experience, also becomes understood by people, mostly implicitly, to have this role and responsibility.

In order to further understand the role of technologies within lived experiences and the way the concept of *mediation* should be interpreted

within this theoretical framework, it is important to consider what Heidegger (1977) calls a *technological attitude* that is proper to the way people approach the contemporary world, and cities. Because of this attitude, or *disposition*, people instinctively consider the lifeworld as being mediated and partially acted upon through technological artefacts. Heidegger calls such technological disposition "enframing" (gestell). Technologies are meaningful because they are automatically considered as *mediating* a lived experience, and as being resources available to achieve specific goals, to act and interact, and to interpret the lifeworld moment-by-moment. Because it is the "assumed, and forgotten, horizon of everyday practice that make technological devices and solutions show up as meaningful" (Introna 2005), we can here consider the use of technological artefacts as being an integral part of a lived and understood everyday experience, whose meaningfulness also depends on, and conditions, the ways in which technologies are introduced and used within the lifeworld, and ultimately contribute to create a lived urban experience.

As explicated in Chapter Two, the urban environment has recently attracted the interest of researchers of ubiquitous computing because it is increasingly filled with technologies that are both present and embedded in the environment and carried around by people traversing it. A phenomenological perspective can then allow researchers to approach the urban experience as one in which technologies make sense because people are already oriented towards the experience in terms of enframing, the *technological disposition* which is proper of contemporary life in city. The design of new computational technologies that become integrated with a lived urban experience can benefit from taking into account the situated aspect of the experience, in which technologies are used and conceived of in terms of a *technological disposition* towards the lifeworld.

The phenomenological concepts discussed so far, some of which have been already explored and used within social computing and others which remain overlooked, provide a solid theoretical basis for categorising

urban life in terms of lived experiences that are situated (in terms of *actions*, *interactions* and *disposition*), *understood* and rendered as meaningful through perception (micro and macro) and reflection, and *mediated* through technologies, which become meaningful because of a *technological disposition* people have towards the lifeworld. The acknowledgement of the role played by technologies within a lived experience constitutes a good starting point for identifying the ways in which such experience can be not only understood, but also addressed by the design of new everyday computational technologies. However, in order to create a stronger link between a categorisation of lived urban experiences in phenomenological terms and the design of future technologies, it is important to consider the fact that designers and researchers interested in everyday computing are also human beings, and both live and understand their experience in similar ways to everyone else. This acknowledgement, which might sound banal, but is deeply rooted in phenomenological thinking, will be demonstrated to be of paramount importance for highlighting the aspects of a lived experience that can actually become relevant for design.

## 3.4 Designers and the Lifeworld

The following sections of this chapter will then discuss the ways in which design as a practice is situated in the lifeworld, how designers' understanding of their lived experiences is projected onto, and reflected through, their designs, how designers plan technologies in terms of their mediation potential, and finally how design can be seen as an outcome of the *technological disposition* of people towards the lifeworld (enframing).

### 3.4.1 The Situatedness of Design Practices

Like other work experiences, design practice can also be approached,

from a phenomenological perspective, in terms of situatedness. The ideas of bricolage and improvisation has been introduced within social computing to acknowledge the situated and complex nature of work practices (Brown and Duguid 1991; Weick 1993). Ciborra (2002) explains how:

> Bricolage means tinkering through the combination of resources at hand. These resources become the tools and they define in situ the heuristic to solve the problem [...] Bricolage is about leveraging the world as defined by the situation. [...] Improvisation puts and emphasis on the suddenness, extemporaneity, and unpredictability of the human intervention, though highly situated (*ibidem*, p.49).

When dealing with practical problems, designers engage in a process where their analytical and synthetic skills are influenced by their bias and a number of external and contingent factors. Within HCI, Fallman (2003) supports the idea of design as a situated practice, calling it a "pragmatic" view of design, in opposition to a "conservative" and a "romantic" one. According to Fallman, a conservative view of design calls for the definition of a linear process (analysis of problem, synthesis of a solution and evaluation of results), where methodologies are well-structured and known to contribute to a certain result. Mostly propelled by the architecture and engineering side of design, a conservative approach to design constitutes a response to both the intellectual pressure of the scientific communities (calling for rigor and analysis in the case of engineering, or for an ideological role of design within society, in the case of architecture) and the commercial pressure of the industrial world (increasing mass production). On the other hand, a romantic perspective sees design as an artistic process where the designer has "mystical" powers that cannot be described in details or analysed; such a view is linked to the creative and artistic side of design that became more widespread after the 1920s with the rise of famous designers and brands that, through product, fashion and graphic design, provided the aesthetic symbolism of modernity. Instead, based on a phenomenological

perspective, and on Schön's idea of the reflective practitioner (Schön 1983), a pragmatic view of design "focuses on the situatedness of the designer in the life-world and brings to light the interweaving of roles, practices, and technologies involved in design" (*ibidem*, p.227).

In line with Fallman's view of design, this dissertation supports the importance of acknowledging that the design of everyday computational technologies emerges as a situated practice, as it takes place it within a range of everyday experiences, and is intertwined within the fabric that constitutes everyday life. The relevance of this concept lies in the fact that new technologies are created as a consequence of designers being-in-the-world, engaging with and understanding the lifeworld as human being, and reflecting this understanding in their designs. The following section focuses exactly on the latter concept.

### 3.4.2 Understanding and Designing for Lived Experiences

A phenomenological perspective towards the understanding of a lived experience, according to Heidegger (1962), cannot separate the subject and the object of the experience, the "I" from the "situation". A lived experience represents an "I-situation" in which the I and the lifeworld constitute each other and cannot be separated, so that the experience can only be understood from the I perspective and not from an external one. This view led Heidegger to criticise the idea that philosophers have special powers or a better and detached understanding of the word. On the contrary, he believes that philosophers have to be considered themselves as situated human beings, as is everyone else in the world. The philosopher's role, then, is to bring to life meanings that are created through experiencing the lifeworld, and not by conceptualising the lifeworld a priori.

If this view is translated in terms of the work of designers it becomes clear how their understanding of the world in terms of lived experiences

becomes the basis of their design activities. Designers live their everyday routine as everyone else, as the users they target; the understanding they gain of this routine is reflected in their designs, as a consequence of the *design disposition* they possess. This acknowledgement becomes important when addressing the design of ubiquitous computational technologies and the study of the lived experiences in which these technologies will be used. As ubiquitous computing affects various aspects of people's everyday lives, designers often have a first hand perspective and understanding of the experiences that they target through their work. Like any other human being, designers, and researchers involved with everyday computing, go to work, return home, meet at bars with friends, queue at the grocery store and wait for the bus on the street. They each have different personal experiences of these contexts, and these experiences are rendered as meaningful through their micro and their macro perception of the lifeworld. Eventually, these experiences are reflected in the way designers and researchers generate new knowledge and plan technological interventions to be integrated in the fabric of people's everyday social and cultural life.

This phenomenology-oriented view of designers, and the ways in which they engage with and understand lived experiences, and reflect this knowledge into their design, holds important consequences for this dissertation. From an epistemological standpoint, it implies that designers cannot become objective and detached towards the lived experience they are addressing through design, as in understanding it they will use their pre-understanding, their backgrounds and their reflections on past lived experiences; this acknowledgement mirrors a view of designers as always projecting their beliefs and bias into their designs (Cross 2001). From a methodological perspective, it suggests that researchers and designers interested in everyday computing not only have a first-hand view of the experience they want to target, but also that they take advantage of, instead of attempting to erase, their existing knowledge and understanding of such experience. In addition to this, living in a world that is already mediated by technologies, and where people perceive technologies as meaningful according to an instinctive *technological*

*disposition* towards the world, also conditions designers in planning new everyday computational technologies.

### 3.4.3 Mediation and Enframing as Design Dispositions

Designers do not only live in a world already mediated by technologies, but they also contribute to this mediation process, by inscribing different types of *mediations* into their designs. As previously mentioned, ubiquitous systems can offer different kinds of *mediations*, in terms of Ihde's existential relationships of *embodiment*, *hermeneutic* and *alterity* (Ihde 1990). By being exposed to these mediations as part of their being-in-the-world, and also by understanding their lived experienced through such *mediations*, designers then reproduce, modify, enhance and create different types of *mediations* for new everyday computational technologies. The co-constructive cycle that determines the generation of new technologies and therefore of new mediations and new lived experiences implies, once again, the fact that designers are part of a lifeworld where technologies already contribute to determine a lived experience and influence future designs. Indeed, we can refer to a process of "re-mediation" (Bolter and Grusin 2000), in this case indicating the fact that the starting point for the creation of new technologies is always represented by existing technological mediations, which influence and are reshaped by the ongoing work of designers.

Indeed designers, just like users, are constantly exposed to the *technological disposition* (enframing) towards the lifeworld, and this also affects the way they approach the design of new technologies. A *technological disposition* implies, as already mentioned, that people approach the lifeworld as a resource that can be shaped through technologies. In relation to design issues, Margolin argues that design activities are inherent to the way individuals make plans on an everyday basis. The author creates a parallel between design and what Schutz and Luckmann (1973) call "project", which represents in general the planning

of situated actions. In this sense, the design of products constitutes the result of a particular kind of technology-oriented action, and products in return enable and limit possible actions that individuals can plan. Margolin stresses that, despite the fact that design itself should still be considered an important profession, it is necessary also to include in what can be called the "product milieu" a wider range of design activities. These refer in particular to the fact that individuals design products for others, design products for themselves, use products designed by others and finally use products designed by themselves; the sum of these activities helps to define the way people conceive and plan personal and collective social life.

The concepts of projects and product milieu are useful resources for the work of this dissertation. First, they point to the fact that to a certain extent every human being is potentially a designer, as part of his/her innate *technological disposition*. Second, in the case of designers we can begin to address a *design disposition*, instead of just a technological one. Even more than other human beings, designers are inclined to approach the lifeworld in terms of a resource to be shaped by technologies. With respect to the design of everyday computational technologies for the urban experience, this *disposition* leads designers to see opportunities for design in a variety of aspects of everyday life, if not all of them. It is important to recognise the designers' skills, compared to other people's, of approaching the lifeworld with a design-oriented inclination, of "translating" human experiences in terms of specifications for design and of reshaping current technologies and technological mediations so to respond to changes in terms of social and cultural advancements. In addition designers (together with the people who conduct research on design matters), more than users, plan the development of technologies not only useful to themselves and their immediate needs, but also useful to a larger community and able to have an impact on the longer term.

A certain differentiation in terms of design skills between people who conduct research or practice in the technology design domain is necessary if we want to consider design in terms of both a discipline

(Cross 2001) and a practice (Schön 1983) that requires certain skills and training. Otherwise, it would be similar to, for instance, claiming that every human being is by default an ethnographer as ethnographic studies can generate results that the scientific community often labels as being "common sense"[4]. Keeping a differentiation between *technological* and *design disposition* is therefore important to support the relevance of acquiring and applying design skills, and for the development of a design-oriented discipline in general. In addition, this differentiation is functional to the argumentation of this dissertation, in that a *design disposition* here represents a step forward in the creation of a strong link between the understanding of the lived urban experience and the identifications of the ways in which this could be addressed by design. The following section will highlight how this link can be addressed, in attempt to answer the question posed at the beginning of the chapter.

## 3.5 From Lived Experiences to Actionable Categorisations

The phenomenological account presented by this chapter tackles the challenge, introduced by the second sub-question, of creating a categorisation of urban life that reflects its complexity and richness, but at the same time reduce such complexity for the purpose of aiding the design process. In order to begin answering the sub-question, the chapter has first conceptualised a lived urban experience, with the aim of approaching urban life in a way that is able to reflect its complexity and diversity. Such a conceptualisation implies that a lived experience be considered as being situated (in terms of people's *actions*, *interactions* and *dispositions*), *understood* and rendered as meaningful by people

[4] This view often emerges within the HCI, IS and UbiComp communities, where articles that involve ethnographic studies of technologies often receive rather negative reviews by the majority of HCI researchers, who do not see the relevance of such approach in scientific terms.

through perception and reflection, *mediated* by technologies in various ways, and characterised by an overall *technological disposition* according to which technologies are considered an integral part of everyday life. Conceived in these terms, a lived experience represents the starting point for creating a new categorisation of urban life.

Second, in order to make such a categorisation become actually beneficial for design, this chapter has shown that it might be beneficial for designers to become involved in living the urban experiences and understand them from their own perspective. One of the reasons why existing categories of urban life, such as the ones of the third place and non-places, have not been approached in terms of how they had been originally conceive of might lie in the fact that they were not created with a specific *design disposition*. Such categories indeed provide insights for designs, but they have not been formulated with the aim of highlighting aspects of lived experiences that might be addressed by design, nor do they suggest ways in which the design of new computational technologies might target such experiences. By using phenomenology as a theoretical lens, this dissertation then approaches urban life from the perspective of designers and researchers interested in urban computing. This dissertation considers this perspective as having the potential to bring to the foreground aspects and issues that are more directly related to, and relevant for, the design of new computational technologies. However, it is important that the *design disposition* proper to designers and researchers does not become the prevalent mode in which a lived experience is approached, otherwise the risk is to adopt a techno-centric perspective in which a multitude of aspects that are not directly relevant for design are left behind and neglected. In order to create rich categories of lived experience it is therefore important that designers approach such experiences first as human beings, who are expert of the often forgotten rules and dynamics that characterise everyday life (Dreyfuss 1992). This chapter has demonstrated that a *design disposition* will anyway influence the understanding of lived experiences, the challenge being then to interpret this understanding and unpack the implicit relationship that exists between lived experiences and the ways in which they are

addressed by designers, according to their *design disposition*.

Ultimately, then, the generation of a categorisation that emerges from designers' and researchers' engagements with lived urban experiences can be reached by reflecting on such engagements. Chapter Two described how other categorisations of everyday life emerged within technology design-related research, such as being at work and being at home, are the consequence of researchers focusing on different aspects of these experiences and systematising the knowledge produced through these enquiries over the years. As previously stated, this dissertation contributes to the emerging field of urban computing, part of which is already working towards the generation of a categorisation of urban life. In order to do so, and according to the theoretical perspective it has adopted, this dissertation chose to focus on a series of urban experiences lived, and designed for, by a variety of designers and researchers, and to reflect on such engagements in order to systematise the knowledge emerged from them and contribute to the generation of a categorisation of urban life. This process of reflection is in line with the way urban life can be approached from a phenomenological perspective, as described in section 3.3.3. In order to reflect on a series of engagements with urban experiences the dissertation has performed a process of hermeneutic analysis (Heidegger 1962), which will be addressed in details in the next chapter, Chapter Four.

These considerations then motivate the methodology adopted for the empirical study, which will be also discussed in Chapter Four, and will address the process of generating a novel categorisation of urban life and therefore provide an empirical answer to the second sub-question. Within the empirical study the process of engaging with urban experiences and designing for them has been iterated for four different urban experiences, and involved a total of 42 designers and researchers interested in social computing and the design of everyday computational technologies. This iterated process was documented and reflected upon through hermeneutic analysis. A direct engagement of designers and researchers, the consideration of a variety of urban experiences and the reflection

conducted on the process itself represents the methodological solution adopted within this dissertation, in line with the phenomenological perspective elaborated and with the aim of generating an actionable categorisation of urban life.

## 3.6 Summary of Chapter

This chapter has introduced and discussed a conceptual framework, in order to begin answering the second research sub-question. Such question asked for ways to generate a categorisation of urban life, able to reflect its richness and at the same time to reduce its complexity, so to guide the work of designers interested in developing new computational technologies to be integrated with urban life itself. Phenomenological concepts have been used to define a lived experience, which was presented as a suited perspective to approach urban life, as it not only connects places with the socio-cultural dynamics that contradistinguish them, but it also extends this relationship through the acknowledgement that experiences of the same place can be varied, and the experience of different places can hold similarities. A lived experience was conceptualised within the chapter according to its situatedness (in terms of people's *actions*, *interactions* and *disposition*), to how it is *understood* and rendered as meaningful through perception and reflection, and finally how it is *mediated* by technologies and approached through a *technological attitude* which is proper of the contemporary world. This conceptualisation sets the basis for approaching empirical instances of the lived urban experience and for analysing them with the aim of creating a new categorisation useful for design.

In order to make such categorisation relevant for the design of everyday computational technologies, this chapter demonstrated that designers can, and should, also be thought of in terms of human beings, who approach and understand the world like anyone else, but who also have a particular *technological disposition* that can be defined as a *design*

*disposition*, an attitude of considering the world in terms of opportunities for new designs. Because of this *design disposition*, designers' understanding of lived urban experience is already directed toward highlighting the aspects that are most related to and relevant for the design of new computational technologies. This consideration has led the chapter to address the research sub-question presented at the beginning and list the implications which the phenomenological perspective adopted holds both for the definition of a suitable methodology and for the analysis of the results that will allow a novel categorisation of urban life.

According to the theoretical foundations set by this chapter, Chapter Four will then describe the methodology chosen for reaching a phenomenology inspired categorisation of urban life, involving designers' and researchers' direct and design-oriented engagements with a variety of urban experiences. The chapter will also show how reflecting on such engagements through hermeneutic analysis represents the key for the generation of an actionable categorisation of urban life.

# Chapter Four – Research Methodology

## 4.1 Introduction

This chapter will describe the research methodology chosen for studying the urban lived experience, for the purpose of generating a novel categorisation of urban life. The previous chapter laid the theoretical foundations of this dissertation, motivating the adoption of a phenomenological perspective in order to conceptualise a lived urban experience and relate it to the design of new computational technologies. To make a categorisation of urban life relevant for design, Chapter Three indeed demonstrated that it is important to acknowledge not only the role of users, but also the one of designers engaging with the lived experiences, and rendering them as meaningful according to the *design disposition* they possess. Therefore, studying designers, and researchers, engaging with a variety of urban experiences, and designing for them, is here considered as the epistemological standpoint for generating an actionable categorisation of urban life. This chapter will further address the sub-question posed in Chapter Three, with the goal of providing an empirical answer to the challenge of creating such a categorisation.

Building from the theoretical foundation discussed in Chapter Three, this chapter will begin by demonstrating that adopting a qualitative and interpretative approach for the conduction of the empirical study is consistent with a phenomenological perspective. Also coherent with the argumentation of the previous chapter is the choice of involving designers and researchers in the process of categorising urban life, for the purpose of informing the design of everyday computational technologies. In particular, the methodology adopted consists in facilitating designers' and researchers' direct engagement with a variety of urban experiences and with design activities targeted to such

engagement, and in reflecting on this iterated process with the aim of creating a categorisation of urban life. Three workshops and a long-term design project were conducted, where a total of 42 designers and researchers were involved and studied for the purpose of contributing to this dissertation. The empirical study then consisted in design-oriented investigations of urban experiences, involving designers and researchers interested in the design of everyday computing. The design-oriented aspect has been tackled by addressing the phases of *inquiry* and *exploration*, where designers and researchers gain an understanding of the experiences being studied, and open up a design spaces that encompasses design-related instances of such experiences. The three workshops and the long-term design project addressed *inquiry* and *exploration* through the activities *fieldwork*, *discussion*, *design experimentation* and *design critique*. The exercises will be specifically described in terms of how they relate to the phenomenological perspective adopted, allowing a first-hand engagement of researchers/designers with both the urban experiences and the design of new computational technologies that address them.

The chapter will then demonstrate the importance of iterating the design-oriented engagements of designers and researchers with the urban experiences, and explain why specific experiences have been chosen for such engagements. These experiences are: *waiting in public places* in London, *being in transitional spaces* in Orange County, *visiting public toilets* in Amsterdam and *commuting* by the London Underground. The type of data collected during the empirical study will then be discussed, together with the methods used for analysing the data. The chapter will show how hermeneutic phenomenology and reflexivity are suited approaches for conducting such analysis, as they allow the interpretation and emergence of the understanding gained of the urban experiences and to direct such understanding towards a categorisation relevant for design. How the results of the data analysis will be presented in the next chapter, Chapter Five, will finally be outlined, together with the limitations of the methodological approach and the ways in which these have been tackled.

## 4.2 An Interpretative and Qualitative Approach to the Categorisation of Urban Life

From a methodological perspective, the choice of phenomenology as the theoretical lens used to approach the lived urban experience leads to adopting an interpretative and qualitative methodology (Creswell 1998; Seale 1999). It was mentioned in Chapter Three how Heidegger claims that the subject and object of a lived experience cannot be separated, and have to be considered in terms of being-in-the-world (Heidegger 1962). Therefore, a lived experience can be only approached internally, as an "I-situation" where the "I" and the "situation" co-constitute each other moment-by-moment. In methodological terms, this view is coherent with an interpretative approach, which sees the researcher as being entangled with the reality he/she tries to understand and describe, and therefore as being unable to detach himself/herself from this reality and see it objectively. An interpretative and qualitative methodology implies that the researcher engages with real-world experiences in order to understand them (Yin 1994). The only way to reach an understanding of a lived experience is then to make as explicit as possible the researcher's biases and background, and to see this process as ongoing and never able to reach a final and definite stage. This approach is also consistent with the demonstration, made in Chapter Three, that categorisations of urban experiences for design can benefit from designers engaging with, and understanding from the inside, lived urban experiences.

The methodology proposed to approach and categorise lived urban experiences is then a qualitative and interpretative one, where I have facilitated, and then studied, a series of engagements where myself and other researchers and designers interested in urban computing, and with a socio-oriented perspective have lived urban experiences, shared their understanding of such experiences and produced conceptual designs that addressed them. The iteration of such engagements allowed me to collect data on a series of urban experiences, lived and designed for by a variety of researchers and designers. The analysis of such data led to the

creation of a categorisation of urban life that reflects its diversity and complexity, and is actionable for design purposes.

Design itself is an important aspect of the methodology used within this dissertation, as it helps to bring the enquiries to a more practical level, and discuss specific design choices. However, it is important to specify what aspects of the design process will be covered, not only within the empirical study but also throughout the analysis and presentation of the results. The design of new computational technologies, especially within social computing and because of its interdisciplinary nature, is a complex and varied process consisting in many steps conducted in a cyclical way. Because of the variety of ways in which design can be conceived of and conceptualised, it is important then to specify what kind of design and design process this dissertation considers and focuses on. Because it aims at generating a novel and actionable categorisation of urban life, this dissertation focuses on the initial phases of the design process, during which designers and researchers study the situation they want to target with their designs (*inquiry*) and open up a design space suited for a range of design possibilities (*exploration*). Indeed, this dissertation intends to contribute to inspire a multiplicity of designs and not generate specific designs, or address their implementation challenges and potential commercial success. Finally, focusing on the *inquiry* and *exploration* phases of the design process is better suited for the generation of a broad enough categorisation of urban life, as during these phases researchers and designers address socially concerns and aspects that relate to human life. The next section of this chapter will address the design-oriented approach adopted within this dissertation and its empirical study.

## 4.3 Focusing on Inquiry and Exploration Within the Design Process

Chapter Three addressed the implications of applying a phenomenological

approach to the design of new ubiquitous computational, leading design not only to focus on the relationship between the user and the technology, but also to consider the broader interrelation between people, technologies and the world people inhabit and which the technologies mediate the perception of. A computer science or traditional HCI approach to design often attempts to improve technological interfaces on the basis of how people interact with them, and on their degree of understanding and appreciation of the interfaces themselves (Card, Moran, and Newell 1983). However, what has been addressed as interaction design has already attempted to push this approach further and consider the concept of interaction in a broader sense. In relation to the design of ubiquitous computing, McCullough (2004) explores the questions that interaction design attempts to address:

> How do you deal with yet another device? How does technology mediate your dealings with other people? When are such mediations welcome, and when are they just annoying? How do you feel about things that think, and spaces that sense? [...] The more the interactive technology mediates everyday experience, the more it becomes subject matter for design [...] Interaction design thus reaches beyond interface mechanics and consumer experience delivered by means of critical re-examination of everyday life (*ibidem*, p.3).

McCullough then explains how interaction design can be seen as deriving from what has been considered for long just interface design; the author stated that "the use of the term interaction design instead of interface represents a cultural advance in the field" (*ibidem*, p.19), meaning that the focus has shifted from considering computational devices mainly in terms of interactive interfaces that have to be optimised in terms of usability, to approaching new technologies in terms of computational artefacts that support and mediate our experience and interaction with the world. Dourish (2001) supports this argument, suggesting that:

> The [interaction] design perspective seeks to find a new level of engagement between system and user. It reflects an attempt to make interaction engaging and marks a transition from thinking about the user "interface" to thinking about the user "experience" (ibidem, p.202).

While interaction design can be ultimately seen as a collection of practical methods and methodologies for designing digital systems, its core theoretical motivations can be seen as aligned with the way design of ubiquitous computing can address the urban lived experience in phenomenological terms, by placing the technology in a complex web of interactions that happen between individuals and the lifeworld.

Apart from having to consider such complex web of interactions, the design of new ubiquitous computational technologies is also challenging, as addressed in Chapter Two, because of its interdisciplinary nature (especially if approached from a social computing perspective), because the technological implementation is particularly challenging and finally because the technology evaluation often needs to take place in real-world settings in order to reflect a potential use of such technologies (Kjeldskov and Graham 2003). According to Löwgren and Stolterman (2007), the main steps of an interaction design process are *inquiry*, *exploration*, *composition*, *assessment* and *coordination*. In their words:

> *Inquiry* corresponds to the aspects of design work that are mainly oriented toward finding out about a design situation, both in terms of what the situation is currently like and what it could be like in a possible future. *Exploration* is a general label for the work involved in moving though the spaces of possible solutions and problem formulations. *Composition* refers to the methods and techniques involved in crossing the gap from a more general vision to an increasingly specific operative image. *Assessment* is the critical examination of a design idea, concept, specification, prototype, or artifact. *Coordination* is the meta-level of our structure: involving methods and

> techniques intended to facilitate the design process, particularly the coordination between multiple participants in the process. (*ibidem*, p.65)

Because of the reasons previously listed, this dissertation is set to focus on and contribute to two of these design steps: *inquiry* and *exploration*. These phases will be first addressed in high-level terms, and then specifically applied to the empirical study conducted as part of this dissertation.

### 4.3.1 Inquiry

In the context of this dissertation, *inquiry* then relates to the study of lived urban experiences. What is important to stress from Löwgren and Stolterman's definition of what an inquiry represents is the fact that designers not only have to focus on the existing dynamics that the situation targeted by design presents, but also take into account how the introduction of new technologies will change these dynamics. *Inquiry* then has not only to be conducted before considering specific designs, but all throughout the process, in order to understand the potential of such designs once they have been suggested. Within social computing inquiries have been often conducted using methods and methodologies borrowed and adapted from the social sciences. Swann (2002) notes how "the social sciences brought forth a number of alternative ways to investigate and validate research and information, alternatives that have more affinity with design processes than the science/engineering model" (*ibidem*, pp.50-51). Ethnography, ethnomethodology and conversation analysis are among the methodologies borrowed from the social sciences by IS and social computing not only to better understand the use of technologies in context, but also to inspire the design of new everyday computational technologies.

Acknowledging that the lived experience does change between the pre

and the post technology introduction is also important for bringing the knowledge produced by the inquiry from a descriptive to a design-oriented level and resonates with a phenomenological view of technologies. As previously discussed, both Heidegger (1977) and Ihde (1990) stress the non-neutrality of technologies, which transform the lived experience as they introduce a level of mediation previously non existing, both limiting and enhancing the range of possibilities for situated actions and interactions within the lifeworld. Löwgren and Stolterman claim that the *inquiry* phase of design needs to consider both the temporary and the timeless aspects of an existing experience, as the technological introduction has the potential to change some but not all aspects of this experience. What is important, and challenging at the same time, from the perspective of designers interested in ubiquitous computing is to predict possible outcomes of technology usage, in terms of modifying the existing experience, without forgetting that these are only assumptions even when they are grounded in a thorough research process. This is consistent with the *design disposition* discussed in Chapter Three, according to which designers have a natural disposition to consider the lifeworld as a resource to be shaped through design. Such *disposition* not only leads designers to see the world in a particular way, but also to see what the world might become after the introduction of new technologies. However, in order to act on this *design disposition*, designers need to actively engage with design possibilities and choices, that is, with the design phase called *exploration*, which will be below addressed.

### 4.3.2 Exploration

The *exploration* phase of design involves a shift from only considering the existing lived experience, to introducing suggestions in terms of designs. This is still a conceptual phase, which does not take into account the technical details or the specifications of the designs. However, this phase can, at times, involve the generation of conceptual designs, which

provide a space for discussion in terms of how such designs might be suited for the experience targeted and how they might contribute to changing such experience. The exploration phase is particularly important as it creates a connection between the understanding of a lived experience and the ways in which this can be addressed by design. In sum, it creates a design space for further explorations.

The phases that follow *inquiry* and *exploration*, that is the *composition* phase (concerning the more practical side of the design process), the *assessment* phase (relating to the evaluation of the performance and potential use of the design prototypes developed) and the *coordination* phase (including methods and techniques aimed at facilitating the process itself) will not directly be covered within this dissertation and included in the empirical study, although the results of this dissertation are meant to benefit the design process as a whole. Once again, the choice of focusing on the *inquiry* and *exploration* phases of the design process is motivated by the research question that this dissertation aims at answering. In particular, *inquiry* helps to address the understanding of urban life, while *exploration* supports the creation of a link between this understanding and the identification of issues that might be relevant for the design of new everyday computational technologies.

## 4.4 Inquiring and Exploring Through Fieldwork, Discussion, Design Experimentation and Design Critique

This chapter has so far demonstrated the importance of adopting a qualitative and interpretative methodology for approaching urban experiences, in line with a phenomenological perspective. In addition, the previous sections showed the advantages of utilising a methodology that involves the direct engagement of researchers and designers with a series of urban experiences, and with the design phases of *inquiry* and *exploration*. During these phases, designers gain a deep understanding of

the situation/experience they aim to design for, and open up a design space where different design choices are suggested and discussed. This section will then describe the ways in which the empirical study was practically organised to reach the design-oriented engagements of designers and researchers with a series of urban experiences.

As previously mentioned, these engagements consisted in three workshops and a long-term design project that involved a total of 42 people between designers and researchers interested in urban computing and a socio-oriented perspective towards the field. The involvement of researchers and designers was, once again, justified by the theoretical argumentation carried on throughout Chapter Three, while the iteration of the engagements was performed in order to approach a different set of urban experiences, and collect the experiences of a variety of designers and researchers. Finally, the choice of conducting three workshops and one long-term design project was motivated by the opportunity to observe and document the engagements, and collect a large amount of data that could be then analysed with the aim of generating an actionable categorisation of urban life that reflects researchers' and designers' understanding of urban experiences. The analysis of the data collected will be then presented in Chapter Five and later discussed in Chapter Six.

Within the three workshops and the long-term design project researchers and designers engaged with four different, but overlapping in many ways, urban experiences: *waiting in public places* in London, *being in transitional spaces* in Orange County, *visiting public toilets* in Amsterdam and *commuting* by the London Underground. The idea was to choose topics of exploration that could relate to a variety of urban experiences that had aspects in common (e.g. waiting on a busy street for a friend vs. waiting in a queue for the ATM), and could be approached according to their situated and cultural characteristics and specificities. During this process, I contributed to co-select the urban experiences explored, co-organise the workshops, take an active part within the long-term design project and co-write a number of articles and reports that described the project from different perspectives. Two other researchers took part in

the long-term design project; these researchers also co-organised the three workshops with me, but for very different motivations compared to the one driving this dissertation. The long-term design project was conducted in the context of a EU-funded project called BIONETS[5]. The data that I collected during this long-term design project and the three workshops, and which will be later described within this chapter, was used only towards addressing the research question proposed within this dissertation.

### 4.4.1 Description of Empirical Study

Designers' and researchers' engagements with the urban experiences (summarised in Table 2) were crafted to be interdisciplinary and social computing oriented, to bring together the perspectives of researchers and practitioners involved in the design of new ubiquitous computing, and to combine field study and design as a way to observe *inquiry* and *exploration* be conducted hand in hand. Further, while the workshops allowed the exploration of multiple urban experiences to take place, and for a considerable amount data to be collected over a short period of time, the long-term design project provided the chance to study designers and researchers engaging with a single topic in in-dept for an extended period of time. The empirical study was then planned according to its potential to: first, bring together designers and researchers engaging with a variety of urban experiences and designing for it, second, allow the collection of data related to such engagements, third,

[5] Funded through the European Commission as part of the Future and Emerging Technologies programme, BIONETS - which started in February 2006 and will end in 2010 - has the goal of creating a new generation of wireless networks, inspired by biology and self-organisation, allowing heterogeneous devices to access and share data without the support of a fixed infrastructure. BIONETS can be considered to be a quite ambitious research project that tackles some of the ubicomp technical challenges mentioned in Chapter Two. In order to support the relevance of conducting research in this domain, the BIONETS consortium involved the London School of Economics (LSE) with the intent of bringing into the project a social science perspective, and therefore addressing the social side of research on ubiquitous computing.

reflect the interdisciplinary nature of social computing addressed in Chapter Two and, last, remain in accordance with the imperative to engage with lived experiences stated in Chapter Three.

The format of the workshops can be considered as an original interpretation of the so-called "future workshop", which was introduced as a technique for participatory social and organizational development (Jungk and Müllert 1987; Löwgren and Stolterman 2007) and has been later applied to work-related design explorations (Kensing and Madsen 1991). By using critique, fantasy and implementation a future workshop brings together designers, users and stakeholders to approach a certain work situation, which is considered to be problematic, and take into account possible future modifications of this situation in relation to a variety of design alternatives. Löwgren and Stolterman (2007) consider this method to be part of the *exploration* phase of design, as it opens up a design space and allows designers to reach a state of divergence, which implies attempting to avoid being locked to their personal design interests and skills, or their biases and motivations. For this dissertation, this method has been adopted in that the engagements were structured to combine a group of participants coming from different backgrounds and with different agendas, and to contribute to opening up a design space. However, this dissertation has adapted the method in order to explore a context different from work, consider a broader set of aspects of this context compared to the merely problematic ones, and use a different series of activities compared to critique, fantasy and implementation. The format used during the three workshops conducted was, in some ways, more similar to the one recently adopted by other social computing-oriented workshops that have explored new topics linked to research on ubiquitous computational technologies, including the one of urban computing (see Paulos et al. 2005 and Anderson et al. 2006). These workshops attempt to bring together an interdisciplinary team of both researchers and practitioners interested in the topic explored, for instance urban computing, and achieve a combination of *inquiry* and *exploration* by conducting fieldwork and design hand in hand.

Within the empirical study, both the workshops and the design project shared the same format, where *inquiries* and *explorations* were conducted through the activities of *fieldwork*, *discussion*, *design experimentation* and *design critique*. These activities will be addressed in details in the following sections of this chapter, and related to the phenomenological concepts that act as their foundation.

| | | **Lived Urban Experiences** | | | |
|---|---|---|---|---|---|
| **Design Phases** | **Activities** | *Waiting in Public Places in London* | *Being in Transitional Spaces in Orange County* | *Visiting Public Toilets in Amsterdam* | *Commuting by the London Underground* |
| *Inquiry* | *Fieldwork* | 3 hours + presentation of observations | 2 hours + presentation of observations | 2 hours + presentation of observations | 6 months, part-time, alternated |
| | *Discussion* | 1.5 hours | 1.5 hours | 2 hours | |
| *Exploration* | *Design Experimentation* | 2 hours, 5 designs produced | 1.5 hours, 3 designs produced | 2 hours, 4 designs produced | 6 months, part-time, alternated |
| | *Design Critique* | 1 hour | 1 hour | 1 hour | |

Table 2 – Summary of activities conducted during the empirical study, including details of the design phases covered, the activities conducted and the urban experiences studied.

### 4.4.2 Fieldwork

The exercise of *fieldwork* relates to and is motivated by the phenomenological view of being-in-the-world with a *design disposition*, and the epistemological standpoint suggested by such view. As previously mentioned, according to a phenomenological perspective the only way of understanding a lived experience is from the inside, through living it and interpreting it. Chapter Three suggested that a categorisation

of lived urban experiences for the purpose of designing new ubiquitous computing can be generated by reflecting on the process of designers and researchers engaging with, understanding, and designing for lived experiences. According to this perspective, the *fieldwork* activity was planned so that participants of the workshops, and the team involved in the long-term design project could gain a first hand experience of the topics being explored. During *fieldwork*, researchers/designers could also reach an initial understanding of the lived experience, achievable, as discussed in Chapter Three, through a micro and a macro perception of the lifeworld.

During the workshops, *fieldwork* represented the direct engagement of participants with situated instances of the urban experience chosen as the subject of the workshop. After an initial introductory phase, the workshop participants, divided into groups, were asked to explore the city and document their experiences. The *fieldwork* activity spanned over the course of few hours, and participants were either brought to specific parts of the urban environment being explored (such as in the case of the workshop of *being in transitional spaces* in Orange County), or they were provided with a map with interesting places to visit already highlighted by the workshop organisers (such as in the case of *public waiting* in London and visiting *public toilets* in Amsterdam). The micro perception participants had of the urban experiences, the one that most relate to the immediate, sensorial approach to a lived experience, and to its initial understanding, was captured through the documentations that were collected, which included pictures, notes, videos or artefacts found within the urban environment. These documentations allowed people to collect tangible examples not only of their own experiences, but also of the ones lived by other people situated in the same place. On the other hand, macro perception, the one related to people's cultural and personal background, influenced the way the experiences were actually individually interpreted and understood.

Observations were also guided by a list of optional tasks selected by the organisers, meant to help people to partially achieve a process of

"defamiliarization" towards the experiences being lived. Defamiliarization, an artistic technique introduced by Shklovsky (1965) to present things in a strange or unfamiliar way in order to make the audience reflect on them, has been used within social computing in relation to ethnographic work. The previously mentioned study conducted by Bell et al. (2005), for instance, uses the technique of defamiliarization to challenge the assumptions of a techno-centric view on the design of ubiquitous computing for the home. Within the scope of this dissertation, defamiliarization was useful for allowing researchers/designers to gain perspective towards the experiences being lived in first person. The tasks (some examples of which can be found within the Appendix) provided participants with an occasion for noticing aspects of the experiences that the familiarity of such experiences would not have allowed them to see. For instance, while exploring *public toilets* in Amsterdam participants were asked, among other things, to "find an unexpected use of personal technology in the toilet". Participants were meant to document the accomplishment of such tasks, which was then narrated after groups returned from the *fieldwork* activity.

As part of the long-term design project, *fieldwork* was, on the other hand, repetitively conducted over the course of six months, as the design team engaged with and documented first-hand experiences of commuting, through taking notes, pictures and videos of the Underground journeys, with the aim of capturing different aspects of, and perspectives on, such experiences. The team, both together and in separate instances, documented commuting at different times of the day, during rush hour and in the most popular stations of the network, experiencing the "going to work" type of commute, during quieter times of the day, experiencing the flow of tourists wandering around the city, and during evening hours, experiencing youth's pilgrimage to pubs, concerts and night clubs. An in-depth ethnographic study was conducted by one of the designers, as part of an internship at Intel, during the Summer 2006, which consisted of participant observation, photographic documentation, object shadowing and 19 semi-structured interviews. In addition, I have conducted, together with one of the designers, an

informal study on the use of Bluetooth in the Underground, to explore the potential of diffusion of a short-range peer-to-peer technology in such environment. The study consisted in scanning for other Blootooth-enabled devices in range that were visible in range, and in counting the ones that had a generic name that belonged to the device itself and the ones that had a nickname assigned by their owners. This study, somehow similar to the one conducted within the Cityware project in Bath (O'Neill et al. 2006), had the goal of testing not only the technological diffusion within the Underground, specifically of active short range wireless-enabled devices, but also people's effort in broadcasting their "Bluetooth presence", through the use of nicknames.

These exploratory methods of *inquiry* have all informed the design of a specific service that addressed the experience of commuting by the London Underground, called *undersound*. Designers conducted a process of defamiliarization by challenging each other on their macro perception, that is by encouraging each other to notice aspects of the commuting that were familiar, because of commuting habits or cultural background to one but not the others. For instance, the researcher who conducted the ethnographic study had not lived in the UK previously, so her perspective was more detached and attentive to details compared to the perspective of the other researcher and myself, who have both been living in London and using the Underground system for some years already, and were more used to the commuting experience.

While the *fieldwork* activities targeting the experience of commuting might at a first sigh look rather different from the ones conducted through the workshops, they all shared indeed the same format. Mainly they differed in terms of timescale and number of participants involved in the process; compared to the workshops, the design project spanned over the course of months instead of days, and involved mainly 3 researchers/designers, instead of 10-15.

### 4.4.3 Discussion

The *discussions* performed during both the workshops and the design project had the purpose of allowing a more high-level and reflexive understanding of the lived experiences observed and documented, and to include personal opinions and previous experiences of the researchers/designers involved in the study, most of whom came from different locations and had a diverse set of backgrounds. This reflects a phenomenology-oriented approach to the urban lived experience, which can be understood and rendered as meaningful through not only perception, but also reflection. Language and communication are not just important for bringing meanings into life (for instance for articulating people's own *disposition* towards the lifeworld, Heidegger 1962), but also for sharing such meanings with other people and creating a frame of reference for acting an interacting in the lifeworld (Schutz 1967). Discussions then allowed researchers/designers to articulate and share the meanings they attributed to the lived urban experiences they had approached.

In addition to drawing on a phenomenological view of a lived experience, and the process for understanding it and rendering it as meaningful, *discussions* also allowed researchers/designers to further defamiliarize with the experience they had lived in first person. *Discussions* around meaningful aspects of the lived experiences as perceived by researchers/designers helped to bring to the foreground those implicit meanings that are found and created while living experiences that are, in most ways, familiar. Because the researchers/designers involved in the empirical study can be considered as being already experts of everyday life (Dreyfuss 1992), and of many urban-related situations, *discussions* not only help to bring to the surface those socio-cultural aspects that are part of the hermeneutic understanding (macro perception) of a lived experience; they also allow researchers/designers to put in perspective their natural expertise of human beings, by comparing such expertise

with the one of other people with not only different backgrounds, but also lived experiences.

During the workshops, *discussions* were facilitated after the *fieldwork* activities were presented by the groups, through a slide show containing part of the documentation collected, which was commented by the groups in relation to interesting aspects observed and the tasks accomplished during the *fieldwork*. Starting then from the specific instances observed and documented during the *fieldwork* activities, during the *discussions* participants covered a range of more high-level topics that were considered relevant for the understanding of the most prominent aspects of the urban experiences explored. The *discussions* were facilitated by the workshops organisers, who made sure that all participants expressed their opinion and suggested themes for discussion; the organisers also wrote down the themes being discussed on A0 papers, in order to keep track of the flow of the conversation.

During the long-term design projects *discussions* among the researchers/designers were carried out in alternation to the *fieldwork* activities, during the first six months of the project. Such *discussions* helped the design team to understand the nuances of those aspects of commuting that seemed more obvious and familiar, to share personal experiences of commuting by the Underground and to compare these to other experience of urban commuting, in London and other cities that the researchers/designers had inhabited or visited.

### 4.4.4 Design Experimentation

A *design experimentation* is an activity that has been planned to reach the goal of actuating the *design disposition* of researchers/designers involved in the empirical study. Conceptual designs are seen as being specific types of projects, which are in phenomenological terms plans born within a lived experience as the result of the "total context of the

origin of the self, of a personal identity, in the lifeworld" (Schutz and Luckmann 1973, p.19). As mentioned in Chapter Three, the idea of projects can be related to design activities (Margolin 1995), and in particular to the situatedness of these practices, which are the actualisation of a particular type of *technological disposition*, the *design disposition*. The designs produced during the empirical study of this dissertation need to be then considered as being an extension of the urban experiences lived by researchers/designers involved. These designs are meaningful because they cannot be extrapolated from the experience in which they are supposed to be used. Because they are the result of situated practices and directly refer to lived experiences, designs are not only able to highlight specific aspects of such experiences, already emerged through *fieldwork* and *discussion*, but they also have the potential of suggesting different ways in which the experiences can be addressed by design more in general terms.

During the workshops, researchers/designers were asked, after the *discussion*, to engage with *design experimentation*, where they had to select a specific experience as lived, or observed and documented, by their group or another group, and design a new technology suited for such experience. The notion of computational technology was considered in broad terms, so that the design could be an artefact, a system, or an ecology of artefacts and systems. The design approach was also left open-ended, and researchers/designers were asked to be creative and consider a broad range of approaches that included, but were not limited to, problem-solving and critical design (Dunne 2005). The only bond to the design, which remained a conceptual piece because of time constraints, was the explicit reference to an empirical instance of the lived urban experiences, directly observed during the *fieldwork* or presented by one of the groups, and then reflected upon throughout the *discussion*. This constraint had the goal of keeping both the situated aspect of the exploration, and a common frame of references between the workshop participants. Groups could use a number of means to express their designs and the related scenarios, from drawings to clay sculptures, from Photoshopped pictures to acting. The designs produced

during the workshops, twelve in total, were not meant to be technologies potentially prototyped and commercialised, but they represented a way for further understand the lived experiences and for exploring ways in which these could be addressed by design.

The *design experimentation* conducted within the design process was part of a long-term process carried over six months and leading to a very detailed conceptual design. Different design options were discussed over the months, and related to not a specific but different instances of the experience lived and observed. The conceptual design produced was, in this case, not only meant to shed light on aspects of the lived experience not yet emerged and open up a design space, but it was also meant to become a computational system that was intended to be implemented and tested[6].

### 4.4.5 Design Critique

*Design critiques* had a similar role during the empirical study to the one of *discussions*. Indeed, the *critiques* helped putting into perspective the designs and their meaningfulness, in the context of the lived experience they were meant to be part of. *Critiques* also allowed engaging in a discussion on design issues, related to the potential implementation and use of the designs produced. This process helped to imagine how the lived experiences could be affected by the introduction of such technologies, even hypothetically. This is an important aspect of a design process, as previously mentioned in relation to the phases of *inquiry* and *exploration*.

During the workshops *design critiques* were performed after the groups had presented their designs to other participants. Researchers/designers critiqued the designs by asking questions about the design approach

[6] By other researchers involved in the BIONETS project

used, the motivations for choosing such approach and for making specific design choices, the potential for an actual realisation of the designs, and the eventual shortcomings of their usage. During the design project, critiques were mostly performed by peers within the research community interested in the design of new ubiquitous computing, both from a techno-centric and a social computing perspective, through reviews, conferences, presentations, the publication of articles and reports and comments within Weblogs or online magazines[7].

## 4.5 Experiences of Inhabiting and Traversing Urban Environments

The chapter has so far introduced and discussed the methodology used for approaching lived urban experiences, for the purpose of creating a new categorisation beneficial for the design of new everyday computational technologies. Such methodology directly involves researchers and designers interested in urban and social computing, as suggested by the theoretical standpoint adopted within this dissertation and discussed in Chapter Three. Researchers and designers, including myself, were then involved, through the conduction of three workshops and a long-term design project, in the exploration of various lived urban experiences, which included *waiting in public places*, *being in transitional spaces*, *visiting public toilets* and *commuting* by the London Underground. The interaction design phases of *inquiry* and *exploration* were tackled through a series of activities that researchers/designers had to undertake. *Fieldwork*, *discussion*, *design explorations* and *design critique* were chosen as suited activities for allowing a first-hand engagement with the lived urban experiences, a defamiliarization towards aspects of such experiences which were familiar and difficult to break down, and finally the exploration of ways in which design could address

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[7] The design produced within the project, *undersound*, was covered in a number of online magazines and weblog, and received feedback from reders of such magazines and weblogs

the experiences, and how these could be modified by the introduction of the designs produced.

It is at this stage important to better explicate the choice of specific lived experiences as the focus of the inquiries, describe the logistic of the workshops and the design project, explain the choice of participants, and finally outline the type of data gathered throughout the empirical study (more information on which can be found in the Appendix). Chapter Three demonstrated that in order to generate a categorisation of urban life it is important to observe researchers and designers engage with, and design for, lived urban experiences, and reflect on these engagements. On the other hand, Chapter Two discussed how established categorisations of everyday life within research on technology design, the ones of work and home, are the outcome of the systematisation of knowledge produced by studies conducted on a variety of experiences of being at work and being at home (e.g. Bell, Blythe, and Sengers 2005). In a similar way, urban computing is currently working toward a categorisation of urban life, through conducting studies that tackle different urban experiences, and by considering categorisations emerged within other disciplines, such as the one of the third place and non-places. In order to contribute to a categorisation of urban life that is more relevant to the design of new computational technologies compared to third place and non-places, and brings together the work already conducted within urban computing, this dissertation chose to study a variety of engagements with urban experiences and reflect on them.

The lived urban experiences chosen for the engagements allowed for the exploration of different aspects of urban life, together with the identification of commonalities between these aspects. These urban experiences were approached in terms of their socio-cultural situatedness, as the cities chosen were in different geographical locations, and presenting different kinds of urbanity.

### 4.5.1 Waiting in Public Places (Why Wait?)

The first workshop, Why Wait?, on the topic of *waiting in public places*, was held at the Bartlett School of Architecture in London, UK, on the whole day of the 27th and half a day of the 28th of July 2006 with 14 participants (including the organisers) coming from different countries, disciplines, companies, institutions and organisations. The choice of participants for the engagements will be later discussed and further described in the Appendix.

As cities grow bigger and busier, and London sets a good example for this trend, their inhabitants spend increasing amounts of times waiting to perform a range of everyday activities, or to travel between places. Waiting at the bus station, on the Underground platform, or in the train to arrive at destination are examples of this, as well as queuing at the ATM machine, waiting for a friend at the corner of a street, or waiting at the streetlight when biking from home to work. These constitute different experiences of public waiting, which often happens in presence of other people, mostly strangers, and which could be considered as a waste of time if we adopt a functional perspective, in which the goal is for individuals to perform activities in the most efficient way. Instead, public waiting was here considered as an experience, or a set of different experiences with a common denominator, in itself, with peculiarities that are important to discover and highlight because of the increasing weight they acquire when living in big, crowded and busy cities. In addition to this, experiences of public waiting are often linked to a wide use of technologies, both personal (such as mobile phones, game consoles and mp3 players) and embedded in the environment (such as public displays for bus timetables or queue management in stores, and traffic lights).

### 4.5.2 Being in Transitional Spaces (Betwixt)

The second workshop, Betwixt, on *being in transitional spaces*, was held

at the University of California, Irvine in Orange County, CA, on the whole day of the 16th of September 2006 with 11 participants (including the organisers), different from the first workshop but with a similar mixed background and set of interests, and a similar attitude toward the understanding of technological issues. Within this workshop the organisers attempted to explore not only a different urban experience, but one that was proper to a different type of urbanity, in this case related to the concept of megalopolis. By focusing on Orange County the aim was to reach a first-hand understanding of an urban environment radically different in comparison to London. Orange County is part of what is colloquially called "SoCal" (Southern California), which is considered to have grown with a megalopolis structure starting from the 1940s (Preston 1967). The megalopolis is comprised by multiple urban aggregations, which spread from Santa Barbara to San Diego and are "held together as a single system by common values, a common technology, and a common communications system" (*ibidem*, p.237). The generation of the SoCal megalopolis is the result of both processes of centralisation, consisting of people moving into urban centres, and decentralisation, in terms of people and activities spread between multiple urban centres but highly connected through a complex system of freeways. The spread of the megalopolis and the decentralisation of work have led researchers to consider Orange County as a posturban, or centerless region (Kling, Olin, and Poster 1995), where most people have to conduct activities that often involve travelling by car for many miles on the freeway. Because of this aspect, the topic of *being in transitional spaces* was considered as being appropriate for approaching a set of urban experiences characterising the urban environment explored, the one of Orange County. While for the Why Wait? workshop a particular area of London was chosen for the fieldwork and explored mostly by foot, in Orange County the participants of Betwixt were asked to drive (or were driven by the workshop organisers) to different destinations, considered by the organising team to be examples of transitional spaces; such destinations included: drive-throughs in Tustin, the pier in Newport Beach and the shopping mall called the Irvine Spectrum.

### 4.5.3 Visiting Public Toilets [A Public (In)Convenience]

The third and last workshop, A Public (In)Convenience, on the topic of *visiting public toilets*, was held at the Waag Society in Amsterdam, NL, on half a day of the 26th and the whole day of the 27th of October 2007; 21 participants (including the organisers) from 6 different countries and various backgrounds participated to the workshop. The topic of *visiting public toilets* was considered in the context of an urban environment, the one of Amsterdam, more similar to London compared to Orange County but still different in that much smaller. With this last workshop the organisers wanted to consider a set of urban experiences more specific compared to *waiting in public places* and *being in transitional spaces*, but still particularly relevant to for urban life and often overlooked by technology design research, perhaps because it is considered too mundane. The acts of going to, and being in, public toilets were approached as not only important everyday urban experiences worth exploring, but also activities that take place in environments that are often more populated with technologies and potentially inspiring for future designs compared to what technology-related research might have considered so far. What is peculiar of the public toilet system in Amsterdam is the presence of purpose-built urinals for men all around the city centre, which have a typical spiral architecture and reach probably the highest concentration around the Red Light District, because of presence of many tourists and night bars; apart from these urinals, many for-pay toilets are available throughout the city, within spaces such as stations, department stores and shopping malls. Going to a public toilet in Amsterdam represents not only a one-off experience for tourists, but can become part of everyday urban life for city dwellers traversing the city or going out at weekends, and for the street vendors that are frequent in the centre of town and whose premises most of the times do not have toilet facilities.

### 4.5.4 Commuting by the London Underground (*undersound*)

During the time in which the workshops were planned and conducted, I was involved, together with the same research team which co-organised the workshops, in design project that last for 12 months and focused on investigating the experience of *commuting* by the London Underground for the purpose of defining a new conceptual design that targeted such experience. The design produced as a result of this process, *undersound*[8], was brought to a level of specification and detail suited for prototype implementation. *Commuting* by Underground was chosen as one of the urban experiences considered as able to provide inspiration, by applying a social computing approach, to the design of new ubiquitous computing that could be compatible with the BIONETS project.

The London Underground constitutes a parallel city, a space where people travel from one location to another without seeing the above ground urban landscape that connects discrete points constituting the beginning and end of a journey. While strictly interconnected with the city that it navigates and helped to develop, the Underground also has a life of its own. This sub-polis filters and delivers a certain view of the city itself, simultaneously revealing and hiding its contradictions, representing a myth of freedom and a place of fear, exposing people to strangers that span a variety of cultures, races, socio-economic conditions and lifestyles cohabiting within the city (what Augé has called alterity; Augé 2002), and yet also painting a picture of glamorous similarity, through its famously designed advertisements. The London Underground can be seen as being representative of the symbiotic relationship between the spatial and the social in the construction of the urban experience; an interstitial space subject to ambiguity, serendipity, diversity and tension in which strangers share an intimate space and yet often perform a minimum of explicit social interaction (as suggested by Levine, Vinson, and Wood 1973).

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[8] http://www.inbetweeness.org/undersound

## 4.6 Selection of Participants and Data Collection

Including myself and the other two researchers/designers who contributed to organise the workshops and conduct the design project, there was a total of 42 participants involved in the empirical study, coming from 15 countries and 33 different institutions, organisations and companies (see Table 3, and the Appendix for further information). The calls for the workshops were open to anyone interested in the topic, although many of the actual participants were directly invited, because they were considered as having the potential to bring an interesting perspective on the topic. The idea was to look for researchers/designers with a wide range of backgrounds, research interests and design perspectives, so to create an interdisciplinary and international group of participants.

In order to capture the engagements for later reflection and analysis, the workshops were video recorded and photographic documentation of them was collected; all the workshops participants were informed that this data would have been used for research purposes. I then transcribed the video recordings, a process which generated approximately 100 pages of written material that encompasses the presentations of the fieldworks, the discussions, the presentations of the designs and the design critiques. The pictures taken by workshop participants during the fieldworks, and by the organisers during the other activities, have also been considered as data produced within the empirical study.

In order to document the long-term design project I kept a research diary (see Appendix for extracts), consisting of over 200 pages of notes collected from March 2006 until April 2007. The research diary alternates between narratives about events happening during those months that were relevant for the study, and personal and group reflections on the whole process. The research diary documents not only the discussions around the practical aspects of design, but also conversations that were carried out among the researchers about a broad range of topics that related to methodology for design exploration, research on the design of

ubiquitous computing, and design approaches. The relationship with other partners within the BIONETS project was also described, together with a number of side activities and discussions relating to the design activities and involving other researchers or professionals that had the potential to contribute to this dialogue. The diary also details the rationales for choosing a particular methodological approach over another, together with the process that led to certain design choices instead of others in the case of *undersound*. In addition, the diary contains observations, reflections and discussions that relate to the fieldwork conducted by the design team in the London Underground, and how it contributed to inform the design of *undersound*. Video and photographic documentations were also collected and integrated with the narratives.

The alternation between the narration of events, the expression of feelings towards such events and of personal and group reflections represents a starting point for reaching an understanding of not only the lived urban experiences but also the process that links such understanding with the creation of a design space for them. In addition, the diary captures the intent to consider the design process not as a discrete aspect of the everyday life of researchers, but as a situated experience that was integrated with a web of relationships and activities carried out throughout the 12 months of research.

| | | |
|---|---|---|
| **Why Wait?** | *Group One* | *Claire* – Interaction designer<br>*Alistair* – Researcher in geography/ HCI<br>*Anna* – Researcher in architecture/ urban planning<br>*Daniel* – Researcher in engineering/ HCI<br>*Jonathan* – PhD student in HCI<br>*Jill* – PHD student in informatics |
| | *Group Two* | *Chris* – Interaction designer, lecturer in architecture<br>*Matt* – Lecturer in information systems<br>*Carolina* – Phd student in information systems<br>*Sally* – Phd student in HCI<br>*Neil* – Researchers in computer science/ interaction design<br>*Sabrina* – Phd student in information systems |
| | *Group Three* | *Marike* – Phd student in information systems<br>*Adonis* – Post doc in HCI<br>*Jule* – Phd student in architecture<br>*Steven* – Researcher in interaction design<br>*John* – Interaction designer<br>*Kelly* – Phd student in computer science/ architecture |
| **Betwixt** | *Group One* | *Milica* – Lecturer in communication<br>*Alan* – Interaction designer<br>*Sean* – User experience specialist<br>*Jill* – PHD student in informatics |
| | *Group Two* | *Jeremy* – Interaction designer<br>*Marta* – User experience specialist<br>*Carmen* – Phd student in HCI<br>*Sabrina* – Phd student in information systems |
| | *Group Three* | *Bruce* – Professor in communications<br>*Liesl* – Phd student in informatics<br>*Kelly* – Phd student in computer science/ architecture |
| **A Public (in)Convenience** | *Group One* | *Mary-Beth* – Phd student in architecture/ design<br>*Philippe* – Phd student in computer science/ interaction design<br>*Jeremiah* – CRM consultant<br>*Carolina* – Phd student in information systems<br>*Kelly* – Phd student in computer science/ architecture |
| | *Group Two* | *Josephina* – Interaction designer<br>*Marijn* – Phd student in new media<br>*Isa* – Media manager/ activist<br>*Meike* – New media expert<br>*Jill* – Phd student in informatics<br>*Marike* – Phd student in information systems |
| | *Group Three* | *Batya* - Photographer<br>*Giancarlo* – Master student in product design<br>*Sabrina* – Phd student in information systems<br>*Markus* – New media expert<br>*Fatima* – Phd student in geology/ activist |
| | *Group Four* | *Janet* – Phd student in informatics<br>*Bas* – Master student in product design<br>*François* – Phd student in computer science/ interaction design<br>*Cristina* – Interaction designer<br>*Elise* – Master student in interaction design |

Table 3 – List of workshop participants, a total of 42 including organisers. In the table participants are listed correspondently to the groups they were in and the workshop they participated to. Names of participants are fictional, in order to protect their privacy.

## 4.7 Some Reflections on The Workshops

Before describing the ways in which the data collected has been approached and analysed within this dissertation, it is important to briefly discuss few issues related to the workshops conducted as part of the empirical study. First, it is important to stress the fact that the activity of *fieldwork* would normally require longer periods of time compared to the time limit imposed by a one or two day workshop. Over the course of a few hours only certain aspects of the experiences previously described could be actually observed, captured and reflected upon. In comparison, the *fieldwork* conducted as part of the long-term design project allowed a deeper engagement with the experience of *commuting* by the London Underground, as it took place over the course of several months and included iterations and deeper reflections during the process. However, the value of the *fieldwork* conducted within the workshops lies in the opportunity to capture the perspectives of a rather high number of researchers and designers on the same lived urban experience. Among other things, this variety of perspectives allows the sometime individualistic approach of phenomenology-oriented research to be partially overcome, through capturing and comparing a variety of subjective views, discovering common frames of references and better highlighting the nuances of the lived urban experience.

In order to achieve this goal, it was important and also challenging to select participants that could bring interesting and different perspectives to the experience being studied, and who were willing to share and discuss such perspectives with the other participants and the organisers. The challenge here lay both in the unpredictability, proper to social

research, of bringing together people that might not be willing to cooperate or share their perspectives in constructive ways, and in the difficulty of selecting a group of participants that was ideal, in this case interdisciplinary and with an interest in urban computing, for the purpose of the workshops. As previously mentioned, the calls for the workshops were open, and despite the fact that a selection of applicants was made and some participants were explicitly invited, some of the participants were unknown to the organisers, and his made it was hard to predict the positive outcome of the workshops.

Perhaps of the three workshops the most successful one, in terms of the data collected for the purpose of informing this dissertation, was the first one, on *waiting in public places* in London. Despite the fact that final workshop, on *visiting public toilets* in Amsterdam, was perhaps better organised because of the lessons learnt from the previous two, the first one better reflected the variety of perspectives previously mentioned as being one of the main values of the workshops. Mostly, it was during the workshops' *discussions* that these perspectives were not only brought to light, but also shared and worked into a common frame of reference between participants. This frame of reference reflected the socially constructed aspects of the lived urban experiences approached. If we consider that the facilitating role of the organisers was consistent among the three workshops, the outcome of the *discussions* was ultimately in the hands of participants, and their ability and willingness to share and be open to a variety of perspectives. The Why Wait? workshop indeed presented, in terms of participants, the right number, variety and willingness to collaborate that gave rise to a very fruitful *discussion*.

In sum, in order to explore through workshops, given the limited amount of time and a high variety of nuances and perspectives of a lived urban experience, it is extremely important, although very challenging, to select a group of participants that allows both discussion and group work (e.g. between 15 and 20), who come from different socio-cultural backgrounds and disciplines but have the skills required for the workshop activities (e.g. a *design disposition*), who are interested in the theme being

explored and possibly have a compatible approach to such exploration (e.g. social computing). Together with the issues discussed within this section, other limitations and ways to address these are outlined later on in the chapter (4.9). The next sections, however, will describe in detail the analytical framework adopted within this dissertation for approaching the data collected through the empirical study.

## 4.8 Data Analysis: Hermeneutic Phenomenology and Reflexivity

The data collected over the course of the empirical study was analysed using reflexivity and hermeneutic phenomenology. In order to reach an overall understanding of the urban experiences explored, and of the commonalities they present, so to create a new categorisation of urban life, and to unpack the connection between this understanding and the design space it encompasses, it was indeed considered as necessary to engage in a process of reflection on the activities performed, and to follow a hermeneutic phenomenology framework of analysis. This process of reflection represents an empirical solution to the second sub-question introduced in the previous chapter, Chapter Three. The next section will further explain the hermeneutic phenomenological frame of analysis adopted to analyse the data produced within the empirical study.

### 4.8.1 Hermeneutic Phenomenology

As already mentioned throughout the dissertation, Heidegger (1962) supports the idea that an understanding of lived experiences can only be reached in a situated manner, as it is implicit in the being-in-the-world. Hermeneutic phenomenology is then the art of understanding lived experiences by interpreting how meaning is found and created, in a cyclical way. Understanding and meaning are not static and potentially

grasped once and for all, but they can only be interpreted as ongoing processes; this acknowledgement leads to the awareness that it is impossible to reach a final categorisation of lived experiences. However, this dissertation seeks to contribute to this dialogue, by attempting to generate a more holistic categorisation of urban life, as it has already happened in the case of the categories of work and home.

In the context of this research, hermeneutic phenomenology has supported the interpretation of the lived urban experiences, which have been constantly redefined, in terms of meanings found and produced, throughout the empirical study. An understanding of the experiences cannot be reached by analysing the data only once the empirical study is over, but by considering how this understanding has born out from the living the experiences and has evolved and changed throughout the empirical study as an ongoing process. Also, the activities of *fieldwork*, *discussion*, *design experimentation* and *design critique* have to be approached as able to bring out different meanings and understandings of the lived experiences, which need to be related to each other, and analysed in a cyclical way in order to provide a more holistic view of such experiences. However, this view still needs to be considered as not completely able to represent the ongoing flow of lived experiences and of the meanings attributed to them. Such lived experiences and their meanings indeed constitute an ever-changing work in progress that can be only partially captured. In addition, each of the urban experiences needs to be approached and interpreted in terms of the intersection of its micro and macro aspects, and of the different perspectives that have been applied to the understanding of such aspects. Connecting the different aspects of urban experiences, the different meanings attributed to them, their instances and the broader processes and phenomena of which they are an integral part of are the challenges of adopting a hermeneutic phenomenological mode of analysis. For instance, according to this perspective, computational technologies cannot be analysed separately from the specific occasions in which they are used and the socio-cultural dynamics that surround their usage.

Adopting a hermeneutic phenomenological approach is finally useful for understanding how the urban experiences can be addressed by the design of new everyday computational technologies. By engaging in design experimentations and design critiques, researchers/designers automatically identify aspects of the lived experiences relevance to design, because of their *design disposition* towards the lifeworld. However, these aspects and the relationship between lived experiences and design remains mostly implicit, and needs to be unpacked and interpreted when analysing the data. A hermeneutic phenomenological perspective supports, through a process of cyclical interpretation, the emergence of those aspects proper of a design process that are mostly understood and acted upon in an instinctive and implicit way by researchers/designers.

Figure 1 shows how the data collected through the empirical study has been analysed using a hermeneutic phenomenology perspective. Data collected through the *fieldwork* activities and the *discussions* were related to each other and interpreted in a cyclical way in order to unpack an overall understanding of the lived urban experiences explored, able to reflect researchers' and designers' varying perspectives. In parallel, the data collected through the *design experimentations* and *design critiques* were analysed in order to see how the designs reflected the understanding that emerged from the *fieldwork* activities and the *discussions*. The results of these cycles of analysis have then been compared and analysed, as well, in a cyclical way. This process was repeated in order to reach an increasingly higher level of abstraction.

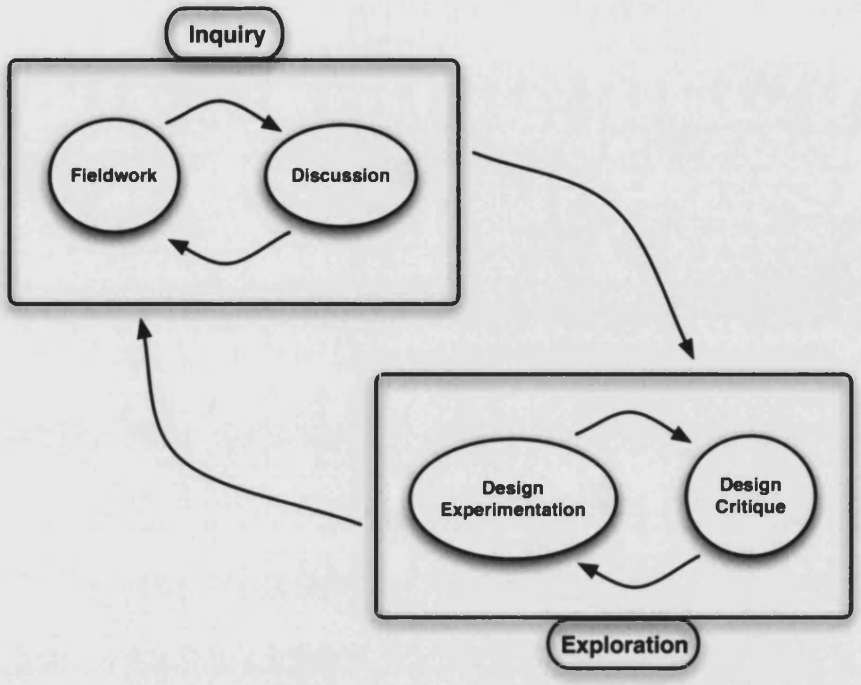


Figure 1 – Summary of how the data produced during the empirical study has been approached and analysed: a hermeneutic cycle was created through interpreting the data from the fieldworks and the discussions, and in relating this interpretation to how the understanding of the lived experiences was addressed through design experimentations and design critiques

### 4.8.2 Reflecting on the Design Process

Reflexivity, which is also established as a research methodology (Alvesson and Sköldberg 2000; Ashmore 1989), represents an important aspect of hermeneutic phenomenology. Self-reflexivity implies "an ongoing conversation about the experience while simultaneously living in the moment, actively constructing interpretations of the experience and questioning how those interpretations came about" (Laverty 2003). While Husserl's phenomenology (Husserl 1970) implies, from a methodological perspective, that the researcher engages in a self-reflective process only to identify his/her biases and assumptions and leaving them on the side (bracketing or epoche), Heidegger's hermeneutic phenomenology (Heidegger 1962) encourages the researcher to take into account such

biases and assumptions and include them in the analysis of the data. In this case, both the personal experience of the researcher, and his/her reflections, contribute to the overall understanding of the experience and its meaningfulness. According to hermeneutic phenomenology, reflections should be done not only *a posteriori*, but also throughout the whole empirical study, and one should attempt to include the participants of the study during this process, in order to provide not only validation, but also multiple perspectives on the experience, and reach a shared understanding of how the experience is rendered as meaningful.

In the context of this research, the reflexive process not only applies to the understanding, and subsequent categorisation, of the urban experiences, but also to the understanding of how these can be targeted by design. From the design perspective, documenting the design process and reflecting on it is already a tradition within design research, mostly derived from Schön's constructivist notion of the reflective practitioner (Schön 1983). The author claims that, in order to improve the understanding of how knowledge comes from and contributes to professional practices, a reflective practice needs to take place during the process of dealing with the real-world, messy and practical problems that professionals encounter on an everyday basis. Applied to design, reflective practice implies that practitioners or researchers engage with design practice in order to understand how real world problems can be approached and solved, and to extrapolate from the process the knowledge that is being both applied and produced. Referring, in this case, to architecture, Schön introduces an argument that can also be applied to design more in general terms:

> A designer makes things. Sometimes he makes the final product; more often, he makes a representation – a plan, program, or image – of an artefact to be constructed by others. [...] The designer [...] shapes the situation, in accordance to his initial appreciations of it, the situation 'talks back' and he responds to the situation's back-talk. In a good process of design, the conversation with this situation is reflective. In

> answer to the situation's back-talk, the designer reflect-in-action on the construction of the problem, the strategies of action, or the model of the phenomena, which have been implicit in his moves, (*ibidem*, pp.78-79).

According to Cross (2001), the notion of the reflective practitioner contributed to establish a discipline of design, where researchers, because of the applied nature of design, need to engage in design activities in order to understand how knowledge is generated through the act of designing, and how this knowledge can be then generalised and theorised. This dissertation adopts this perspective and supports the idea that knowledge can be generated by reflecting on the different phases that characterise the design process, which have been identified in the previous sections of this chapter as being *inquiry*, *exploration*, *composition*, *assessment* and *coordination* (Löwgren and Stolterman 2007). As already mentioned, Fallman (2003) sustains that the concept of reflective design leads to a pragmatic approach to design, which is in line with a phenomenological research perspective, as it considers designers as part of a situated practice, immersed in a web of circumstances that need to be considered when analysing their work and the process that led to it. Therefore:

> Because of its focus on the situatedness of the designer in the lifeworld, and the emphasis on pre-reflective knowledge over theoretical and methodological guidance for action, the pragmatic account not only in an innate way fortifies questions about authority and responsibility of the design process, and suggests the interweaving of roles, practices and technologies involved in design as focal issues, it also connects the pragmatic account of design with the phenomenological attitude" (*ibidem*, p.85).

According to the phenomenological attitude, reflective practice requires that designers describe, in detail, their experience of designing new artefacts, and reflect on it, also by consulting other actors involved in the

process and their views. Because design is often a collaborative and interdisciplinary practice, there are many factors and actors at play during the process; the way design choices are made and knowledge is applied to, and emerges from the process needs, then, to be understood in relation to a complex scenario of actions and interactions.

Parnas and Clements (1986) support the importance of keeping design documentation. The authors maintain that design often cannot be described as a rational process, but that documentation helps making sense of how certain decisions are made and contribute to the replicability of the process itself. In the documentation, they stress, not only the final decisions need to be recorded, but also "the design alternatives that we considered and rejected. For each, we explain why it was considered and why it was finally rejected" (*ibidem,* p.256). This procedure can contribute to the unpacking of bricolage activities (Weick 1993; Ciborra 2002), and of the tortuous and improvised path that brings designers to deal with work constraints. Raein (2005) claims that:

> By carrying out the act of writing, they [designers] describe to themselves, in self-reflective mode and to their audience, the steps or processes which are fundamental to and formulate their work. This act of writing demands of the designer to look at him/ herself and question the feelings and thoughts they experienced as they come to a realisation about their work. These understandings are contextualised by attendant theories that provide designers with a critical framework, in order to phrase their arguments, these new understandings act as a basis for debate about the role and performance of design (*ibidem*).

In a certain way reflecting on the design process conducted by oneself holds similarities to what has been called auto-ethnography (Bochener and Ellis 2002) or self-study (Bullough and Pinnegar 2001), where the researchers study themselves in attempt to understanding a phenomenon they are directly involved in. Being a reflective practitioner

often involves engaging with a self-study, but this is applicable if only one person is involved in the process. Research projects on ubiquitous computing are generally comprised of a team of researchers, and in the case that they are adopting a social computing approach, the team will also be of an interdisciplinary nature. Although a self-study could, therefore, not apply to this research, it carries a similar goal that is to attempt to unpack personal perspectives and assumptions, and to see how they have contributed to a specific understanding of the topic being explored.

Within this dissertation, the research diary (Hughes 2000) represents a form of documentation that is generated according to the pragmatic design perspective, which is, as previously demonstrated, coherent with a phenomenological standpoint. The research diary captures the empirical study, with a specific focus on the long-term design project, while it unfolds, and sets the basis for, the hermeneutic phenomenological analysis of the urban engagements.

### 4.8.3 Data Analysis and Presentation

The research diary, written in first person, has been integrated with other forms of documentations collected during the empirical study, such as the workshop transcripts and visuals collected during the empirical study. This allowed me to approach urban life from a variety of perspectives and points of view that reflected the engagement of researchers and designers, so that a richer understanding of urban life can be achieved. While hermeneutic phenomenology is primarily concerned with finding the meaning of an experience within a textual presentation of the data (Radnitzky 1970), this dissertation has expanded its scope to include photographic documentations that supported and triangulated the textual data collected. In addition to this, photographs acquired an important role within the empirical study, as they were used by the participants as frames of reference to present and discuss the urban experiences

observed, and as an inspiration for the designs. This photographic documentation, then, became useful in achieving the goal of the data analysis, which was to retrieve the characteristics of the urban lived experiences that were rendered as meaningful by the participants of the empirical study, find the commonalities between the different experiences approached, and finally understand how these characteristics and commonalities can be, and were, taken into account and targeted by design.

More practically, the identification of the meaningful characteristics of each of the urban lived experiences approached was achieved through: first, retrieving statements about how participants have experienced the topic investigated (horizonalization), second, grouping these statements into units of meaning, third, contextualising these meanings according to where, when and by whom they were generated in the first place, fourth, cluster the units of meaning into *categories* and, finally, generating descriptions of what was considered to be the *essence* of the experience (Moustakas 1994; Creswell 1998). This process was iterated for the different urban lived experiences considered, and the various categories and the essence of the experiences were compared in order to find commonalities and to create a more holistic, broad-reaching categorisation.

Therefore, the urban experiences will not be considered specifically but addressed in terms of a more holistic categorisation able to encompass their commonalities. This choice is due to the main goal of this research, which is, at the same time, to consider the urban experience in terms of its richness and variety, and also to introduce a broader categorisation that can be addressed in terms of a design space for urban computing. To achieve this goal, hermeneutic phenomenology becomes particularly useful as it brings the analysis back and forth between the specific instances and aspects of the individual experiences and the broader meanings that unify, from the perspective of different individuals, these experiences. For instance, waiting for a friend on the corner of a busy street or being stuck in traffic on a freeway are different, and culturally

specific, experiences, yet they both have aspects, which could be perceived, lived and rendered as meaningful in similar ways by individuals.

The analysis of the data collected throughout the empirical study will be analysed and presented in Chapter Five and later discussed in Chapter Six. Chapter Five will outline the results in terms of a preliminary categorisation of the lived urban experiences that has emerged primarily through the *fieldwork* and the *discussions*. A series of tensions will be identified as proper to the lived urban experiences considered, and it is these tensions that comprise the preliminary categorisation of urban life. Such a categorisation will be presented with a descriptive style of writing, which is consistent with the phenomenological perspective adopted. The description of the urban lived experience in terms of tensions will be performed by using a chronological approach, starting from the moment in which an individual enters a particular urban environment to the moment he/she exists that environment; this approach has not been adopted to consider the experience as a series of events from beginning to end, but, rather, to maintain a situated view of the experience and create a connection between the different aspects of the experience that are being presented. The way these aspects have been approached and described is consistent with the way a lived experience has been conceptualised in Chapter Three, using a phenomenological perspective. Accordingly, the phenomenological concepts discussed in Chapter Three will be then related to the way the categorisation of lived urban experiences has been achieved and described.

The description of the tensions proper to lived urban experiences, performed in third person, will be alternated with reflections and narratives, in first person, which have emerged from the workshops and the research diary. While these reflections and narratives are directly quoted from the diary, the same does not apply for the workshops, where statements made by the participants have been reconstructed and adapted from the dialogues that occurred during the workshops. Because these dialogues are fragmented, as conversations between different

people often are, it would be confusing to present them in their original form; instead, thoughts and reflections coming from the workshop participants will be summarised to provide an incisive view of their personal takes on the urban lived experiences. These reflections will be both directed towards the experiences lived during the workshop and to previous personal experiences of the participants that are considered by them to be relevant for reaching an understanding of the urban experiences themselves.

The second part of Chapter Five will then begin to highlight the ways in which the preliminary, tension-based, categorisation of lived urban experiences relates to the design of new technologies, by focusing on how the tensions proper of such experiences have been, mostly implicitly, addressed through the *design experimentations* and *design critiques*. The identification of this relationship will be supported by the research diary, through the combination of descriptions of the design and reflections on the motivations leading to certain design choices rather than others, and by the workshop transcriptions through the combination of design presentations and the design critiques. A selection of exemplary designs, which emerged from the *design experimentations* will be considered in terms of how they have addressed the lived urban experiences and contributed to highlight their aspects that can be relevant for the design of new everyday computational technologies. The ramifications of the relationship, which begins to emerge between the preliminary categorisation of lived urban experiences and the designs will serve as the basis for a holistic, higher level and actionable categorisation, which will be presented in the last part of the chapter, and later addressed in Chapter Six in terms of "in-between-ness".

## 4.9 Limitations of the Methodology Used

Because of the novelty of the topic explored and the methodologically rich field of social computing, the methodology adopted within this

empirical study is varied, original, and explorative. While this implies that such a methodology has the potential to bring a novel approach to the research community, such approach does not draw from a single method and is preliminary in itself. The reflective process was, therefore, also aimed at making sense of the whole methodological process, and to produce knowledge that is potentially reusable by researchers and designers. However, only future studies in this direction will be able to further validate the empirical study conducted as part of this dissertation, and therefore this method should not be considered as the primary contribution of this dissertation. Nonetheless, it acts as a living first step towards an understanding of how the social computing perspective might begin to further define the complex experiences, which it seeks to explore.

It should also be noted that my personal involvement in the process posed the challenge that I not lose perspective on the process I was undertaking. Doing so would have made it difficult to reflect with fresh eyes on the positive and negative aspects of the empirical study and on its outcome. Even within the interpretative tradition of qualitative research, different approaches suggest techniques that enable the researcher to acquire a rather detached perspective on the study he/she undertakes, which often also involve other people rather than himself/herself (Creswell 1998). However, in the context of this study the personal involvement of the researcher is, in fact, beneficial factor for various reasons. Most importantly, it is consistent with a hermeneutic phenomenology-oriented approach, where the researcher contributes to the understanding of the lived experience through his/her participation to the enquiry process and his/her personal perspective on it. In addition to this, the participatory approach is important within a design process to better understand the details of the work involved and the practice itself. The previously described notion of the reflective practitioner (Schön 1983) motivates engagements with the practice being studied, in order to understand it and contribute to its advancement; this approach, as Cross (2001) notes, can be well applied to research that looks into design, which ultimately involves the use of a specific set of skills and knowledge.

Being exposed, and contributing, to design activities and to the phases of *inquiry* and *exploration* can help to adopt the frame of mind of a designer (*design disposition*), and therefore better understand the process and how it is conducted.

Another limitation of the methodological perspective adopted by this dissertation is the fact that the urban experiences must be abstracted and compared, in order to find the commonalities that can lead to the determination of a new categorisation of urban life. This process might seem to limit the richness of the lived urban experiences explored, together with their socio-cultural situatedness. However, it is necessary to reduce the complexity of urban life in order to eventually achieve a categorisation of the experiences it encompasses. In this process, culturally specific aspects of the experiences, and the different backgrounds of people living them, contributed to understanding how seemingly different experiences present aspects in common that might not be explicit or easy to identify at first, and how people might assign very different meanings to seemingly comparable experiences. Finally, it is implicit the assumption that researchers/designers interested in ubiquitous computing who decide to address urban experiences similar to the ones considered within this dissertation are still strongly encouraged to take into account the socio-cultural specificities of such experience before engaging in the design of new technologies.

## 4.10 Summary of Chapter

This chapter elucidated the methodology used for investigating lived urban experiences, and strengthen the answer provided in Chapter Three to the second research sub-question. Such methodology is then meant to help empirically generating a categorisation of urban life for the purpose of informing the design of new everyday computing. According to the theoretical standpoint adopted and discussed in Chapter Three, an interpretative qualitative methodology was used to study researchers and

designers engage with a series of urban experiences: *waiting in public places* in London, *being in transitional spaces* in Orange County, *visiting public toilets* in Amsterdam and *commuting* by the London Underground. An interdisciplinary group of researchers and designers was indeed involved in the empirical study, for which I co-organised three workshops and a long-term design project. Researchers and designers engaged in first person with the lived urban experiences and with design activities, through *fieldwork*, *discussion*, *design experimentation* and *design critique*. Such activities, inspired by a phenomenological perspective, were chosen for the purpose of contributing to the *inquiry* and *exploration* phases of a design process aimed at understanding urban life and opening up a design space to address it. Hermeneutic phenomenology and reflexivity have been used to analyse the data produced throughout the empirical study, with the goal of interpreting the meanings emerged from, and attributed to, the urban experiences during the various activities and exercises, highlighting their relevance for the design of new everyday computational technologies and finally generate an actionable categorisation of urban life.

Chapter Five will then present the results of the empirical study as they have emerged from the analysis of the *fieldwork* and *discussions* first, in relation to the understanding and preliminary categorisation of the urban experiences, and of the *design experimentations* and *design critiques*, in relation to how such understanding and categorisation have proven to be relevant to design. The chapter will finally show a tighter relationship emerged between the phases of *inquiry* and *experimentation,* thanks to the hermeneutic cycle that has been performed. This analysis will lead to the creation of an actionable categorisation of urban life.

# Chapter Five – Analysis: The Tensions Proper to Urban Life

## 5.1 Introduction

The previous chapter, Chapter Four, described the methodology used for conducting a study of the exploration of lived urban experiences, for the purpose of introducing a categorisation able to inspire the design of everyday computational technologies. This chapter will present the analysis of the data collected from the empirical study by focusing first on the understanding of the urban experiences, which emerged through the *inquiry* phase (*fieldwork* and *discussions*), then, secondly, by examining the relationship between that understanding and the design of new technologies, which emerged during the *exploration* phase (*design experimentations* and *design critiques*), and, finally, by considering the hermeneutic cycle created between these two phases.

The categorisation of lived urban experiences will be presented in terms of the most prominent features that contradistinguish them, a series of tensions that arise from the situated (in terms of *understanding*, *actions* and *interactions*, and *dispositions*) relationships that are established between people inhabiting and traversing the urban environment, the environment itself and the regulating authorities. In the second part of the chapter, six of the designs produced will be described and analysed in terms of how they address the tensions proper to the lived urban experiences. This will serve to demonstrate how the *design dispositions* of the researchers/designers have produced an understanding, which has both influenced, and has been influenced by, the way they have generated specific design concepts.

To further explicate this point, the chapter will demonstrate how the hermeneutic analysis of the data, bringing together the different phases

of the empirical study (*fieldwork*, *discussions*, *design experimentations* and *design critiques*), allowed for the creation of an actionable, holistic categorisation of urban life. The end of the chapter will then be given over to describing this categorisation, which is comprised of two parts: sites for design and approaches to those sites. More specifically, this chapter will identify three main sites for design – *awareness*, *engagement* and *legitimisation* – able to encompass the tensions proper to urban life and relate them to the design of everyday computational technologies. In addition, three ways in which such sites can be addressed will be presented, - *integration, mirroring*, and *alteration*. Such design approaches not only reflect the motivations behind the planning of new technologies, but also stress the potential these technologies have to change the current state of urban experiences. The categorisation of urban experience then becomes not only an interesting and rich analytical construct, but also a space, which is actionable in terms of design, precisely because it builds upon the conceptualisation of the urban experience, which researcher/designers already implicitly, or less often explicitly, create and draw upon.

## 5.2 Towards a Phenomenology-oriented Categorisation of Urban Life

It was shown in the previous chapter, Chapter Four, how hermeneutic phenomenology and reflexivity has been used for analysing the data produced throughout the empirical study conducted within this dissertation. The analysis will contribute to highlight and interpret the understanding of the urban experiences that was produced during the study, and the ways in which such understanding was addressed by design. The sections that follow will present, first, a preliminary categorisation of the urban experiences based on the conceptions, which emerged from the analysis of the *fieldwork* and the *discussions*. This categorisation will present urban experience in terms of a series of tensions that relate to being-in-an urban environment. The description of

these tensions will be conducted according to the phenomenological perspective that has guided the analysis and the concepts highlighted and discussed in Chapter Three. Such description will be supported by reflections, elaborate in a suitable format, which emerged directly from the data. As mentioned in Chapter Four, these reflections will be presented by summarising extracts from the dialogues recorded from the workshops and documented within the research diary, in order to represent the perspectives of different researchers/designers involved in the empirical study.

### 5.2.1 Approaching Urban Life in Terms of Tensions

The situated aspect of the urban experiences can be approached in terms of the ongoing relationships created and negotiated between people inhabiting and traversing the urban environment, the environment itself and the authority regulating it. Such relationships can lead, immediately, or over a period of time, to the creation of tensions, which, as we will see through the course of this chapter, can serve to represent a variety of nuanced aspects of the urban experiences considered in the course of the empirical study. The interpretation of urban life in terms of tensions is not a new concept. Indeed, studies from sociology and cultural geography often focus on the tensions, which arise in social or public settings. It was mentioned in Chapter Two how the relationship between citizens and the regulating authority is seen in many cases as involving the latter imposing strategies of control and regulation by means of a variety of tools, including technologically enhanced ones (Scott 1998)(Massey 1993). This relationship leads to a tension that is often negotiated by citizens by adopting and performing tactics through repurposing the tools used by the authority figures, in order to circumvent the imposed regulations (De Certeau 1984). However, tensions do not only arise between authorities and citizens. Within urban computing, Brewer (Brewer 2009) highlights the ways in which a variety of cultural geographers study ongoing tensions that are generated within

urban environments between different groups of people (Suzuki 1976; Grengs 2004). According to Brewer, while some cultural geographers have stressed that urban tensions can be an outcome of the co-existence of different ethnic groups and social classes within the same environment, others have claimed that tensions can also arise due to a clash between different paces and lifestyle rhythms, fostered by modernisation (Hubbard and Lilley 2004). Often within these accounts of urban life, technologies are seen as playing the role of increasing and strengthening the tensions proper to it. For instance, according to Graham and Marvin (2001), the technologies inscribed in the urban landscape, and used by people inhabiting and traversing it, contribute to fostering separation and segregation among social groups.

The tensions described below, which have emerged from the empirical study conducted as part of this dissertation, resonate with, and are partially inspired by, the work emerged within cultural geography. In particular, the tensions emerged from the engagements with a variety of urban experiences reflect, in the same ways many studies within cultural geography do, the complex relationship that is created and negotiated in a variety of ways between different people who traverse and inhabit the urban environment, and between people and the environment itself. However, it is important to stress the different ways in which the generation and negotiation of urban tensions are approached and interpreted within this dissertation. First of all, the previously mentioned studies mostly focus on the high-level, emergent facets of urban life, involving political and social aspects of wide range and high impact. Instead, the phenomenologically driven analysis of the empirical data has focused on urban dynamics happening at a smaller, more interpersonal, scale, the interactions, which comprise the everyday, mundane aspects of urban life. Second, the role that technologies play within these tensions is not conceived merely in negative terms, as instrumental for imposing power and control, or as fostering segregation between social groups. Instead, technologies are regarded, in phenomenological terms, as tools that *mediate* the perception and interpretation, and therefore the experience, of urban environments. Technologies are, then, not forced

into an existing order, but they grow within urban environment organically and are used and interpreted according to an instinctive *technological disposition* that people have. Technologies are certainly not neutral, but this dissertation will demonstrate that they ought to not only be conceived of in purely negative terms or merely as instruments of power. Rather, while technology can be used to maintain, embed or provoke urban tensions, it can also be used to negotiate, navigate and mediate such tensions.

This chapter will then build upon, in part, the work of Arnold (2003), who attributes to mobile phones the metaphor of "Janus-faces", as they are, in his terms:

> Not simply a mechanism for achieving a given outcome, where desires, means and ends can be understood in reasonably unambiguous, linear and stable terms. Rather, their performance reconstitutes desires and ends, as well as mechanisms, and to account for this reconstituted socio-technical landscape, we need an approach that allows theoretically and empirically for contrariness, paradox and irony to arise within the analytic frame" (*ibidem*, p.232).

So, not only can of the adoption and use of technology trigger a series of tensions, but also, as we see from Arnold, it can support the coexistence of contradictory effects and experiences of the technologies themselves (see also: Jarvenpaa and Lang 2005). Within this dissertation, then, computational technologies are indeed approached by taking into account their paradoxical power to both create and alleviate tensions.

Finally, the tensions that will be presented not only serve to contradistinguish urban life, but are also be deeply related to, and relevant for, the design of new computational technologies. This account, indeed, will constitute a subset of the urban tensions and is not meant to be exhaustive of everything that urban life that is comprised of. Rather, the tensions, which serve to comprise the preliminary categorisation will

serve as the foundation for a more holistic categorisation of urban life that remains relevant for design.

### 5.2.2 A Phenomenological and Design-oriented View of Urban Tensions

While the previous subsection highlighted the ways in which the preliminary categorisation, which will be presented, draws inspiration from cultural geography work, the presentation of the tensions will be strongly rooted in a phenomenological and design-oriented perspective. Specifically, the tensions will be discussed in terms of the way in which they relate to and affect how the urban environment is being perceived and *understood*, in terms of opportunities and constraints offered for situated *actions and interactions*, and in terms of people's *disposition* towards the experience itself. In the coming sections, the tensions proper to the lived urban experiences will be categorised as:

- Tensions that are created according to, and affect, people's *understanding* of the world as a *transitory destination*
- Tensions that are created by, and give rise to, people's *actions* and *interactions*, as they alternate between *hiding and seeking*
- Tensions that are created by, and give rise to, people's *disposition* of *borrowed empowerment*

The first set of tensions relates to the way in which people perceive and *understand* the affordances and rules presented and offered by the environment, which are defined either by a regulating authority (top-down), or by people's *actions* and *interactions* over time (bottom-up). The affordances include both the computational technologies present in the environment and those carried and used by people, and are all rendered as meaningful in terms of enframing, the *technological disposition*. All of the affordances and rules, either implicit or explicit, proper to the environment both allow choices and set limits to people's situated *actions* and *interactions*, and convey a perception of either

control or lack of control towards the contingent situation. This process creates a set of tensions that reflect the ways in which the urban environment is perceived and interpreted by the people inhabiting and traversing it.

The second set of tensions relates to the level of engagement people show towards others, the environment and the authority regulating it. This implies people *acting* and *interacting* according to the rules and affordances at play within the urban environment, process, which leads to the generation of tensions. These tensions represent different ways to adapt and react to the urban environment, and define a range of urban behaviours that involve different levels of negotiation.

The last set of tensions relates to how people feel about the urban experience, that is their *disposition* towards the lifeworld, which is linked to, and affected by, their *actions* and *interactions*, together with the rules and affordances that enable and limit them. People's *dispositions*, and the way these are manifested, with and without the use of computational technologies, can lead to the generation of tensions that are negotiated in various ways.

According to the empirical study, the ways in which these tensions are expressed, interpreted and dealt with is situated and highly influenced by the socio-cultural specificities of the urban environment and the backgrounds of people inhabiting and traversing it. Eventually, it is the iterated and contextual interrelation of the three sets of tensions, which creates a specific kind of urban experience. This set of tensions, then, will be presented and described in detail in the following sections of this chapter.

## 5.3 Understanding the Urban Experience

As previously stated, the urban experiences explored during the course of the empirical study – *waiting in public places*, *being in transitional spaces*, *visiting public toilets* and *commuting by the Underground* - can be preliminarily categorised in terms of a series of ongoing tensions that characterise the relationship between people, the environment they inhabit and traverse and the authority regulating it. This section of the chapter focuses on the first set of tensions, the ones that make the urban environment be perceived and *understood* in terms of a *transitory destination*.

The concept of *transitory destination* is itself representative of a tension in its very wording, and it was chosen because it captures the way in which the urban environment is also conceived of and, interacted with, by its inhabitants. For example, specific instances of a particular sort of urban environment, like the bus stop, might constitute destinations, but as these destinations are sometimes merely stops on the way to other places, they can also feel transitory at the same time. This section, then, will be given over to the description of tensions, which address the relationship between people and the spaces they inhabit. These tensions centred around *transitory destinations* will be divided into two groups. First, this section will describe tensions, which provide opportunities and constraints with different levels of flexibility (constrained opportunities). These opportunities and constraints are set by the affordances physically present in the environment, and can be interpreted and *understood* by people in a variety of ways. Second, this section will highlight the tensions that relate to the legibility of the space, often mediated by technologies, and created over time by cyclical relationships between people, the environment and the regulating authority (layered legibility).

### 5.3.1 Constrained Opportunities

***Closed vs. Open*** - An urban experience often begins when people traverse, or dwell in, a specific space in order to perform a certain activity. Consequently, one of the first concepts, which emerges when we attempt to characterise such an experience is the "access", which people have to that space. The issue of access is often, but not necessarily, linked to how an authority manages and regulates a particular space, and because of the variety of urban spaces it is difficult to build generalisations about how this management is performed or manifested. However, access to the space can also be socially negotiated, or can be the result of a negotiation between the regulating authority and people entering and inhabiting the space.

Broadly speaking, the access can be either open to everyone without discriminations, or it can be open to only certain typologies of people (i.e. restricted access). Even when open to everyone, entrance may, or may not, come at a cost, which can further restrict those who do not have the financial means to enter. The reflection below summarises how a participant felt about accessing public toilets in Amsterdam, specifically in relation to their own culture:

*What is weird is that wherever I go I never pay for public toilets. I just, for instance, walk into a hotel and go to the toilet, or even where there are toilet attendants I just go and not pay them. Maybe it's part of my culture, as where I'm from (i.e. Nigeria) you never have to pay for toilets, but here we've been only talking about paying to go to toilets, and perhaps it's something specific to here, to Amsterdam. But even since I've been here I've never paid. (Jeremiah, group one, A Public (In)convenience)*

The urban environment having an open, a closed, or a restricted access to specific locations also conditions the affordances of such environments, and leads to tensions in terms of the different situated actions and

interactions that such affordances allow. The reflection presented below refers to how these tensions can be perceived:

*I thought it was interesting that there were so many benches at the mall, it just made me realize how many few benches there are on the streets of San Francisco. Like when my parents came to visit, they were complaining that they did not find anywhere to sit. The reason, I think, is that they want to prevent homeless from sleeping on the benches. And going back to the mall, there were so many benches 'cause I bet that they would not allow homeless to enter the space in any case, so why bother. (Marta, group two, Betwixt)*

This is also the case of affordances present in the environment to fulfil specific purposes (e.g. benches for relaxation and socialisation) being used and interpreted in unexpected ways by people inhabiting the space (e.g. benches used by homeless people to sleep on), and causing a reaction from the authority according to such interpretation (e.g. benches removed from urban sidewalks to avoid homeless people to sleep on them).

***Support vs. Discourage Interactions*** - The layout and design of urban spaces has also the potential of encouraging or discouraging people to interact with each other; interactions between people might happen for different purposes, such as information retrieval, collaboration, competition or communication. In certain cases the space is arranged to support, intentionally or not, interactions and processes of socialisation, while in other cases the space is not, or is not perceived as being, suitable for socialisation. Tensions here arise when layouts that are supposed to be suitable for interactions do not meet social expectations, or vice versa, when layouts that are not meant to support interactions are used for such purposes. These tensions can have an effect in terms of management of the space, if they lead to behaviours that are not acceptable to the eyes of the regulating authority, or have an effect on the perception of the space if such behaviours appear unusual to the

eyes of people inhabiting the space. In the context of how the experience of visiting public toilets was perceived by workshop participants, unusual behaviours are not as rare as one might think, in terms of socialisation:

*Public toilets are not really places for socialisation, but it's also true that often you see girls going there together to chitchat and share gossips or stories. Sometimes I wonder why there is not a sofa there, as it would make the space more suitable for such interactions. (Fatima, group three, A Public (In)convenience)*

In a similar way, environments that are often seen as discouraging socialisation can be approached in creative ways by their inhabitants, such as in the case of the London Underground:

*It was about rush hour in the Tube, and everyone was at the platform waiting for the train, looking a bit nervous and uncomfortable, and then there were these two girls sitting on the floor and just chatting non-stop, as it was the most natural thing to do in that occasion. I remember I wasn't the only one looking at them and being really surprised about their behaviour. (Jill, group one, Why Wait?)*

In addition to a serendipitous adaptation of the urban environment for socialising purposes, the habit of being in a specific place can offer, with time, opportunities for creatively appropriating the space, in order to make it more personal or close to one's needs. This can happen, for instance, in the case of spaces that are usually transitional for the majority of people inhabiting them but are, on the contrary, non transitional for people working there:

*Those two girls were obviously, by the way they were dressed, working on the bar on the pier (see Figure 2), and it seems they were taking their breaks on that bench there, like that was their usual place to wind down. (Liesl, group three, Betwixt)*

Figure 2 – This image* showing workers taking a break on the pier represents an example of the tensions that involve interacting with the urban environment, which offers constrained opportunities.

### 5.3.2 Layered Legibility

***Environment Modified to Enforce Rules vs. Changed Over Time*** - The layout of urban environments and the affordances present there, which can often "suggest" a specific behaviour or enforce rules, can be the outcome of a specific plan by the regulating authority, or it can be the result of years of situated *actions* and *interactions* performed by people inhabiting and traversing the space. Often, tensions arise in terms of how the layout is negotiated between the authority and the social groups inhabiting the space, and between these groups themselves. Such negotiations can happen over time and involve ongoing cycles of actions and reactions, as the reflection below suggests:

*In this street [in Amsterdam] there are signs on the wall like people had been peeing on them over and over again. And now there is a mobile public toilet just next to that wall, sign that they [i.e. the authority] have acknowledged this behaviour and are now trying to prevent it. I'm not*

*sure if this is actually stopping people from behaving this way, but I can see they've made an effort. (Philippe, group one, A Public (In)convenience)*

Although such ongoing negotiations can be seen as a distinctive sign of urban environments, it is not rare to witness examples of relatively subtle forms of urban planning directed by the authority to enforce a specific experience of urban places (see Figure 3).

*In cities it's different [compared to the mall], you can feel that the environment changes as a consequences of people interacting with it and with each other. It's a matter of time, an organic change. Instead, the mall seems to be designed to kill the concept of time, there's no past or future, it's like an out-of-time experience that has been designed for the people. (Carmen, group two, Betwixt)*

In the case of the shopping mall, then, a considerable effort has to be made by the regulating authority to erase signs of people's *actions* and *interactions* within the environment, and therefore part of the "history" that the environment itself could otherwise gain over time.

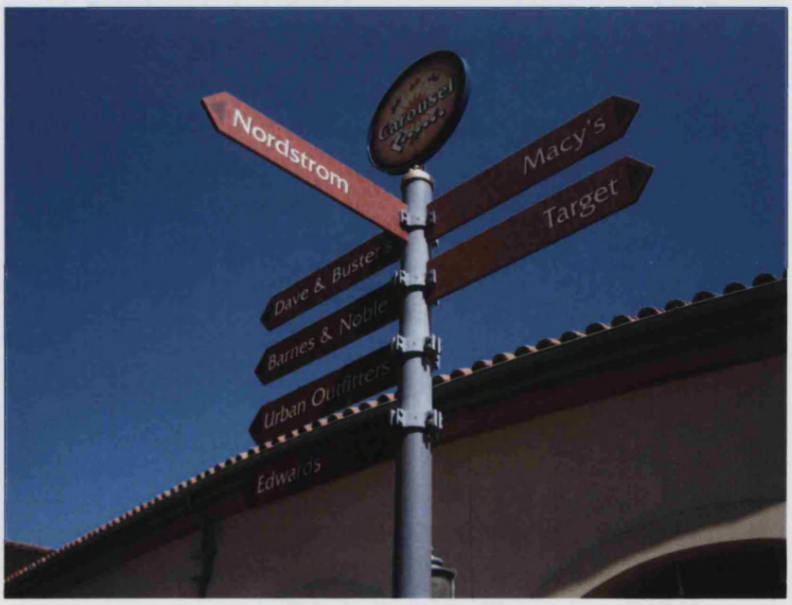


Figure 3 – The street signs* indicating shops at the mall are examples of tensions that involve interacting with the urban environment, which offers a layered legibility.

***Appearance vs. Reality*** – A different set of tensions characterising the urban experience emerge from the contrast created between the ways in which people perceive and *understand* physical aspects of the urban environment, and the real reasons that underlie the presence of such physical aspects. This often leads to interpretations of what the true aspect of the space is and the reason why it seems the way it does. Sometimes the space hides its past, involuntarily, as a consequence of how it is been used and changed over time, or sometimes the way it looks follows a precise intent by its regulating authority.

*While spending time at the mall I started to grow a weird feeling, like that there was a hidden force behind everything that happened there. It's like all signs of human actions were being deleted as soon as they happened. It must have been the cleaners always there, ready to wash away those signs, and I'm sure there were guards checking what was going on, although I didn't see them. (Carmen, group two, Betwixt)*

The presence or absence of people themselves could make a certain urban situation gain a certain level of ambiguity; for instance, the absence of people who are supposed to be there but are not, and vice versa.

*It really looked like there was something there, like a box, that had been taken away, and there's a sign on the wall of where it used to be. There was something odd about the building itself, where there were shops, which seemed totally deserted. For instance, on that door next to where the box used to be there is a sign saying 'we're open, if we're not there just call this number', but the impression was that none would have come even if you'd actually called that number. (Sean, group one, Betwixt)*

Within the tensions that lead people to read the urban environment as a *transitory destination*, the ways in which rules and affordances are perceived and *understood* increasingly relies on the presence of everyday technologies, which represent forms of *mediation* and ultimately

condition the urban experiences. For instance, group three of Why Wait? spent a considerable amount of time during the *fieldwork* observing the dynamics involving pedestrian crossing at traffic lights, and the ways in which this practice is both socially negotiated and technologically managed and enhanced. On the other hand, it emerged from the workshop discussion how the experience of waiting for buses is gradually changing in London, now that a website[9] allows travellers to plan their journey more efficiently, and displays announce with precision the arrival of specific buses at the bus stops. However, from the workshop also became clear how the experience of waiting for buses is not only influenced by technological interventions, but also by cultural expectations. For instance, Anna from group one noted how people in Germany would complain if buses are late even few minutes, while Sabrina commented that expectations about the on time arrival of buses in Italy are rather low. In line with a phenomenological perspective, this confirms how everyday computational technologies need to be studied and considered as being part of a complex and intertwined set of relationships and dynamics that characterise urban environments.

In sum, the urban tensions described so far mostly relate to the ways in which the urban experiences designers and researchers engaged with have been *understood*, in terms of the rules and affordances present within the urban environment. The urban tensions led designers and researchers to *understand* the environment as a *transitory destination*, which offers a series of constrained opportunities, according to the dynamics that involve access to the environment (*closed vs. open*) and opportunities for socialisation (*support vs. discourage interactions*). In addition, what makes the urban environment be conceived as a *transitory destination* depends on its layered legibility, which is the outcome of how the environment is managed by the authority and by people inhabiting it (*environment modified to enforce rules vs. changed over time*) and of it is physical layout and the different ways in which it can be read and interpreted (*appearance vs. reality*).

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[9] http://www.tfl.gov.uk

The next section will present a second set of urban tensions emerged from the *inquiry* phase of the empirical study. These tensions particularly relate to how people *act* and *interact* within the urban environment.

## 5.4 Acting and Interacting in the Urban Environment

While traversing a the urban environment, people indeed *act and interact* with it and other people there, depending on their reason for being there, the activities they have to perform and their understanding of the opportunities and limitations provided by the environment's layout, the rules regulating it, the affordances it presents and other people inhabiting it. One intrinsic tension in the behaviour exhibited by the people within urban situations concerns the ongoing negotiation between wanting to show they engage or have engaged with people and the space, and trying to hide any proof of this engagement. Such contradictory behaviour is manifested through a second series of tensions that can be grouped into social and spatial interactions, that is, how people behave towards each other and how they relate to the surrounding environment.

### 5.4.1 Social Interactions

***Wanting to Be Seen vs. Trying to Hide*** - The behaviour exhibited by people towards the surrounding space cannot be decoupled from how people relate to other people who are inhabiting, have inhabited, or will inhabit in the future, that space. In particular, people often exhibit the contradictory behaviour of wanting to show that they live and act in the space, but at the same time they also want to reach a level of invisibility, not least to keep a certain degree of privacy and autonomy towards everything happening around them. Signs left in the space by people

demonstrate their desire to be seen and communicate with others, sometimes even in a conspicuous way. This phenomenon can also be seen as an effect of a technological attitude, where the environment is seen and treated as a resource to be used to achieve a certain goal. For instance, stall doors in public toilets are often treated as surfaces where written messages can be left, as people will have the chance to come across these messages while spending time inside the stalls.

In other cases, communication between people can happen in a comparatively subtle way, in the form of a socially negotiated cooperation; the following reflection from the Underground study highlights such behaviour:

*Many think that people don't really interact in the London Underground, but if we look harder forms of interactions are not rare; one of the most distinctive is the exchange of newspapers, which constitute sort of a common good. People pick them up before they enter the space, read them and then leave them visibly on the seat so that other people who missed their chance to get the newspapers can still find them and read them. (From the Underground exploration/ research diary)*

The asynchronous communication is, in this case, mediated by a specific kind of technology, the newspaper. There are other signs of peer-interaction that display a higher intent of communicating, but still involve a tension between wanting to be seen and wanting to hide.

*Here [i.e. on the Power Point slide] you can see what I would call an "interactive graffiti". Someone has left a political statement on the door of the toilet, and someone else has changed it by erasing part of the writing and adding some more, and it seems another couple of people have contributed to the dialogue over time. (Bas, group four, A Public (In)convenience)*

One of the reasons behind the manifestation of this specific tension lies in the discomfort people feel in making their presence and identity visible to

others, especially if they are strangers. Urban environments might be seen as often allowing people to keep a high level of anonymity, because of their density, the variety of things happening, and because of the temporary lack of a specific social role people might experience there. Often people are concerned with keeping their anonymity, as they might feel afraid of being stalked or persecuted, and staying anonymous can be perceived as being a sign of freedom. However, many occasions require people to disclose aspects of their identity and give out their personal information, for instance when using the Oyster Card system in the London Underground, or driving a car displaying license plates that are visible to CCTV cameras at stoplights. The trade off between being able to be anonymous in urban situations and having to disclose one's identity needs to be constantly negotiated, often with the regulating authority but also between peers.

***Cooperation vs. Competition*** - When involved in the same situation or activity within an urban environment, people can show either signs of cooperation towards each other (see Figure 5), or be uncooperative and interpret the situation as a sort of competition they have to overcome. The following two reflections show how these aspects can equally play an important role within an urban experience:

*It is rush hour in the Tube, and everyone is tired and wants to go home or is late for work - who knows – but I don't know if anyone is really justified to act in a rather uncivil way, pushing everyone to get into the carriage first, no matter if they're old, women, kinds or sick people. (From the Underground exploration/ research diary)*

*We started to queue at the ATM that was empty, 'cause we wanted to test the reaction of other people to this quite unusual behaviour, and people in the queue for the ATM just next to it would tell us not to bother trying, because that one was not working. (Anna, group one, Why Wait?)*

In most urban situations, and depending on the culture, the level of social cooperation or competition can be somehow expected, while in a few occasions it can come as unexpected and involve a certain degree of adaptation, or happen serendipitously as a way to resolve a sudden problem, as both the previous and following reflections show:

*We were surprised to notice the level of interactions going out just outside those public toilets (see Figure 4). The thing is that you needed coins to get in as there was this machine controlling the access, and as many people did not have change they would ask other people so everyone would help each other, because they were all in the same situation. (Bas, group four, A Public (In)convenience)*

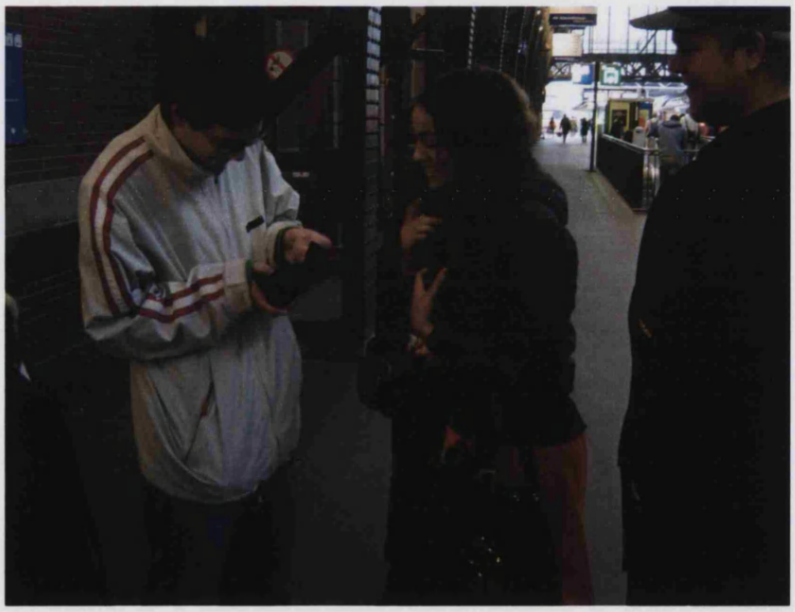

Figure 4 – Workshop participants interacting with people in front of a public toilet*, an example of social interactions happening within urban environments, specifically of serendipitous, and synchronous, cooperation.

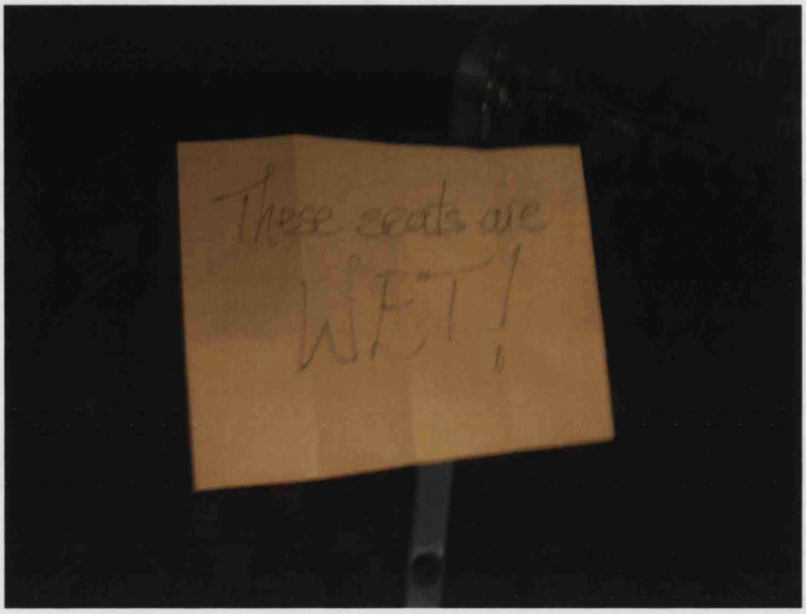


Figure 5 – A warning sign written by commuter for other commuters in the Underground[#], an example of subtle social interactions happening within urban environments, specifically of asynchronous cooperation.

### 5.4.2 Spatial Interactions

***Preserving vs. Subverting (through Appropriating)*** - This set of tensions refers to how people interact with the space they inhabit, which, in some cases, they leave unaltered and, in other cases, they use to their advantage, to the extreme of altering the space in a subversive way. This might depend on the level of engagement people feel towards the space, or on the degree to which they want to show and feel they belong there. There can be several occasions in which people serendipitously appropriate a space and claim their temporal "ownership" towards it, often using artefacts to achieve this goal, as the following two reflection demonstrate:

*We were in central London, on Tottenham Court Road, and this girl was peacefully eating her sandwich in the middle of the sidewalk, using her huge luggage as a seat. She didn't really seem to be bothered or affected*

*by all the people walking around her. It was quite astonishing. (Jonathan, group one, Why Wait?)*

*So we entered the Mall, and we were straight away in this department store, and right in the entrance there was a little sofa that had been appropriated by this woman with her baby, whom she was breastfeeding. She had her stuff all around, cloths, food and the baby's buggy. That was definitely her spot and there was no doubt about it. (Marta, group two Betwixt)*

These examples show a particular kind of *technological disposition* towards the urban environment, where objects and computational technologies are creatively interpreted and used to communicate a certain personal standpoint towards the urban experience and other people who are part of it. In a sense, this practice can be relate to the previously mentioned argument made by De Certeau (1984) about people performing a variety of tactics within the urban environment, process in which, as Dourish et al. (Dourish, Anderson, and Nafus 2007) point out, the creative use of computational technologies can be also involved.

The level of appropriation people demonstrate towards the urban environment might also depend on how the concept of public space is interpreted personally, socially and culturally. Often, this interpretation itself involves a particular kind of tension, where people feel the right to both use to their advantage and subvert the public space.

*One of the problems with public toilets is that people feel they have a right to find one wherever they are, because it's considered to be a common good, but then, on the other side, they show no respect towards public toilets and often leave them dirty or break things in it. But still they want to find them clean when they come back. (Kelly, group one, A Public (In)convenience)*

This reflection also shows how tensions can arise from the expectations people have towards the affordances, which are present in the urban environment and the ways in which they should be managed. There seems to be, in some cases, such as the one of public toilets, an abdication of responsibility regarding who is supposed to preserve and keep clean the urban environment.

***Permanence vs. Transition*** – Most of the urban experiences that have been explored as part of the empirical study involve a high level of transitivity, as people inhabiting them are mostly passers-by, who have to either move from point A to point B, from which the environment happens to be in-between, or have to perform activities that usually span a limited timeframe. However, these spaces can be seen as involving a higher degree of permanence, for instance for the people who either work there or regularly frequent them. Tensions can arise between people acting and interacting within, and with, the environment, and with other people inhabiting it, depending on their levels of (actual or perceived) permanence and transience. Indeed, also the subjective perception of what it means to be transitory or permanent within the environment can generate a tension, and lead to a rather contradictory definition of such concepts.

*We wanted to talk to people working in transitional spaces, and we were looking for somebody who was rather permanent here. However, among the people we talked to nobody wanted to admit that they were permanent in any way there, but they were just in transition. On the other hand, people waiting had that 'permanency' in their waiting. And also the same shop had the sign "we're open" and next to it had a sign saying "call me and I will be here in minutes" or something, so again it was this play between being there and not being there, but eventually coming back. (Milica, group one, Betwixt)*

*We were surprised in the level of care that toilet attendants put into decorating their working space. I mean they all are in a quite small,*

*uncomfortable and transitory space, but they put little toys, photos, and other objects to personalise it, and perhaps to gain a stronger feeling of permanence in being there. (Bas, group four, A Public (In)convenience)*

Especially in transitory situations, the level of engagement and interaction demonstrated by people towards each other and the surrounding space can be often *mediated* by artefacts and technologies. Also, according to a *technological disposition*, objects and technologies are used to regulate, increase or decrease this level of engagement and interaction. During the fieldwork conducted as part of the workshops and the long-term design project it designers/ researchers observed the ways in which people explicitly use, among other things, cigarettes, mobile phones and mp3 players to decrease their level of interaction towards the surroundings. As Bull (Bull 2000) points in his ethnographic study of the personal stereo, people often use this technology to avoid dealing with the overwhelming urban environment, and to help preserve a constant mood while traversing this environment. Decrease of awareness and engagement towards the surrounding can then become a form of personal defence, but it can also lead to the tension of not having the right level of attention necessary to deal with the multitude of activities happening around. For instance, listening to music might become dangerous when crossing the street, as it is also rather important to be able to hear the cars coming.

This section has presented the urban tensions emerged from the empirical study that most relate to the *actions* and *interactions* people perform within the urban environment, leading to a behaviour that can be considered as an alternation between hiding and seeking. From the analysis of the activities of *fieldwork* and *discussions* it emerged how urban tensions might arise from the often contradictory, and subtle, ways in which people socialise within urban environment (social interactions), spanning from the desire of being see to the one of not being seen (*wanting to be seen vs. trying to hide*), and from showing signs of collaboration towards others to being highly competitive with each other (*collaboration vs. competition*). In addition, urban tensions can be an

outcome of how people interact with the physical environment (spatial interactions), by either being careful to maintain its condition, or, on the contrary, expressing signs of subversion or, most commonly, attempting to appropriate part of the space for personal purposes [*preserving vs. subverting (through appropriating)*]. Finally, urban tensions can arise from people behaving in rather contradictory ways when it comes to express their presence within an urban environment as being rather permanent, or show signs of it being highly transitional (*permanence vs. transition*).

The next section will present the final set of urban tensions, generated by the difference of *dispositions* people tend to have towards urban experiences.

## 5.5 Developing a Disposition towards the Urban Experience

Inhabiting, and acting within, the urban environment leads people to develop a certain perception of their being there, that is a certain *disposition* towards the urban lived experience. The concept of *borrowed empowerment* is here introduced to convey people's *disposition*, which emerges as a consequence of one's transient presence in a more permanent situation, or vice-versa, being torn between interacting, or not interacting, with the surroundings, becoming an expert of what the environment offers and the rules regulating it, or being unable to properly read and interpret the environment when needed. The following sections will then describe the tensions that relate to developing a *disposition* of *borrowed empowerment* while living an urban experience, first in terms of assigning different, and sometimes contradictory, values to specific aspects of the experience, and then in terms of feeling more or less comfortable towards the experience, and therefore developing a higher or lower sense of belonging.

### 5.5.1 Ad Hoc Values

***Gain vs. Waste of Time*** – It is not uncommon for people to conceive of moments such as the time spent riding the Underground, waiting on the street for a friend who is late, looking for a public toilet in an unfamiliar city or being stuck in the Freeway traffic during rush hour, as time lost or wasted. From an authority's perspective, much effort is expended in order to optimise the flow of activities happening throughout the urban environment so that the city as a whole runs smoothly. Technologies play a rather important role in this process, not only in supporting the efficiency and functionality of urban processes and activities (e.g., panels providing information about the next bus or the next free till), but also in making people feel like they are not wasting their time while going through such processes (e.g., personal technologies such as game consoles and books are used to kill time in the Underground).

However, in many cases the distinction between *gained* and *wasted time* becomes rather blurred, in that the time spent commuting by Underground could be seen as preferably avoidable, but at the same time it could become useful to perform activities for which it would be harder to find spare time during the day. In addition to this, being in these urban situations might feel like a pause in the hectic rhythms of urban life, a personal time for reflection. The following quote show how the tension of spending time in the urban environment can be manifested and perceived.

*It is kind of annoying when your flight gets delayed and you just want to get to the destination as soon as possible. On the other hand, if I go to the airport and the plane is about to board and I don't have any time to do any work before leaving I'm highly disappointed, cause I often count on that time. (Alistair, group one, Why Wait?)*

*A friend of mine was used to commuting like an hour and a half everyday, then he changed job and there was no commuting, so he was suddenly a bit lost and felt he had to fill those "lost" hours of commuting.*

*So he started doing meditation instead. In a way, emblematically, I think waiting can also become a form of meditation. You're suddenly none, and you've got nothing to do...it's like dying. (Chris, group two, Why Wait?)*

The value assigned by people to the time spent in these urban situations varies depending on the situation itself and on the degree of familiarity felt towards it; this value can also be highly subjective or socially constructed, implying ongoing processes of negotiation and adaptation.

*Something that really surprises me is the fact that I see more and more girls in the Underground, especially in the morning, doing their make-up, in front of everyone. It's like the carriage becomes an extension of their bathroom, I feel it involves sharing quite some intimacy with strangers in a way. On the other hand, I can understand that it is convenient for them, as they're saving time. (Sabrina, group two, Why Wait?)*

In this case the time spent in the Underground feels almost like an extension of the time available for people to get ready to go to work or meet someone. Also, the urban environment becomes an extension of home, in which people seem to accept the compromise of being perhaps less comfortable and more exposed to strangers in proximity.

***Appropriate vs. Inappropriate*** – The last reflection then hints to another tension characterising the urban experience, which relates to the judgment people make of the behaviours exhibited by others. People's actions and interactions can be judged as appropriate, or inappropriate, depending on many factors, such as the rules regulating the environment, personal or socially constructed values, the specificity of the situation and the culture in which this is embedded. A good example of a socially constructed judgment of people's behaviour is highlighted below:

*We spent some time observing this guy, who was comfortably standing in front of a sex shop [see Figure 6]. He was just there, perhaps waiting for*

*someone or something, or just relaxing and watching around. We all agreed that he must have been the owner of the shop, because people would not wait or stand for a long period of time in front a sex shop, as it would look quite dodgy. It's just not socially acceptable to do so, but if it's the owner, then it's all right. (Jonathan, group one, Why Wait?)*

The variability of how behaviours are being considered among the inhabitants of an urban environment can indeed lead to tensions but, at the same time, it can provide a certain level of flexibility in terms of what it is or not allowed within the environment. Sometimes behaviours need to go through forms of ongoing negotiations in order to reach a level of acceptance, as the reflection below shows:

*When I was living in San Francisco, on my way to work I would see a couple of homeless people, and they would be always there, collecting recyclable trash. It was like a full time job for them, as they would start early in the morning and go on all day. It was the only way for them to manage to stay there and not be kicked out from the street. However, after a while they were evicted from the street as works were being done in the spot where they were sleeping. (Marta, group two, Betwixt)*

In this case the long-term presence of homeless people on the sidewalk was implicitly accepted by both people and the regulating authority, till the moment when actions had to be performed within the urban environment; this occasion made this presence become suddenly unacceptable to the eye of the authority.


Figure 6 – This image* showing the owner in front of his sex show represents an example of the socially constructed and negotiated rules that characterise urban environments, compared to the ones imposed by a regulating authority; in this case such rules relate to what are considered to be *appropriate* and *inappropriate* behaviours.

### 5.5.2 Sense of Belonging

***Ownership vs. Loitering*** – How people's actions and interactions are seen by others co-habiting the urban space or the regulating authority can affect people's *disposition* towards the urban experience. In addition to this, the layout of the environment itself, the opportunities for action and interactions presented, the use of artefacts and technologies, either personal or found in the space, and the reasons for being in the environment are among the causes that lead people to feel that they belong, or do not belong, to the urban environment. Regularity can play,

for instance, an important role in providing, with time, a feeling of *ownership* of the space inhabited, as the following reflection suggests:

*We were talking with this guy sitting in the park. He told us that he was always waiting there for his son to finish his baseball game. He would bring his radio to listen to a baseball game, and then he had a puzzle, some candles and tobacco for his waiting time, so he was very well equipped. He also told us that he knew everything about the park, so if we wanted to know more we should ask him. (Milica, group one, Betwixt)*

In this example, a *technological disposition* led the person to use a range of artefacts he owns not only to entertain himself, but also to communicate to others his being in control of that particular urban experience, and the sense of belonging he feels toward the urban environment he occupies.

Within the urban environment, tensions can arise when people not only feel but also manifest a different perception of either ownership of loitering towards the space they inhabit, as this feeling is often subjective and can lead to confusion when communicated and shared with others. It was previously mention how people can not only behave in a permanent or transitional way in the urban environment, but also how this behaviour can be contradictory, in terms of how it is perceived by other people around. Often, achieving a sense of belonging involves a certain level of personal investment, together with a process of communication directed at obtaining a self-reinforcement. The following reflection could be seen as an example of this personal and social negotiation.

*We interviewed one toilet attendant, and were surprised to notice how much pride they can show in their work. She was telling us that she also attends the toilets of a couple of other places, some posh hotels or similar, and that her daughter is an attendant as well. She is also writing a memoir about interesting situations she witnesses during her working time, which she hopes to publish some day. (Meike, group two, A Public (In)convenience)*

This reflection mirrors the one introduced in the section about the tensions that relate to behaving towards the environment in either permanent or transitory manner. The toilet attendants' *action* of using objects to show their state of permanence then reinforces, as in the case of the man in the park, their *disposition* towards a sense of ownership of the urban space they occupy.

***In Control vs. Under Control*** – The reasons leading to feeling more or less comfortable with being in the urban environment also apply to, and are in turn affected by, the level of control people feel towards the experience they are living. The degree of familiarity people have with the environment and the, official or socially constructed, rules at work there are among the main factors leading to feeling in control of the situation, as the following reflection shows:

*The technologies used [to manage queues] at Tesco or Sainsbury [British supermarkets] wouldn't work at the pub, as there you need to use your expertise and it's a special one. It's all about making eye contacts with the bar tender, trying to get his attention. And it's like a magic trick as he seems he doesn't pay attention to you at all and then suddenly he turns to you and asks what you want. At the bar it's all about showing that you can get the drinks for your friends as fast as possible. (Chris, group two, Why Wait?)*

In this example the rules applied to the situation are both socially constructed and implicit, and can be learnt mainly through repetitive experiences of such situation. In some other cases rules can be made explicit, especially by the regulating authority, and this can be supported by the use of technology as it happens in certain supermarket chains like the ones mentioned above. However, from the example above it is clear how the same technology would not be suited for experiences, which, at first sight, present similarities and could be approached in a similar manner. It is important to consider the socially constructed rules that

regulate urban environments, and how technologies can tap into the existence and knowledge of such rules, and the tensions their negotiation leads to.

On the other hand, urban environments regulated by explicit top-down rules, rather than socially constructed ones, can lead to people feeling less in control of the situation, as is the case in the excerpt below:

*The pier looks like a place that is open to everyone and where you can stroll and just relax. The reality is that there are a series of rules that you need to respect, and they are written on the floor of the pier itself [see Figure 7]. For instance you cannot bring dogs, skate, rollerblade, dive, jump, basically you can't do anything that is fun there. (Liesl, group three, Betwixt)*

Here the tension is created in terms of the perception of what an open-access environment should offer or be like in contrast to what it really is, in this case a highly regulated one. This shows how the expectations people might have towards urban environments can also lead to tensions, depending on the degree to which they correspond to reality; cultural differences can contribute to this confusion.

Three sets of tensions that serve to explicate the urban experience were presented in the previous section. The first set of tensions attempt to capture how the rules and affordances of the urban environment are not only created, but also perceived and *understood*, as possibilities and limitations for *actions* and *interactions* (*understanding* of the urban environment as a *transitory destination*). The second group of tensions demonstrate how situated *actions* and *interactions* within the environment often imply both wanting to be seen and wanting to hide (behaviour manifested as an alternation between *hiding and seeking*). Finally, the third group of tensions highlight how *dispositions* towards the experience can make people assign different values to aspects of such experience and feel either in control or not of the situation (disposition of *borrowed empowerment*).

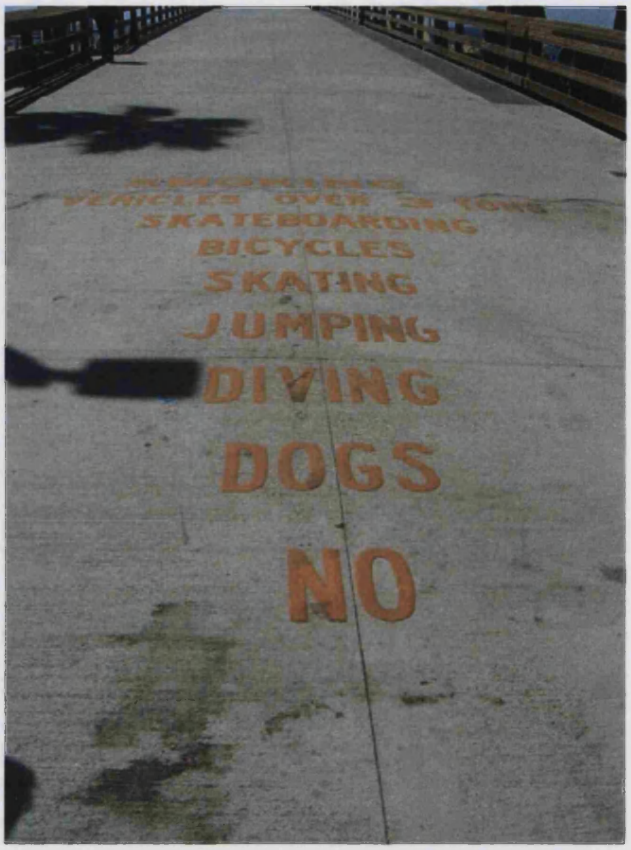


Figure 7 – Sings on the pier indicating forbidden behaviour* are an example of some of the rules characterising urban environments, in this case not socially negotiated by imposed by a regulating authority.

## 5.6 From Understanding to Designing for the Urban Experience

The previous part of this chapter introduced a preliminary categorisation of the lived urban experiences explored by designers/researchers during the empirical study in terms of a series of tensions (summarised in Table 4). These tensions, proper to the urban experiences considered, emerged through the analysis of the *inquiry* phase of the empirical study, that is, the phase of the activities of *fieldwork* and *discussion* where participants of the workshops and the design project reached and shared their understanding of the experiences lived in first person. Such understanding has been extrapolated through the analysis, interpreted

and described in terms of ongoing tensions, representing an attempt to create the starting point for a novel categorisation of urban life.

| **Understanding the Urban Environment as a Transitory Destination** | **Acting and Interacting by Hiding and Seeking** | **Developing a Disposition of Borrowed Empowerment** |
|---|---|---|
| <u>Constrained Opportunities</u><br>• Closed vs. Open<br>• Support vs. Discourage Interactions | <u>Social Interactions</u><br>• Wanting to Be Seen vs. To Hide<br>• Cooperation vs. Competition | <u>Ad Hoc Values</u><br>• Gain vs. Waste of Time<br>• Appropriate vs. Inappropriate |
| <u>Layered Legibility</u><br>• Changed Over Time vs. Modified to Enforce Rules<br>• Reality vs. Appearance | <u>Spatial Interactions</u><br>• Preserving vs. Subverting (through Appropriating)<br>• Permanence vs. Transition | <u>Sense of Belonging</u><br>• Ownership vs. Loitering<br>• In Control vs. Under Control |

Table 4 – Summary of tensions that characterise the lived urban experiences considered.

It is important now to explore how this preliminary categorisation is useful for aiding the design of new everyday computational technologies. This section, then, will present an analysis of the ways in which the understanding of the urban experiences guided the design activities performed during the course empirical study in order to demonstrate how this preliminary categorisation was made, implicitly, actionable by the researchers/designers already during the empirical study. Again guided by hermeneutic phenomenology, together with the phenomenology-oriented conceptualisation of a lived experience described in Chapter Three, this section will present an analysis of the data produced during the *exploration* phase of the empirical study, that is, the *design experimentation* and *design critique* activities. This analysis, which cycle was summarised in Figure 1, will explicate the tight connection between researchers/designers' understanding of the urban experiences, and the way in which this understanding is reflected and addressed, because of

an innate *design disposition*, within the design activities. The remainder of this section, then, will begin to highlight the link between the preliminary categorisation of the lived urban experiences and how it can be addressed through design, by considering a number of designs produced during the *design experimentations*, and identifying how they relate to the tensions previously described. In particular, this analysis will show that certain tensions are reflected and addressed more than others, and that there are different ways in which such tensions can be interpreted in terms of design choices.

Twelve designs were produced by the researchers/designers during the empirical study, six of which will be presented below with the aim of elucidating how the categorisation of the urban experiences, expressed in terms of tensions, was, implicitly, addressed by the researchers/designers. This will serve to demonstrate, then, how, in a practical sense, the preliminary categorisation was used, by the researchers/designers as an actionable means for guiding the design process. It is important to remember that the designs presented below (Myst-Air, the Moo Card, Tuckatruck, the Toilet Paper Publishing Company, the Toilet Chatterbox and *undersound*) have not been implemented or tested as working prototypes. Rather, they are conceptual pieces that, when analysed along side the tensions, demonstrate the ways in which the preliminary categorisation emerges as an implicitly actionable understanding of the urban experience, which can guide the creation of new technologies.

### 5.6.1 Myst-Air

The first design, Myst-Air, was created by group one of the Why Wait? workshop. The Myst-Air is a hand-held, breath-activated device that emits a fine mist of water into the air around the user (see: Figure 8). This mist creates a sort of "cool" bubble around the person who uses the device while waiting in an outdoor public area. Myst-Air was inspired by

several situations observed during the *inquiry* phase of the workshop, where people waiting in urban spaces used their body gestures and objects that they owned, or that were embedded in the space, to "claim" their own personal space for either relaxing or conducting other activities, such as eating (see: Figure 9). Also inspirational for the design was a discussion on the role of cigarettes in public waiting, often used, among other things, to take a break from a certain activity, to communicate a state of busyness, or to serve as the basis for social bonding activities. Finally, Myst-Air takes inspiration from the "meditative" aspect of waiting, which was well summarised in one of the quotes presented within the section describing the tensions of perceiving waiting time as either, or both, *gained* and *wasted* (5.5.1).


Figure 8 – Workshop participant presenting Myst-Air to other groups°, enacting its potential use; on the top right, image of the clay prototype of Myst-Air°.

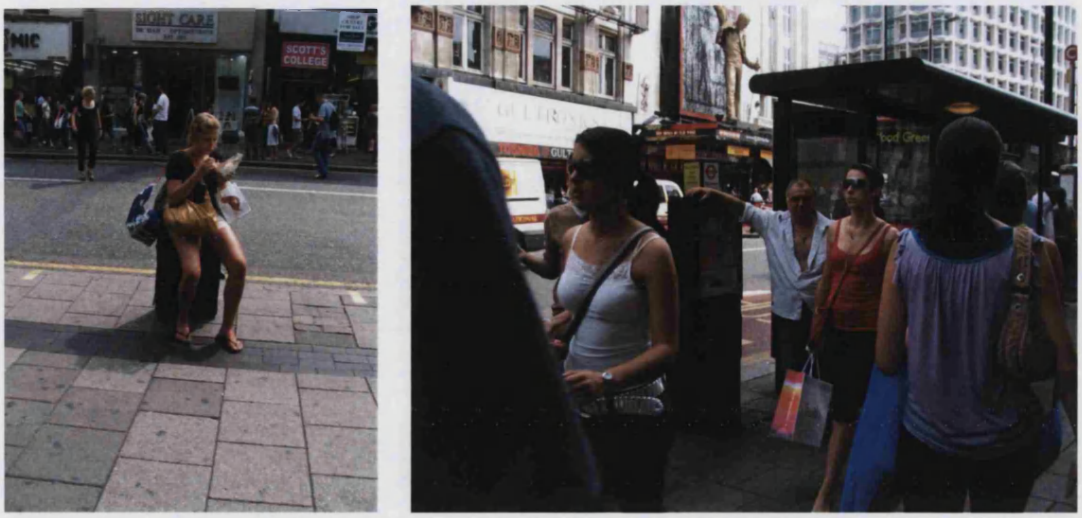


Figure 9 – Inspiration for Myst-Air, girl claiming her space to eat on the sidewalk by using her body and personal objects* (left) and man claiming his space through his body gesture, by leaning on the bus ticket machine* (right).

Myst-Air addresses several of the tensions that characterise lived urban experiences. By reflecting how people use their body posture, their personal objects and the objects embedded in the environment, Myst-Air represents a tool for symbolically *appropriating* part of the urban space people inhabit and for achieving a sense of *ownership* of this space. Myst-Air allows the individuals to be temporarily *permanent* in a context of *transition*, and to feel a sense of intimacy in the public domain that could lead them to feel relaxed and detached from the busy surroundings. As a cigarette only demands part of people's attention, Myst-Air leaves to individuals a certain degree of awareness of the surroundings, compared to more immersive technologies, such as mobile phones. Also, in the same way cigarette do, Myst-Air can be used by individuals to negotiate the level of engagement they want to display towards co-located people; the technology can be used to *hide* from people by using the mist of the bubble created, or as a *socialising* tool to form communities of Myst-Air users, similarly to how smokers sometimes bond in public spaces. Compared to cigarettes though, Myst-Air *respects* the environment and co-located people, by emitting, not toxic substances, but a breeze of fresh air. Further, the act of breathing in and out of Myst-Air can help people achieve a sense of relaxation. And finally, read in

phenomenological terms, the Myst-Air seems to provide a relationship of *embodiment* (Ihde 1990) for people using it, as it represents an extension of people's bodies aimed at claiming one's presence in the urban environment.

### 5.6.2 Moo Card

The second design, the Moo Card, was created by group three of the Why Wait? workshop. The Moo Card functions similarly to a retail store loyalty card, in that it allows individuals to earn points and win prizes according to their consumption patterns, except that in the case of the Moo Card points are collected in relation to the time spent waiting in the shops rather than products purchased (see: Figure 10). In shops that have adopted the Moo Card system customers will find, for example, two queues: one where people will wait longer and a fast track. In the longer queue, people who would like to can collect Moo points, while if they are in a hurry they can opt to go for the fast track where they will not be awarded any Moo points. The Moo Card was inspired by the observations of researchers/designers who notes that waiting is often perceived in urban contexts to be a "waste of time", and how technologies are conceived as being able to speed up processes and make them more efficient, in order to "save time" (see: Figure 11).

By challenging people's perception, the Moo Card allows them to have a more *relaxed* experience while waiting for things that are not in their *control*, such as while waiting for the train to arrive, for the cashier to be free, or for the ATM to be available. Of course, there are still potentially negative consequences surrounding the use of the Moo Card as one needs, as with other loyalty cards, to allow access to personal data in order to benefit from the system. Issues of privacy and identification are then brought up by this system, which requires people to trade their identity to an authority who can then reward them through prizes. The Moo Card challenges the current value system assigned to the time spent

in urban environments. By rewarding people who wait, it encourages city dwellers to stretch out the duration of the urban experience and it adds new value to the time that is currently often considered as *wasted*. Further, using the Moo Card can radically change the rhythms of the user experience, together with the way stores, businesses and other systems (such as transport) are being organised. Stretching the time spent waiting, and assigning a positive value to it, could then have the effect of slowing down the pace of urban experiences. Also, the Moo Card has the potential to create a more direct link between people using a particular urban service and the regulating authority, and to change the perception of what is or is not considered to be fair and *appropriate*; for instance, travellers of the London Underground could automatically gain Moo points when they wait extra time at the platforms for the trains to arrive. Finally, from a phenomenological perspective, the Moo Card provides a *hermeneutic* relationship (Ihde 1990) to people using it, being a tool that mediates people's macro perception of the urban environment and helps them to read the environment, and the opportunities provided by it, from a specific perspective.


Figure 10 – Poster presenting the scenarios of the Moo Card use°; clay prototype of the card° on the top left and clay and drawing logo and slogan° on the bottom right.


Figure 11 – Inspiration for the Moo Card, technologies used within shops and supermarkets to speed up payment processes*.

### 5.6.3 Tuckatruck

The third design, Tuckatruck, was created by group two of the Betwixt workshop. The Tuckatruck is a three-wheeled vehicle designed for homeless people that allows them to both collect recyclable rubbish and provides them with a place to sleep (see: Figure 12). Tuckatruck allows homeless people to move around and to legitimate their presence, as they provide a service to the community where they currently reside. The design of the Tuckatruck took inspiration from participants observing the characteristics of shopping malls, where regulation is applied in a rather subtle but firm way, and where, often, homeless people are not allowed to enter the space (see: Figure 13). This issue was discussed in the section dedicated to the tensions that relate to the urban access being either *closed* or *opened*. In particular, one of the quotes (5.3.1) compared the layouts of cities to the one of shopping malls, where there is an abundance of benches perhaps also because homeless are not allowed to enter the space. Such limited access contrasts with other urban environments such as the park where participants interviewed a homeless gentleman. In this park the presence of homeless people, while not formally allowed, is often permitted. Finally, the participants took inspiration for the design of the actual vehicle from the typical South and East Asia taxi, the Tuk Tuk.

The Tuckatruck design attempts to push the boundaries of urban environments, most of which are rather *open* to a vast population but where issues of access and *permanency* also often exist. The technology is targeted to spaces regulated by a pay-for access, or to the ones where the authority tries to maintain social control and order by limiting the access to the space, or to the time, potentially spent there. Tuckatruck then attempts, by focusing on a certain type of city inhabitants, to *open* up the access to urban environments by providing a trade-off, a way to make open access be more acceptable and *appropriate* to the eyes of other people and of the regulating authority.

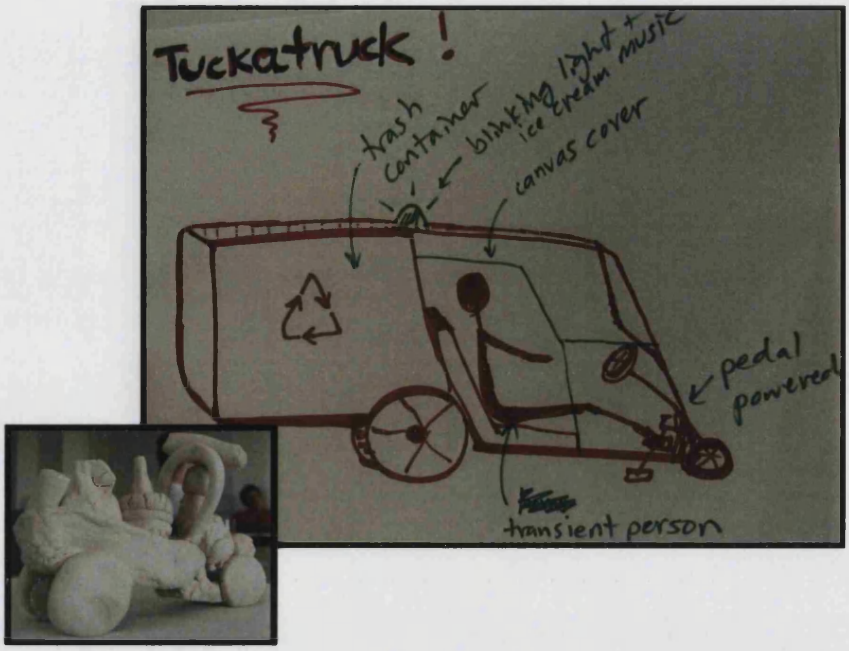


Figure 12 – Clay model of the Tuckatruck° (bottom left) and drawing of the technology and its main functionalities° (top right).

Figure 13 – Inspiration for the Tuckatruck, the mall as a system highly regulated where signs of human activities tend to be cancelled, and access is not open to everyone, especially to homeless people*.

In addition, Tuckatruck provides a way to alleviate the tension homeless people can perceive between feeling at home in the urban environment and constantly being reminded that this feeling is not legitimate and can therefore be easily disrupted by the regulating authority or by other people. Tuckatruck can then allow homeless people to feel more in

control of their situation, and legitimised to inhabit the space, but at the same time, and in seemingly contradictory terms, also to feel more *temporary* due to the nature of the design itself, which is a "mobile house". This could lead homeless people to feel a decrease in the *sense of belonging* towards urban environment, as they no longer focus on adapting a public space to make it their own. However, it provides a new *sense of belonging* to the Tuckatruck itself, to the space, which the Tuckatruck occupies, and to the society itself as the homeless person begins to take on a role, which benefits the community. Finally, like Myst-Air, the Tuckatruck also provides a relationship of *embodiment* for people using it, as it acts as an extension of the homeless' body in order to make their presence more conspicuous, but also more readable, in a certain way, for people inhabiting the same environment.

### 5.6.4 Toilet Paper Publishing Company

The fourth design, the Toilet Paper Publishing Company, is the work of group two of the A Public (In)convenience workshop. The Toilet Paper Publishing Company (TPPC) allows toilet attendants to record and capture their observations of, and interactions with, customers (see: Figure 14). These are then printed out on the toilet paper in the cubicles for customers to read. The system also connects public toilets in different locations in order to create a new channel for communication among toilet attendants and costumers. The design of the TPPC was inspired by observations of toilet attendants' behaviour and by informal interviews conducted with the attendants. Workshop participants noticed how attendants take pride in their role and care about building a personal space where they work, usually at the entrance of public toilets. In particular, the group who designed the TPPC interviewed an attendant who was writing a memoir of herself and her personal experience, after collecting a series of episodes she witnessed over the years (see: Figure 15).

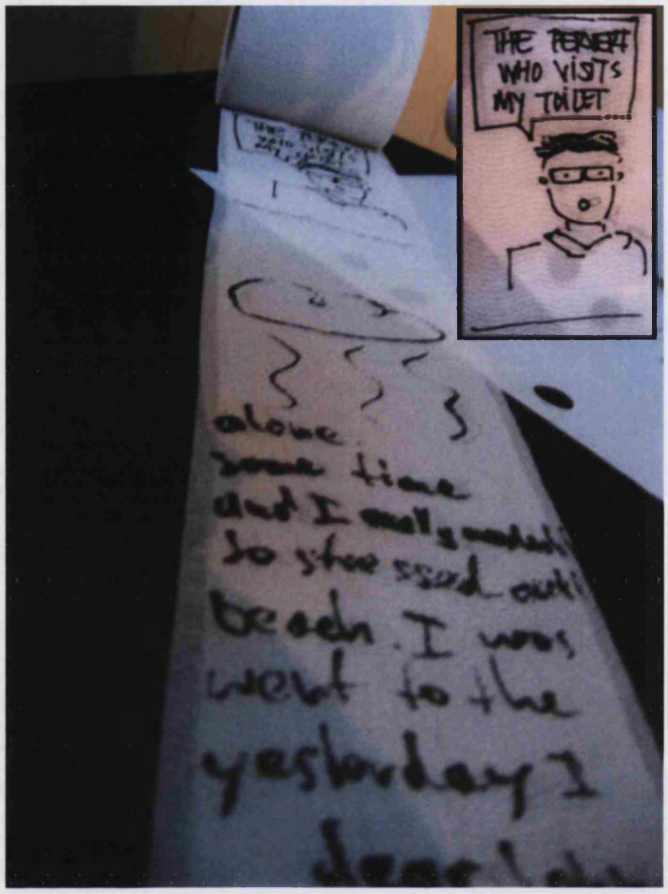


Figure 14 – Lo-fi prototype of the TPPC°, built using a toilet roll, and detail of one of the user scenarios° (top right).

Figure 15 – Inspiration for the TPPC, appropriation and personalisation of her working space by a toilet attendant* (left), and workshop participant interviewing another toilet attendant on her idea of writing a memoir* (right).

The Toilet Paper Publishing Company, like the Tuckatruck, takes into consideration a particular kind of city inhabitant that is highly identifiable within the space considered, in this case, the toilet attendant for public toilets, and provides a means for such a population to negotiate some of the existing tensions present in the space. The TPPC supports the *social* aspect of public toilets, by creating a communication link between attendants and the toilet costumers, who usually do not interact with each other in such depth. In addition to this, the TPPC increases the level of *cooperation, which* exists not only within the space itself but also among distant toilet attendants, by creating a centralised network where the data for the publishing service is collected and distributed; such a network could function not only for practical purposes (e.g. collection of data), but also to make attendants feel like they are part of a broader system together with their peers, something that could provide them with support when needed.

However, the TPPC also challenges the feeling of intimacy that the toilet costumers might perceive while inhabiting the space, by providing them with information that might concern themselves or co-located people, with the risk of making them feel like they are being observed, or that they have *little control* over the information made available about them. In opposition, the system might reinforce the feeling of *ownership* that attendants have towards the space they help to regulate, a perception that they already try to achieve by bringing personal objects in the space and modifying this to make it feel more "homey". Finally, The TTPC provides different types of *mediation*, between attendants and toilet costumers, and between remote attendants. It also supports the creation of a *hermeneutic* relationship, where the technology provides a novel way to read the environment inhabited, the role of toilet attendants within such environment and the actions and interactions performed by costumers.

### 5.6.5 Toilet Chatterbox

The fifth design, the Toilet Chatterbox, was presented group three of the A Public (In)convenience workshop. The Toilet Chatterbox allows people visiting public toilets to write stories, look for dates or leave general messages on screens placed in the toilet cubicles. All the messages are then displayed on a public screen in the common area of the toilets; these messages fade away with time, leaving space for new ones, although they are archived and consequently accessible online at any time (see: Figure 16). Users can choose whether they want to be anonymous or leave their personal information when they create messages, depending on their intent. Workshop participants took inspiration for the Toilet Chatterbox from an existing cross-cultural habit that was discussed during the *inquiry* phase of the workshop. Participants noted how people all around the world often write messages on the walls of public toilets, and presented several examples of this practice, which they observed during the *fieldwork* activity (see: Figure 17, right). In addition to this, participants were inspired by an installation they encountered in the public toilet of a local art gallery, consisting of a karaoke machine situated in the common area of men's and ladies' toilets (see: Figure 17, left). They speculated that it was perhaps implemented in order to encourage to people reflect on the socialising behaviour that was, or was not, happening in that public toilet.

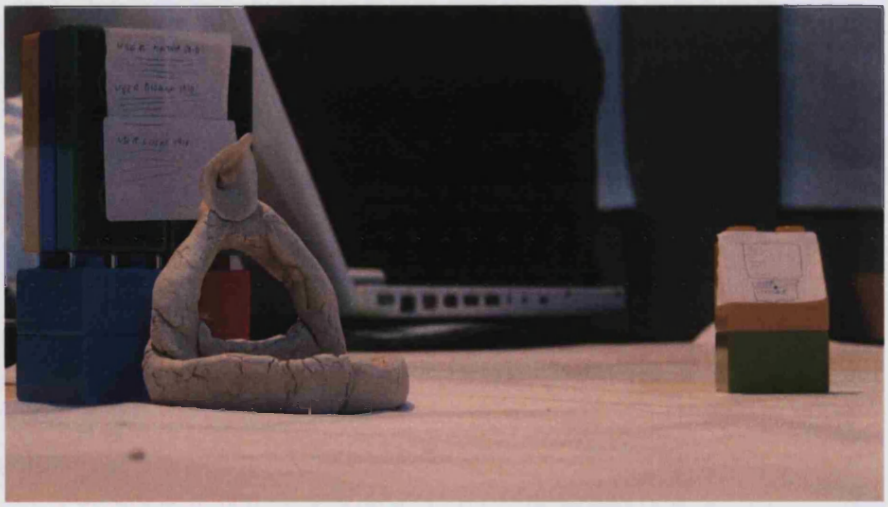

Figure 16 – Lo-fi prototype of the Toilet Chatterbox°, built by using clay, paper stickers and Lego.

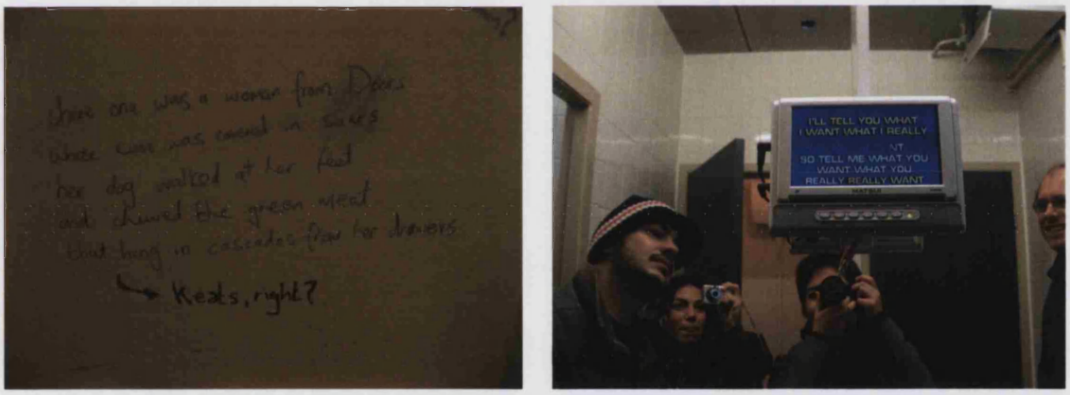


Figure 17 – Inspiration for the Toilet Chatterbox, interactive writings on the walls of public toilets* (left), where people respond to other's messages in an asynchronous way, and karaoke installed in the communal area between men's and women's toilets in an art gallery* (right).

The Toilet Chatterbox addresses some of the social tensions present within urban life, which are characterised by the seemingly contradictory and subtle ways of socialising and of using non-explicit forms of communication. The design highlights what some of the workshop observations also made clear: public toilets are often places where people want to both *hide* and be as *transitory* as possible, but also *be seen*, by leaving messages on the walls or chatting loudly with friends, thereby

giving out personal details and stories to strangers. The Toilet Chatterbox provides a space for situated *social interactions*, but also leaves to people the freedom to not engage with anyone if they do not wish to. By providing a way to interact with others, but also to obtain information that could be potentially useful for people visiting the place, the Toilet Chatterbox has the potential of dilating the time spent in public toilets and providing *added value* to it, similarly to the Moo Card. By increasing socialisation the design also has the potential to give the toilets a more familiar feeling to those who use them in a way that builds upon the already familiar architecture and layout of the public toilets themselves. For the people who run street stalls in the city of Amsterdam and use the toilets of nearby coffee-shops, their repeated encounter with the Toilet Chatterbox could then strengthen their connection with their "personal" public toilet. Together with several of the previous technologies, the Toilet Chatterbox provides a *hermeneutic* relationship for people using it, as it mediates the macro perception of the surrounding environment, highlighting signs of previous actions, interactions and reflections that took place in the environment, and providing added information about the experience. Finally, the Toilet Chatterbox also has the potential of mediating the real-time perception of co-located people, as it provides a live channel of interaction.

### 5.6.6 *undersound*

The final design, *undersound*, was created by myself and my colleagues Johanna Brewer and Karen Martin. *undersound* is a mobile and situated system designed for the London Underground, where musicians upload their Creative Commons-licensed songs at a specific station (see: Figure 18, top left), and commuters download the songs, using their mobile devices, from the platforms (see: Figure 18, top right) or from other users (see: Figure 18, bottom left). The patters of interactions generated by people using the system are recorded and shown, in a symbolic manner, at each station though public displays (see: Figure 18, bottom

right). This constitutes a way of encouraging people to reflect on their actions and to allow them to see how they contribute to global behaviours. *undersound* was inspired by a variety of behaviours encountered and observed in the London Underground. Among these, the habit many people share of listening to music while riding the Underground, together with the performances musicians often give in the tunnels of the Underground to commuters who are passing by (see: Figure 19, right), played an important role in the inspiration of *undersound*. Additionally, the common behaviour of reading the free newspapers and then leaving them on the seat for other commuters to read (see: Figure 19, left), highlighted to the designers the existence of an object-sharing culture within the Underground. It was this lo-fi, peer-to-peer distribution of media, which inspired the more technologically-enhanced music sharing of *undersound.*


Figure 18 – Four user scenarios for *undersound*: commuter/musician uploading a Creative Commons-licensed song at the access point at one of the Underground station[#] (top left), downloading songs from the access points on the

Underground platform[#] (top right), browsing songs from another commuter within the train carriage[#] (bottom left), and looking at the display showing the usage patterns at one of the Underground stations[#] (bottom right).

Figure 19 – Inspiration for *undersound*: people's habits of listening to music and exchanging free newspapers in the Underground[#] (left) and buskers playing in assigned places within the Underground[#] (right).

*undersound* provides *opportunities for interactions* that did not exist before, as through the system people are able, not only to exchange songs, but also to send messages to each other, whether or not those messages be related to the topic of music. At the same time, *undersound* does not impose such interactions, as with the system people can download songs from others without explicitly communicating with them. However, the system is planned so that users receive a notice that a song was downloaded from them, and so the interaction might not always go unnoticed. This reflects the tension people manifest by both *wanting to be seen* and *trying to hide. undersound* then addresses the issue of the tension between *open* and *closed* access to urban environments, specifically for musicians, who usually must audition in order to, legally, perform in the Underground. With *undersound* musicians can, on the other hand, access the Underground with their music, but they still have the limitation of choosing only one entry point to the network, as the system is planned so that musicians can upload each of their songs in one station only. *undersound* also deals with how

the time spent in the Underground is perceived by commuters, and with the tension involving the attribution of a negative or a positive value to this time (i.e. *waste vs. gain of time*). Further, downloading and exchanging music while commuting could be an incentive to improve the appreciation of the commuting and to consider it as *gained* time. The *sense of belonging* perceived in the Underground is finally addressed by providing the stations with a music identity that commuters and musicians can, if they choose, identify with.

*undersound* provides a variety of different types of mediations: between co-located commuters, between musicians, between commuters and musicians, between musicians and the Underground environment, and finally between commuters and, not only the Underground environment, but the also the urban places each station refers and connects to. The type of existential relation fostered by *undersound* is mainly a *hermeneutic* one, as the system is meant to provide music-related information that is made available in the environment through the use of the system itself. Such a *hermeneutic* relationship is both personalised (through the use of personal mobile devices) and collective (through the use of public displays).

### 5.6.7 Towards a More Holistic Categorisation of Urban Life

The analysis of how Myst-Air, the Moo Card, Tuckatruck, TTPC, the Toilet Chatterbox, and *undersound* reflect the urban tensions previously discussed within this chapter, has served to demonstrate how the preliminary categorisation of the lived urban experiences presented so far can become actionable in terms of design. While the first step of analysis that focused on the *fieldwork* and *discussion* activities brought to the surface an overall understanding of the lived urban experiences, which was expressed in terms of tensions that are being negotiated in an ongoing way, this second phase of analysis of the *design experimentation* and *design critique* activities has demonstrated how the preliminary

categorisation has been approached and reflected through the designs produced. This implies, then, that the preliminary categorisation of the lived urban experiences in terms of a series of tensions constitutes not only an analytically interesting construct, but also an actionable conceptualisation, which can inspire the design of new everyday computational technologies. The first two phases of the analysis, then, served not only to make explicit the understanding of the urban experiences held by researchers/designers and to abstract that understanding in order to create a broader preliminary categorisation, but also to bring to the surface the ways in which such understanding influences, and has also been influenced by, the design of new technologies.

From these two phases of analysis, then, it also becomes clear that, while all of the tensions that comprise the preliminary categorisation can be potentially tackled by design (see: *undersound*), researchers/designers focused on some of the tensions more than others (see: Table 5). For instance, the tensions that relate to people's behaviour in terms of *hiding and seeking*, were addressed, in a variety of ways, by all of the designs discussed within this section. Many designs focused, in particular, to how social interactions are carried out and managed within the urban environment. Indeed, in Chapter Two, it was noted that a strong trend within the socio-oriented side of urban computing has been to find and provide new *opportunities for socialisation*. This trend has then, consequently, been further reflected by the designs discussed within this section. What we begin to see, here, is that this preliminary categorisation has the potential to encompass urban computing trends that already exist, and simultaneously situate them within a broader categorisation that also provides space and a relational structure in which new trends can be placed. This highlights the potential for a categorisation, which builds upon current understandings of the urban experience and allows for the coherent, rather than fragmented, expansion of this categorisation of urban life in a holistic fashion.

The next step of analysis is then to strengthen the relationship between the understanding of the urban experiences and the ways in which they can be addressed by design. In order to do so, I will, in the next sections of the chapter, approach the analysis of the *inquiries* (composed of *fieldwork* and *discussion*) and *explorations* (generated through *design experimentation* and *design critique*) from a more holistic perspective, so to refine the categorisation of urban life in a way that is more broadly related to, and relevant for, the design of new computational technologies that goes beyond the particular instances of the empirical observations and at the same time takes into account the work already done within urban computing to date.

| | **Transitory Destination** | | **Hiding & Seeking** | | **Borrowed Empowerment** | |
|---|---|---|---|---|---|---|
| | *Constrained Opportuni-ties* | *Layered Legibility* | *Social Interac-tions* | *Spatial Interac-tions* | *Ad Hoc Values* | *Sense of Belonging* |
| *Toilet Chatterbox* | X | X | X | X | X | |
| *Moo Card* | | | | X | X | |
| *Tuckatruck* | X | | | X | X | X |
| *Myst-Air* | X | | X | X | | X |
| *Toilet Paper Publishing Company* | | X | | X | | X |
| *undersound* | X | X | X | X | X | X |

Table 5 – Summary of the tensions proper to the urban experience as addressed by the designs.

The hermeneutic phenomenology-oriented analysis of the empirical data (see again Figure 1 in Chapter Four for reference) will allow for a stronger correlation between the understanding of the urban experiences,

which emerged from the activities of *fieldwork* and *discussion*, and the ways in which this understanding has been addressed by design, which emerged from the activities of *design experimentation* and *design critique*. Such an analysis will yield a more refined, yet generalized, description of the tensions, and the approaches to them, which characterise the preliminary categorisation. More specifically, the remaining sections of this chapter will present a more robust categorisation of the urban experience, comprised of a series of sites for design (*awareness*, *engagement* and *legitimisation)* and a series of ways in which those sites might actionably be approached through design *(integration, mirroring and altering*). Once again, these sites for design have emerged from the cyclical hermeneutic analysis of the activities of *inquiry* and *exploration*. For instance, the tensions characterised by an alternation of *hiding and seeking* have demonstrated that people interact with each other and the space in ways that are often subtle (e.g. sharing newspapers in the Underground), serendipitous (e.g. asking for change to access public toilets) and contradictory (e.g. working in a transitional space but claiming to be highly transient). The ways these tensions have been addressed by designs such as *undersound* and the Toilet Chatterbox show that researchers/designers both acknowledged and addressed these peculiar forms of interactions, or *engagements*, and planned technologies that could mirror them (e.g. sharing music with other commuters in *undersound*), *alter* them (e.g. attempting to increase the level of communication in public toilets in the Toilet Chatterbox) or *integrate* with them (e.g. not forcing explicit forms of communication both in undersound and in the Toilet Chatterbox). This relationship between urban tensions and design will be further described in the following section.

## 5.7 Expressing the Tensions as Sites for Design

In this section, a series of sites for design (*awareness*, *engagement* and *legitimisation*) will be introduced and discussed. These higher-level sites

of design serve to organise the tensions previously presented in terms of how they have been, and can be in the future, addressed by the design of new everyday computational technologies. These sites build upon design principles that have been already considered within studies that related to the design of new everyday computational technologies (Dourish 2001). While the design-oriented categorisation presented by this thesis strives to encompass also the prior work, which serves as the foundation for urban computing, it will specifically build upon the design issues that are relevant for the urban experiences considered within the empirical study.

It is important to note that, while they will be presented individually, *awareness*, *engagement* and *legitimisation* ought to be considered as design spaces, which do not stand independently from each other, but, rather, are deeply interrelated and overlapping, and refer to different aspects of the same experience. The same computational technology can, for instance, address just one of these design spaces in depth, or it can tackle all of them at the same time.

### 5.7.1 Urban Awareness

This first site for design, which emerged from the analysis of the tensions proper to the lived urban experiences, was the one of *awareness*. *Awareness* refers especially, but not solely, to the tensions that arise from the variety of ways in which the urban experience is perceived and *understood* in terms of its rules and affordances, which contribute to the definition of the set of possibilities and limitations for *actions* and *interactions*.

As previously described, the urban environment, often perceived in terms of a *transitory destination*, is modified over time by people behaving in it, and by the authority managing it. These changes are then revealed, or obfuscated, in such a way as to create a history of the urban

environment, which then provides opportunities for legibility for the people who traverse the environment and interact with it. The ways in which this history and legibility are perceived and *understood* by people give rise to the tensions extensively described in the previous sections of this chapter. For instance, it was shown how participants of the Betwixt workshop felt that the authority regulating the mall was attempting to hide most of the signs of human behaviour within the space, but that it was hard to see that this process was executed (see: 5.3.2). From the data analysis it then emerged how there was a mismatch between what participants felt that should be the history of the mall, and the history that was actually conveyed by the regulating authority. A similar mismatched emerged when participants of Betwixt discussed their experience of the pier (see: 5.5.2), which held a tension between how the space was read in both subjective and socially constructed terms (i.e., a space for free action) and how it was actually strictly regulated by the authority (i.e., a space with limited freedom of action).

By looking at the designs, which emerged from the empirical study, the data analysis showed how these tensions are addressed by researchers/designers in terms of the degree in which computational technologies provide an *awareness* of different aspects of the urban environment. It will be described in the following sections how designs specifically reflected this design principle. In general, everyday computational technologies have been approached as presenting the opportunity to further highlight, or hide, histories of urban environments, and modify the legibility of the space. Providing, or discouraging, an *awareness* of the urban environment refers to the degree to which new technologies record and display specific aspects, social or architectural, past or present, of the urban environment people inhabit and traverse.

Phenomenologically speaking, the *awareness* of the affordances and rules proper to an urban experience is fostered by computational technologies in terms of *mediation*. It was previously mentioned how some of the designs that were conceptualised as part of the empirical study foster specific kinds of existential relationships (Ihde 1990), by means of

mediating people's micro and macro perception. For instance, the Toilet Chatterbox shows the signs of people that are, or have been, in the same public toilet by displaying the messages these people decided to leave for others to read. Such messages can contain different types of information, from personal reflections and thoughts to practical information about that specific toilet, from dating offers to poems, and many other kinds of creative expressions. Accessing these messages implies being exposed to a level of *mediation* in which the technology shows, and at the same hides, aspects of the experience that influence how people perceive and understand the experience itself and the opportunities it presents.

The public displays placed at the stations as part of the *undersound* system also *mediate* people's perception of the environment, in this case the London Underground. Such displays provide an *awareness* of how the *undersound* application is being used, by revealing to users how the music, which they upload, download and exchange travels throughout the Underground network over time. This *mediates* the perception of the Underground by conveying a sense of which locations are most popular for either the quality of the music uploaded or the quantity of people traversing such locations.

These considerations about the designs produced within the empirical study begin to highlight what it means to address some of the urban tensions in terms of *awareness*. *Mediating* the *awareness* of the environment through technological systems implies that we can tap into the existing ways in which the tensions related to perceiving and *understanding* the urban experience are being negotiated and dealt with. Influencing the *understanding* of the opportunities and limitations presented by such an experience implies that researchers/designers also influence, through the technologies they create, the ways in which people *act* and *interact* within the environment and towards other people. The next section will introduce and discuss the concept of *engagement,* as a way of reframing, in a design-oriented way, the tensions relating specifically to how people *act* and *interact* in the urban environments.

### 5.7.2 Urban Engagement

This section will present the design space of *engagement*, which emerges from the analysis to encompass mainly the tensions that arise from the manifestation of urban behaviours. These behaviours, which are often caused by, and affect in return, people's *disposition* toward the urban experience, leave the signs that contribute to creation of the history of urban environments and define their legibility over time. Such behaviours include all the *actions* and *interactions* that people inhabiting or traversing the space perform with other co-located people and with the surrounding environment. As previously discussed, these *actions* and *interactions* can vary in terms of intensity and involvement and can assume various forms, from very explicit to rather subtle. For instance, it was described how from the A Public (In)convenience workshop it emerged through the analysis that public toilets are more social spaces than they appear. Participants indeed noticed how girls enjoy continuing their conversations while sitting in the cubicles, how people talk on the phone in public toilets, and how a certain degree of cooperation and socialisation is displayed outside of for-pay toilets (see: 5.4.1). It was also shown how also other spaces with apparently a low level of social interaction, such as the London Underground, are indeed characterised by subtle interactions such as the sharing of newspapers (see: 5.4.1). In turn, the analysis of the designs, which emerged from the empirical study showed how the design of new computational technologies can reinforce or modify the level of *engagement* people perform towards others and the surrounding environment. *Engagement* becomes, then, a site for design which acknowledges that people's behaviours proper to urban experiences are often contradictory, and contradistinguished by an alternation between *wanting to be seen* and *trying to hide*.

The *engagement* that can be fostered through the design of everyday computational technologies can also be approached in order to provide different kinds of mediations. For instance, Myst-Air was described as an example of a technology that creates a relationship of embodiment with the person using it, as it provides a, both symbolic and actual, extension

of his/her body, through generating an aura of mist around the person. This mist mediates the way people interact with the environment and other people inhabiting it, as it serves the purpose of occupying a certain space for a period of time, and communicating either the wish of hiding or the one of socialising with other people. Myst-Air could be used indeed to bond with other people through the collective use of a single technology, similarly to the way that smokers often use cigarettes as they socialise outside of bars, or to invite other people to share a refreshing watery air during the summer; on the other hand, it could also be used to keep a certain level of personal space with respect to the people outside of the watery bubble, thus communicating the desire to not be disturbed or engaged with. *undersound*, however, addresses urban engagement differently by opening up a new level of mediated communication among co-located people. This communication can be ignored or avoided (e.g., by not replying to messages received from other users), or acted upon is subtle ways (e.g., through downloading or making available for download specific songs), or fully exploited (e.g., by sending messages to other users). The *mediation* provided by *undersound* generates a new space and means for negotiating the tensions that relate to *engagement*.

Introducing new levels of *mediation*, by means of ubiquitous computational technologies that allow new types of *engagement* or limit existing ones, affects another side of the situated aspect of an urban experience, the *disposition* people have toward such experience. The next section will describe how *legitimisation* emerged from the data analysis as a design space that encompasses the urban tensions leading the individual to develop a *disposition* of *borrowed empowerment*, and it will elucidate not only the ways in which *legitimisation* relates to these tensions, but also how the concept contributes to opening up a new space for urban computing design.

### 5.7.3 Urban Legitimisation

*Legitimisation* is a concept, which builds upon the tensions of the preliminary categorisation, which relate to the *dispositions* that people have and manifest while living an urban experience. Often, depending on the degree to which they are acquainted with the place, the culture and the specific situation they are experiencing, people can feel more or less comfortable and express, or hide, their *dispositions* in a variety o ways. City dwellers sometimes, as mentioned previously, feel a temporary lack of role when finding themselves in an urban experience, and can therefore be inclined to create an "urban identity", which helps them to gain a *sense of belonging*, or to legitimise their presence toward other people. From the previous sections of the chapter we saw that urban experiences can involve the creation of a temporary identity, which can take on a wide range of forms and often results from ongoing negotiations with other peers and the regulating authority. For instance, it emerged from the data analysis that people who work in highly transitional spaces, such as public toilets attendants, can develop a rather strong and public identity, also by using personal objects (see: 5.4.2). Similarly, people who regularly spend time in these places, such as the man in the park (see: 5.5.2), develop a peculiar identity, which highly relies on the objects used during this time (e.g., the radio playing baseball matches commentaries).

Focusing on what an urban identity might be like, instead of labelling it as a shared or absent identity, as it happens in the case of Augé referring to non-places (Augé 1995), is extremely important for design purposes, in order to unfold nuances that can then be addressed, reflected and taken into account during the design process. Also, because urban experiences that go beyond being at work and being at home are increasingly an important part of everyday life, the urban identity, in its variety of forms, becomes no less important than a work or home-related identity. The design of new technologies can be seen as having the potential to support people as they create and communicate their urban identity. *Legitimisation* as a design space, then, refers to the fact that

people's *dispositions* towards the urban experience often lead them to look for and manifest "who they are (or ought to be)", together with their "right to be there".

By attempting to influence a rather widespread disposition in which people perceive, as the analysis of the *inquiry* phases of the empirical study demonstrated, that the time spent waiting in public places is *wasted time*, the Moo Card aims to *legitimise* such an activity by rewarding people for waiting as long as possible. The identity of the person waiting in public places is then *legitimised* by the presence of a technology that recognises this activity as not only perfectly acceptable, but also profitable in terms of prizes. By *legitimising* the act of waiting, the Moo Card also aims to improve the *sense of belonging* of the people who wait, and provides people with a tool for changing their *disposition* toward the urban experience. The Moo Card points towards another level of *mediation* in which it is not the presence of the person that legitimises itself, but the person is legitimised instead by the presence of the technology.

It is also a technology, which *mediates*, in a more physical way compared to the highly virtual *mediation* of the Moo Card, the *legitimisation* of homeless people in the case of the Tuckatruck. The social accountability and utility of the activities being performed through the technology, in this case the collection of recyclable refuse, provides the opportunity for being legitimised within a particular environment. At the same time, the Tuckatruck assigns a specific urban identity to homeless people using it, the one of recyclable refuse collectors. Because of the rather flexible character of urban identities, new computational technologies have the potential to introduce a multitude of ways in which such identities can be both constructed and negotiated.

As sites for designs that are contradistinguished by a series of tensions, *awareness*, *engagement* and *legitimisation* all have to be considered according to their interrelated aspects, which reflect the complexity and wholeness of an urban experience. As previously mentioned, these design

spaces can be tackled separately or, most commonly, they can all be approached in different ways through the design of new computational technologies, as the designs produced during course of the empirical study demonstrate. In the next section, I will focus on how the analysis of the empirical data further deepened the categorisation of the urban experience by identifying three different ways in which the design spaces of *awareness*, *engagement* and *legitimisation* can be approached by researchers/designers: namely, by creating new computational technologies, which either *integrate* with, *mirror* or *alter* existing aspects of the design spaces detailed in this section.

## 5.8 Presenting the Reactions to Urban Tensions as Design Approaches

The hermeneutic analysis of the data produced during the *inquiry* and *exploration* phases of the empirical study led to the emergence of different ways in which the sites for design that categorise an urban experience, *awareness*, *engagement* and *legitimisation*, can be addressed by researchers/designers. There are indeed different approaches that researchers/designers have proven to adopt when tackling the design spaces identified in relation to urban life. As discussed in Chapter Three, a phenomenological perspective conceives of researchers/designers as human beings whose *design disposition* allows them to turn their *understanding* of lived experiences into opportunities for design. In addition, a phenomenological perspective also considers the design process as being a situated lived experience in which designers not only project their *understanding* into the design of new technologies, but also their bias, assumptions, backgrounds and motivations. Often not only designers' *understanding* of the experience for which they design remains implicit during the process, but also the motivations that lead designers to make specific design choices instead of others.

Within this dissertation, the data analysis has allowed the emergence of three different ways in which, according to various motivations, most of which remain implicit, researchers/designers plan technologies for urban experiences. In certain cases they express through their designs the intent of having new computational technologies rather seamlessly *integrate* with the urban experience, while in other case they attempt with their designs to *mirror* specific aspects of the experiences. Finally, sometimes researchers/designers seem to want to *alter* the urban experiences, or aspects of it, with the introduction of new computational technologies. These different approaches are ways in which researchers/designers can, and do, act upon their *design disposition*, expressed by attempting to modify the urban experiences, through the planning and introduction of technologies that change the way such experiences are perceived, understood, interacted with and felt. It is then important to bring to the surface the ways in which researchers/designers approach urban life by not only acknowledging aspects of design practices that mostly remain implicit, but also by allowing and encouraging the researchers/designers to reflect on how the technologies they plan have the potential to change the lived experience, which they will be eventually become part of. When designing new ubiquitous computational technologies for urban experiences, the awareness of whether these technologies have been planned for *integrating* with, *mirroring* or *altering* the experience itself can be therefore useful to reflect on the potential of new technological interventions. Finally it is important to keep in mind that the same technology also has the potential to achieve all three effects when applied to different aspects of an urban experience.

### 5.8.1 Integration

The first way in which researchers/designers can approach the design spaces is to introduce technologies that rather seamlessly *integrate* with the range of everyday activities people conduct. Among the designs that

have been previously discussed, *undersound* tries, for instance, to reach a high degree of integration by offering music upload, download and exchange in situations or locations that have been considered by designers to be appropriate for such activities. For instance, the upload points (that is the place where artists can enter their music into the system) are located within the ticket halls of the Underground stations. The location of the upload points is, then, in a public and free area of the Underground (as it is before the ticket barriers), which allows artists to upload music into the *undersound* system without paying to ride the Underground. On the other hand, as the music is meant to be downloaded by commuters as they wait, the designers chose to have the access points for download located inside of the Underground network. Instead of placing the download points at the entrance of the station, where people are mostly passing by quickly, the access points where placed on the platform where commuters usually have a few minutes of waiting time in which they find themselves just standing by. As far as the peer-to-peer exchange of music is concerned, the time spent riding the train from station to station was considered to be sufficient for browsing the music and downloading (or at least beginning to download) songs. A solution aligned with common peer-to-peer music sharing system has then been planned to overcome the problem of people starting to download the songs but not being able to finish the download; the system, in fact, is planned in such a way as to resume the download when it encounters other people who have the same song, as the limited time spent in one train and people's schedule might make it difficult to download multiple full songs. Such design issues relate to how the technology has the potential of *integrating* with both the environment and with people's behaviour, as observed and understood by designers.

Addressing urban experiences with the aim of *integrating* new computational technologies in a rather seamless way implies attempting to add something to the experience without modifying its existing course. Technologies planned with the purpose of being highly *integrated* with the lived experiences in which they will be used have the least potential of modifying the tensions proper to urban life, or of providing new tools

for dealing with these tensions. However, as discussed in Chapter Three, technologies are never neutral and always introduce levels of *mediation*, which eventually affect the perception and *understanding* of lived experiences. It is important to remember, then that *integration* cannot never truly produce technologies, which are entirely seamless and neutral. For instance, by providing the ability to upload or download songs within Underground stations, *undersound* adds new affordances and services within the environment and provides an *awareness* of them.

### 5.8.2 Mirroring

The design of new computational technologies for the urban experience can also attempt to *mirror* certain aspects of such experience. Looking back to *undersound*, the exchange of songs between commuters in the Underground carriages reflects the subtle form of communication currently exhibited by people exchanging free newspapers. The observation of this behaviour was inspirational for the designers in finding an alternative way of supporting equally subtle ways of socialising. Most of the designs produced during the workshops also mirrored behaviours that were observed during the fieldwork activities. Myst-Air, for instance, reflects people's habit of smoking cigarettes in urban situations in order to claim a personal space within the public domain. Tuckatruck, instead, *mirrors* the fairly common habit of homeless people in California to collect recyclable garbage from the street as a way of becoming legitimised within the space they occupy. Additionally, the Toilet Chatterbox reflects people's way of writing messages on the doors of the public toilets, while the Toilet Paper Publishing Company *mirrors* a specific behaviour observed, the one of a toilet attendant who felt the need to share the events she witnessed during her working hours in the form of a memoir.

In some cases quite general and explicit behavioural trends can be represented and mirrored through new computational technologies, while

in other cases more specific or rather implicit behaviours can be taken into account, if designers find them more interesting, promising or novel. Planning technologies that mirror certain aspects of urban life implies building upon existing behaviours, so to provide people with an additional, and somehow compatible, means of negotiating and dealing with the tensions of the urban experience. For instance, Myst-Air not only *mirrors* but also amplifies the act of smoking cigarettes, as it creates a clear aura of cool mist around the person using it; this is likely to affect the tensions regarding the *engagement* with the urban environment (in terms of spatial interactions), as the technology supports the individual in achieving a higher degree of appropriation of the space to better manifest a state of *permanence* within a rather *transitory* environment.

### 5.8.3 Alteration

New everyday computational technologies for the urban experience can also aim at *altering* the current state of such experience. From a research perspective the movement of "critical design", which gained popularity through the work of Dunne (Dunne 2005) and the Royal College of Art[10], has actively reflected on how design can become disruptive and be used to challenge designers' and people's understanding of technologies and their potential effect on people and society. From the analysis of the data collected throughout the empirical study it becomes clear that several of designs produced can be considered as examples of critical design. For instance, the Moo Card challenges the rather common negative *disposition* toward the time spent waiting in public places, and the fact that technologies are often attempting to kill such time spent waiting, or to reduce it by making urban-related processes faster and more efficient. By introducing the Moo Card system, then, designers made a clear statement that a specific aspect of the urban experience should be changed and pushed towards a different direction. Finally, while many of

[10] http://www.rca.ac.uk/

the designs created during the course of the empirical study did not specifically attempt to solve problems, it is clear that altering aspects of the urban experience could also be used by researchers/designers who adopt a problem-solving approach.

Computational technologies might also carry a more subtle potential for *altering* urban life. *undersound*, for instance, challenges the aspect of non-communication that is often referred to by passengers in the Underground, that is, the custom of not speaking to strangers. By offering a messaging feature, *undersound* encourages, or provides an opportunity for, explicit communication between commuters, and therefore has the potential to *alter* this aspect of the commuting experience. This choice emerged from the designers' belief that the Underground could become a more social environment than it currently is. In addition to this, *undersound* allows the download of certain songs only at specific stations (as the songs cannot be uploaded more than once) and therefore encourages people to travel to other stations to retrieve songs (e.g., the ones that become extremely popular with time), if they cannot find them from other people nearby. This choice was supported by the designers' belief that people could develop a stronger *sense of belonging* toward Underground stations because of their acquired music identity, and perhaps explore new neighbourhoods of the city, by using the system to travel around and retrieve new music.

By attempting to *alter* certain aspects of an urban experience, designers also take a specific stand toward the tensions that are proper to such an experience. They express a judgement about how such tensions should be negotiated and dealt with, and provide technological tools accordingly. For instance, *undersound* pushes the perception of the *awareness* of the urban environment (in terms of constrained opportunities), as it allows a higher degree of access for musicians within the Underground, and provides more *opportunities for socialisation* compared to the ones currently present.

*Integration*, *mirroring* and *alteration* represent then different ways in which researchers/designers can approach urban life and design for it, expressing their own perspectives on how the tensions proper to such experience should be negotiated. These approaches help to further expand the categorisation of urban life and compliment the design spaces presented earlier. It is important to remember that, similarly to the design spaces, new ubiquitous computational technologies can span several approaches simultaneously. For instance, a design such as *undersound* aims, according to the motivations of the designers, to *integrate* with, *mirror* and *alter* different aspects of the urban experience of commuting by the London Underground. The attempt to *integrate* with and *mirror* aspects of the experience can be seen as a way of making the adoption process easier and smoother, or of highlighting aspects of the same experience through making the technologies become a magnifying glass for such aspects; on the other hand, the effort towards *altering* the tensions proper to urban life can become an explicit statement from designers regarding their way of seeing and judging the current state of things.

## 5.9 Deepening the Categorisation of Urban Life

The previous sections of this chapter demonstrated how the hermeneutic and reflexive analysis of the data collected from the empirical study has allowed not only the generation of a categorisation that encompasses the lived urban experiences approached, but also the identification of how such categorisation can be related to the design of new everyday computational technologies. The analysis built upon the preliminary categorisation of urban experiences as a series of tensions in order to identify sites for design through an examination of the ways in which researchers/designers address those tensions when planning new technologies. Identifying a series of spaces for design, and a set of ways in which those sites can be responded to, both of which are rooted in the tensions of urban life and the ways in which designers already attempt to

negotiate them, contributes to the formation of a categorisation of urban life, which is actionable for the creation of new ubiquitous computational technologies.

The next step, then, is to further characterise and discuss this categorisation of urban life, so to assess its relevance, as both a theoretical and an actionable construct, within social and urban computing. The next chapter, Chapter Six, will introduce the term "in-between-ness" as a way to address the categorisation of urban life, which differentiates it from the experiences of being at home and being at work, and renders it more distinctive and identifiable within the range of work conducted by the wider academic community aimed at informing the design of new everyday computational technologies.

## 5.10 Summary of Chapter

This chapter has presented the analysis of the empirical study outlined in Chapter Four. First, the chapter presented a preliminary categorisation of the urban experiences explored that focused on the ongoing tensions, which relate to interpreting and *understanding* the urban experience, *acting* and *interacting* in the urban environment and having a *disposition* towards the experience itself. These tensions, which emerged through the analysis of the *fieldwork* and *discussion* activities, were shown to be the results of the relationship that is created between the individual, an environment not always familiar or easy to read, other people inhabiting it, often strangers, and the regulating authority.

The chapter then has presented the ways in which researchers/designers, during the course of the empirical study, implicitly addressed the urban experiences, in terms of the tensions proper to them, in order to demonstrate that the preliminary categorisation was actionable for design. The analysis of the *design experimentations* and *design critiques* indeed demonstrated how researchers/designers' *understanding* of the

lived urban experiences both affects, and is affected by, the generation of specific designs. Finally, this chapter built upon this preliminary categorisation comprised of urban tensions to identify a series of sites for designs, *awareness*, *engagement* and *legitimisation*, which can be approached by planning computational technologies that either *integrate with*, *mirror* or *alter* aspects of the tensions proper to the urban experiences considered.

The next chapter, Chapter Six, will continue this analysis, by addressing the categorisation of the lived urban experiences in terms of *in-between-ness*. In addition, the chapter will discuss how a categorisation of urban life framed in these terms can help to consider some of the work already conducted within urban computing from a more unified and interrelated perspective, by addressing urban life as a whole instead of a collection of different and unrelated aspects.

# Chapter Six – In-between-ness and the Design of Everyday Computational Technologies

## 6.1 Introduction

In the previous chapter, Chapter Five, the results of the analysis of the activities of *fieldwork* and *discussion* have been described in terms on a series of ongoing tensions. In turn, the results of the activities of *design experimentation* and *design critique* have been outlined in terms of how such tensions have been already, mostly implicitly, tackled by researchers/designers involved in the empirical study. The hermeneutic cycle of analysis conducted between these two halves then lead to the emergence of a stronger link between the description of urban life and its relevance for the design of computational technologies. This further analysis, then, gave rise to a more holistic categorisation comprised of a series of design sites *awareness*, *engagement* and *legitimisation*, which can be approached by design through *mirroring*, *integrating with* and *altering* some of their characteristics.

It is important at this stage to discuss how this categorisation of urban life, which emerged from the analysis of the empirical study, has the potential to gain a more generalisable value within the current state of urban computing research. This chapter will then address this issue and attempt to provide a more exhaustive answer to the main research question posed by this dissertation:

***How can the design of new computational technologies benefit from an improved understanding of urban life?***

In order to achieve these goals, the chapter will address the sites for designs and design approaches presented in Chapter Five in terms of how

they can encompass not only the designs produced within the empirical study, but also the various urban computing projects and technologies, which were discussed in Chapter Two. This chapter will introduce the concept of "in-between-ness" to address the categorisation of urban life described so far. The chapter will then highlight the potential of in-between-ness as a categorisation able to include a variety of ubiquitous computational technologies and design perspectives, and will identify the ways in which such a categorisation can further inspire the design of new technologies and expand current design approaches. In-between-ness is indeed presented not as a static categorisation able to describe various urban computing trends in relation to one another, but as a dynamic space able to guide further designs and acknowledge how such designs might change the characteristics proper to in-between-ness over time. The categorisation then frames the design of new computational technologies as an active and circular process of *understanding*, and also creating, meaning while living urban experiences.

In order to further establish the relevance of in-between-ness for the design of new ubiquitous computational technologies, this chapter will then discuss the ways in which this categorisation expands on current conceptualisations of urban life within urban computing by considering the trends, both techno-centric and social computing, discussed in Chapter Two. The chapter will continue by demonstrating how in-between-ness represents a starting point in the dialogue surrounding a categorisation of urban life that is able to reflect its richness and complexity, inspire the design of future everyday computational technologies, and bring together various perspectives and design approaches proper to urban computing. The chapter will end by bringing to the foreground the main theoretical advancements introduced by this dissertation, discussing the novel ways in which phenomenology has been used with respect to previous social computing research.

## 6.2 In-between-ness and the Tensions of Urban Life

This chapter will begin by giving a name to the categorisation of lived urban experiences, introduced and discussed in Chapter Five as a series of sites for design (*awareness*, *engagement* and *legitimisation*), rooted in urban tensions, which can be addressed by specific design approaches (*integration*, *mirroring*, *alteration*). Instead of addressing this categorisation in terms of "urban experience", I selected a more original name in order to draw attention to a specific space for the design of new ubiquitous computational technologies, and to allow this space to be differentiated, but still related to, the experiences of being at work and being at home. Instead of using terminology already introduced and used within urban computing, such as third place or non-places, I refer to the categorisation of lived urban experiences in terms of "in-between-ness", in order to move away from the original meaning and connotation attributed to such terminology so far and especially within other disciplines. In addition, it will be shown over the next sections of the chapter how conceptualisations such as the one of non-places only cover specific aspects of in-between-ness, as it is described within this dissertation, and cannot be seen as exhaustive of all the characteristics proper to it, nor sufficiently able to comprehensively guide the design of new ubiquitous computational technologies.

The term in-between-ness has been already used within other disciplines (such as behavioural studies, e.g. Braidotti 1994) and has been previously mentioned within urban computing (Anderson and De Paula 2006). The organizers of the workshops that are part of the empirical study also utilized the term to refer to the kinds of urban experiences being addressed[11]. However, in the context of this dissertation I will specifically refer to in-between-ness as the categorisation, which has emerged from the analysis of the data produced within the empirical study, and therefore the term will be utilized to express and summarise the sets of tensions that contradistinguish such a categorisation.

[11] See http://www.inbetweeness.org

In-between-ness reflects the tensions of the urban experiences, emerging from the co-presence of a transitional and permanent aspects, and highlights the fact that such experiences are often not ends in themselves, but, rather, moments, which lie in-between, and stitch together, planned everyday activities and destinations. People do not normally explicitly plan to stop at a public toilet while visiting a city, nor do they write in their to-do list (even if they might take it into account) that they must wait at the post office before reaching a free counter. These are all experiences that become a rather unpredictable, but still consistent, part of people's everyday life, affecting their schedule and also the overall experience of urban environments. The level of permanency that in-between-ness experiences present can also vary between different types of people, and reach higher degrees of frequency in the case of people working or living within the urban environment, such as the homeless people or the toilet attendants. In-between-ness experiences create a feeling of urban life, which takes on the form of a flow of varied circumstances, rather than a set of defined and separated situations like "going to work", "being in the freeway", "waiting for the ATM," and so on. The concept of in-between-ness can be then seen as an attempt to address a set of seemingly heterogeneous aspects of urban life, and as a category for design which boundaries are rather loose but which can still serve to identify a specific way of being, acting and interacting within the urban environment.

In-between-ness, therefore, does not refer just to places that lack identity, history and relational aspects, as non-places do according to Augé (1995), but to a set of experiences that are varied, complex and contradistinguished by a set of ongoing tensions. These experiences can span from travelling between home and work to waiting for a friend on the street, from being in a lift to queuing at the ATM machine, from stopping at a public toilet to walking between shops in a mall. An in-between-ness experience, as this chapter will explore, can be conceived of in three different, but related, ways. First, it is an experience for which the urban environment is both a destination, albeit transitory at times,

and a space, which people traverse but also interact with. This conception highlights the ways in which people are able to develop a relationship of habit and familiarity towards the urban environment, and draws upon the tensions relating to *understanding* the environment in terms of a *transitory destination*. Second, in-between-ness experiences are lived from the perspective of a heterogeneous variety of people. This perspective stresses that though these city dwellers do not often explicitly socialise with each other, they still communicate and relate to one another in rather subtle and often socially constructed ways; and this conception builds upon the consideration of the tensions proper to urban behaviour as an alternation between hiding and seeking. Finally, an in-between-ness experience is one where people might perceive a temporary lack of role and attempt to both feel and show that they have the right to be and act within the urban environment they inhabit. This conception draws upon the set of tensions that relate to the ways in which urbanites often feel a sense of *borrowed empowerment*.

The following Figure (Figure 20) summarises the conceptualisation of in-between-ness that has emerged throughout this dissertation. This conceptualisation will be discussed in the next sections of this chapter, and will bring together the phenomenology-based theoretical underpinnings behind the idea of "lived urban experience", the actionable set of tensions expressed in design terms, and the sociological aspects of in-between-ness as adopted from Augé's analysis of non-places and further expanded in light of the results of this dissertation. The situated understanding, actions and interactions and dispositions (shown on the left side of Figure 20) of people living an in-between-ness experience give rise to tensions that can be approached in different ways by technology designers, and thus give rise to different sites for design. The sum of these tensions, how they are being handled, with the aids of technological artefacts, and how they are designed for, contributes to defining the historical, relational and identity-related aspects of in-between-ness. These sociological aspects (shown on the right side of Figure 20) are, once again, drawn from Augé's notion of non-places, but in the context of in-between-ness they are expanded as they present,

because of the tensions proper to in-between-ness, a dual aspect of absences and presences that co-exist and are constantly being redefined and dealt with. The loop that is created between the phenomenological and the sociological aspects of in-between-ness, going through the creation, management and addressing of the tensions, is meant to represent the ongoing co-constitution of all these aspects (phenomenological, social and design-related), implying that in-between-ness can only be grasped in terms of an ever-changing, and complex, lived experience.

The following sections of this chapter will bring together the different aspects of in-between-ness and their intertwining. First, to strengthen and broaden the analysis of the tensions and sites for design carried on in the previous chapter, Chapter Five, I will start by discussing the central part of Figure 20, in relation to how such tensions and sites for design can reflect the research being conducted so far within urban computing and expand it in the context of in-between-ness. This is central to the argument of this dissertation as it demonstrates how in-between-ness is, and has to be, considered as an actionable categorisation, which has the potential to guide the work of designers who want to address such a lived urban experience. Then, I will show how this core of in-between-ness experiences, expressed in terms of actionable tensions, contributes to the emergence of sociological aspects, proper to in-between-ness, which are in part similar to the ones Augé's attributes to non-places, but in part differ as they (i.e., history, relations and identity) present a dual aspect where absences and presences co-exist and reflect the tensions of in-between-ness. Finally, I will discuss, in light of such a conceptualisation of in-between-ness, how the phenomenological constituents of a lived urban experience that acted as the theoretical basis of the analysis represent the starting point of every in-between-ness experience.

Figure 20 – Summary of the lived experience of in-between-ness, as emerged from the theoretical framework, the analysis of the empirical study and the discussion that will be carried out in Chapter Six.

## 6.2 In-between-ness as an Actionable Category for Design

The urban experiences that can be considered in terms of in-between-ness are then characterised by an underlying series of tensions, which, when analyzed, gave rise to sites for design for the planning of new computational technologies. In the previous chapter, the analysis of the tensions of in-between-ness, which lead to a higher level categorisation of the urban experience, characterised by *awareness*, *engagement* and *legitimisation*, also served to demonstrate that in-between-ness is an actionable category of urban experiences that can be addressed by design, specifically because it builds upon the experiences and understandings of researchers/designers working towards the design of new ubiquitous computational technologies. The category of in-between-ness acquires an even further value in aiding the design process through the acknowledgement of the different ways in which the sites for design that contradistinguish it can be approached by researchers/designers, in terms of *integration*, *mirroring* and *alteration*.

From a phenomenological perspective, the actionable character of in-between-ness implies that researchers/designers not only identify and attribute meanings to lived urban experiences, but also that they contribute to changing these meanings, and adding new ones, through the act of designing new computational technologies. Researchers/designers then create meaning through their designs in a variety of ways, and these designs in turn have the potential to change the lived urban experiences, which they become part of. In accordance with an hermeneutic phenomenology point of view, in-between-ness does not represent a static categorisation, which can be understood and described once and for all, but, instead, it is a dynamic category in which meanings are constantly captured, interpreted, defined, added and modified through an active engagement of researchers/designers within the lifeworld and the ongoing production of new computational

technologies, which are the products of such engagements and affect them in return.

Once the dynamic nature of in-between-ness has been acknowledged, together with its potential for guiding the design of new ubiquitous computational technologies aimed at targeting urban life, it is important to consider how this categorisation is relevant to, and even beneficial for the analysis of, existing projects and technologies that contribute to the field of urban computing. Discussing the ways in which such projects and technologies fall into the categorisation of in-between-ness further strengthens its potential, and serves to begin to unify disparate urban computing trends into a more holistic view of urban life. Finally, contextualising existing projects and technologies within the categorisation of in-between-ness helps to identify new opportunities for expanding on current design approaches. In the following sections the sites for designs proper to in-between-ness, *awareness*, *engagement* and *legitimisation* will be then discussed in relation to existing projects and technologies, and this analysis will lead to the identification of a series of practical suggestions for how the design of future computational technologies can further address such sites for design.

## 6.3 Awareness and Urban Computing

Re-examining current research in urban computing we can see that the in-between-ness design space of *awareness* has been approached, implicitly and explicitly, from both a techno-centric and social computing perspective. In terms of improving the legibility of in-between-ness, for instance, designs have attempted to solve the problem of navigating unfamiliar urban environments, through the implementation of, among other systems, interactive maps on mobile phones or other handheld devices (UCL CAPABLE project[12]; Mackett et al. 2007). Even existing

[12] http://www.casa.ucl.ac.uk/capableproject/

commercial products such as Nokia's smart phones with built-in GPS are being advertised in terms of their way-finding built-in applications. Finally, Google Maps are being increasingly integrated and used on handheld devices such as the Apple iPhone. Way-finding technologies tap into the tensions that relate to the layered legibility of in-between-ness, and attempt to *alter* the way people currently deal with such tensions, as they aim at solving what designers perceive as being urban problems, in these case problems of dislocation (Dourish, Anderson, and Nafus 2007).

Other research projects or new commercial applications attempt to map urban environments in terms of resources that might be useful for people traversing them, such as shops, hotels and restaurants (e.g., iPhone's UrbanSpoon[13] and Outalot[14]). In terms of supporting the creation of in-between-ness memories and histories, existing designs have provided the opportunity for people to leave messages, using mobile phones or handheld devices, in the urban environment (e.g., Urban Tapestries[15] and Angus et al. 2008); these messages can take the form of comments directed to other people, information about the environment, personal advertisements or virtual graffiti. In this sense such technologies *mirror* the way people already leave signs of their presence in the environment, but also *alter* the state of things, by limiting the access to such signs, which become only visible to people who have the suitable technology (e.g., PDAs with a specific operating system).

Other urban computational technologies leverage existing opportunities for social engagement (e.g., Zune[16], Brightkite[17] and Loopt[18]) by providing additional information (such as music taste, current location or general interests) about co-located people, both friends or strangers, above and beyond what one can see without the support of such technologies (for instance clothing, body posture and gestures). These

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[13] http://www.urbanspoon.com
[14] http://outalot.com
[15] http://urbantapestries.net
[16] http://www.zune.net
[17] http://brightkite.com
[18] http://www.loopt.com

technologies primarily address the tensions that relate to the readability of the environment in terms of *supporting or discouraging social interactions*. Also, while in certain cases these technologies *mirror* people's habit of revealing certain kinds of information to co-located people, they also, at times, attempt to *alter* current trends by providing new kinds of information (such as match-making based on common interests) that is meant to change not only the way people perceive their surroundings, but also the way they act upon such perception (for instance by wanting to meet strangers with common interests).

The aforementioned ubiquitous computational technologies tend to highlight specific aspects of in-between-ness experiences and provide information about these aspects in a variety of ways, mostly through the use of personal and portable devices. Other designs have then combined the use of personal and portable technologies with the use of public displays and visualisations to convey the *awareness* of a certain kind of information. These ubiquitous computational technologies, however, are less numerous and typically constitute examples of art-oriented or critical designs. For instance, Nold has created a range of urban "emotional maps", by providing users with portable devices, which measure their Galvanic Skin Response (GSR) and aggregating the data produced by this process to generate a visual representation (Bio Mapping[19]). In a complimentary way the Common Sense project[20] developed between Intel and U.C. Berkeley (Aoki et al. 2008) uses portable sensor-enabled mobile devices to aggregate environmental data about different cities in order to generate visualisations, which provide information about the environmental condition of the cities themselves. The use of public displays makes the information available to a wider range of people beyond those who have compatible personal technologies and conveys information that is geared towards collectives rather than merely individuals. The perception and *understanding* of in-between-ness can, therefore, be *mediated* in ways that are potentially interesting, and also accessible, for a rather large number of people; otherwise, such

[19] http://biomapping.net/
[20] http://www.citizensensing.org/

*mediation* can be differentiated and restricted in terms of access, depending on whom it is directed to.

### 6.3.1 Extending the Awareness of In-between-ness

Contextualising both techno-centric and social computing-inspired urban computing design efforts within the findings of this dissertation helps not only to bring together such efforts, which have mostly remained fragmented so far from a research perspective, but also to find inspiration and room for improvement when it comes to designing future everyday computational technologies for in-between-ness experiences. The design space of *awareness* can then be expanded upon, compared to how it is currently addressed by existing technologies or design projects. For instance, the Toilet Chatterbox demonstrates how a system that allows people to leave virtual messages in the physical space could be implemented not only in a café or near historical buildings, but also in a public toilet, as people already leave messages there, and subtle forms of interactions are manifested. The modalities for developing a public authoring system in a café would have to be, however, rather different compared to one implemented within a public toilet, not only in terms of interactions, but also in terms of what aspects of the public toilet the technology provides an *awareness* of. Among the other designs, which emerged from the empirical study, *undersound* suggests a way of recording and displaying a history of people's movements in the London Underground, by focusing on how and where a specific content, music, is accessed and exchanged over time. Both *undersound* and the Toilet Chatterbox use public displays as a way to convey the interactional histories of in-between-ness, and aim at positioning such displays so to reach a high level of *integration*, by choosing locations where they could be most commonly seen by the targeted audience (in the common area of public toilets in the case of the Toilet Chatterbox, and at the entrance/ exit of the station in the case of *undersound*).

It is therefore important to understand what are the characteristics of urban environments that can be represented through a computational system and communicated to people inhabiting them, and where, when and in which form this communication can occur. Overall, new ubiquitous computational technologies have the potential to show signs and traces of in-between-ness that were previously hidden and to hide others that were previously manifested. From a designer's perspective, it is important to consider the aspects of in-between-ness that he/she wants to provide an *awareness* of, how this *awareness* can tap into the existing tensions proper to the experience, and how the new computational technologies can be used by people and authorities to further negotiate such tensions.

### 6.3.2 Design Suggestions for Awareness

In order to bring the discussion to a more practical level, so that it becomes useful for designers who have to make concrete decisions about their designs, this sub-section will present several suggestions that would be beneficial to take into account during the process of planning new everyday computational technologies that tackle in-between-ness *awareness*. Such suggestions reflect both the findings of this dissertation and existing trends coming from the socio-oriented side of urban computing.

***Awareness of whom and of what*** – The first important aspect to consider and reflect upon is the kind of *awareness* that designers want to foster, in terms of what aspect of in-between-ness they want to convey. Is it *awareness* of people? And of whom in particular, all inhabitants of the place, just a subset of them, people co-present or who were previously inhabiting the place? Is it, instead, *awareness* of people far away, friends or strangers? Otherwise, is it *awareness* of objects and affordances situated in the environment, nearby, far away? Embedded in

the environment, permanent or temporary and mobile? Is it *awareness* of patterns, movements, behaviours or rules?

These are all relevant questions that designers ought to take into account while planning a new technology for in-between-ness; implicit in such questions is a deep understanding of the specific dynamics of the in-between-ness experience chosen. It is indeed always important to acknowledge not only the common aspects of in-between-ness experiences, but also the aspects that make them be diverse and peculiar, and so can make diverse and peculiar the design of computational technologies that address them. For instance, a design planned for a public toilet in Amsterdam could provide a very different kind of *awareness* compared to one planned for a shopping mall in Orange County. Finally, as previously mentioned, according to a phenomenological perspective, "for every revealing transformation there is a simultaneously concealing transformation of the world, which is given through a technological mediation" (Ihde 1990, p.49). Consequently, it is crucial to reflect on what aspects of in-between-ness will be hidden as others are amplified and conveyed.

***The importance of Representation and Location*** – Once the designers have reflected on the aspects of in-between-ness they want to address and highlight, it is important to plan what modality can be used to display the information for people to access. Is it through personal and mobile devices, public displays or both? Is it embedded in the environment, temporary or permanent? Is it a graphical representation, a literal or a symbolic one? Otherwise, is it a haptic or sonic feedback? Also, how does it relate to the surrounding environment, how is it accessible and where is it situated?

These questions as well rely on a deep understanding of the in-between-ness experience being targeted and of the situated relationship between people and the environment. For instance, designers might want to situate a public display where people spend some time and are not highly

transitional, or place it close to the piece of information that it is providing knowledge of, so that it becomes highly relevant for the people watching it. Also, designers might not want to provide too much information through people's personal devices if it is clear that they do not have the occasion to check them, or if it appears to be counter-productive to access that information in a specific situation (e.g., obtaining information about a shop nearby while crossing the street).

***Functionality is not always the answer*** – The last important thing to consider when fostering *awareness* of in-between-ness is that functionality does not have to be the core goal behind implementing a new computational system, as a techno-centric approach could suggest. Providing useful information about the surroundings, and improving the efficiency and legibility of in-between-ness are extremely important agendas; however, it is also necessary to take into account, as the socio-oriented side of urban computing also suggests, the *aesthetic* and experiential aspect of in-between-ness (Brewer, Mainwaring, and Dourish 2008). For instance, obtaining information about the music flow in the London Underground does not contribute to making the transport system more efficient, nor does it help commuters to find the most straightforward way to reach their destination. However, it can help them see what music is more popular and where it can be downloaded and which stations are more popular in terms of upload and download of music; finally, it can provide a rather personalised metaphor for the commute.

These experiential aspects of in-between-ness are sometimes overlooked within urban computing, perhaps because they are not strictly efficiency-oriented, or, from a more commercial perspective, it is sometimes challenging to monetise such ideas. However, the quality of the in-between-ness experience could be improved by technologies that are able to convey information, which is not only useful and perhaps educational, but also entertaining, relaxing, engaging and aesthetically pleasant. This approach represents an effort in the direction of moving

beyond considering the urban experience in problematic terms only, as a techno-centric perspective tends to see it.

## 6.4 Engagement and Urban Computing

Many of the computational systems previously mentioned also address the *engagement* of in-between-ness in various ways. For instance, technologies attempting to introduce new *opportunities for socialisation* (some of which have been mentioned in relation to *awareness* (e.g., Zune and Brightkite) not only provide information about co-located people, but also allow the user to communicate and share resources with such people. Similarly to *undersound*, such technologies aim at *altering* the current state of in-between-ness, by encouraging people to *want to be seen* instead of *trying to hide*, and engaging with, instead of avoiding, social interactions.

Other technologies previously mentioned (e.g., Urban Tapestries), which allow people to access signs of human behaviour and information of different kinds with the urban environment, rely on people to actively use them in order to create such signs and information. This is the case of technologies that open up a new space for *mediated engagement,* not only with people who inhabit, or have inhabited, the same environment, but also with the environment itself. Mostly, these systems attempt to be *integrated* within the in-between-ness experience, leaving to people the freedom of engaging at their discretion and in the location they choose. However, they also often *alter* the experience, because of technical constraints that do not allow messages and information to be left in any location, or because of an active attempt by designers to foster specific kinds of engagement (for instance the decision to have songs downloadable from one station only, in the case of *undersound*).

*Engagement* is also addressed by various urban computing projects that consider in-between-ness in terms of *opportunities for playful*

*interactions*. Among these, the mixed-reality games that have been mentioned in Chapter Two, where participants have to engage with both the physical space and co-located people, and with distant and virtual players (e.g., Benford et al. 2004 and Benford, Magerkurth, and Ljungstrand 2005). Such games are therefore both constrained and supported, in terms of possible *actions* and *interactions*, by the affordances of the urban environment, and tap into the tensions of in-between-ness that relate to *engagement*. They attempt to *integrate* with the experience by respecting such affordances and taking them into account, but *alter* the experiences by encouraging new kinds of *cooperation and competition*. In addition, the often *alter* the levels of *permanence and transition* proper to the urban environments where the games take place.

### 6.4.1 Expanding the Engagement Towards In-between-ness

By examining these everyday computational technologies in relation to the characteristics of in-between-ness, and comparing them with the designs produced within the empirical study, it is possible to see how the design space of *engagement* is currently approached and what room it leaves for future designs. Indeed, there are many aspects of in-between-ness *engagement* that are currently unaddressed but could be reflected, amplified and subverted through design. In particular, it is important to see how future designs relate to the tensions proper to in-between-ness *engagement*, which embody people's desire to both avoid and be involved with, hide from and appropriate, be invisible and leave signs in the urban environment. For instance, there are two different ways in which *undersound* addresses in-between-ness *engagement*, by allowing people to exchange songs and communicate to each other, and by having people upload and download certain songs from the stations. In the first case, engagement relates to how people interact with each other and *mirrors*, through the song exchange, the level of subtle communication

that was observed in the London Underground. On the other hand, the explicit communication between commuters, which is often absent, is here promoted through the implementation of a messaging system, which has the potential to *alter* existing dynamics, but still leaves to people the possibility to negotiate the level of interaction they want to perform. In the second case, *engagement* refers to how people relate to the surrounding physical environment, by attempting to *alter* the highly transitory aspect of the Underground station. Limiting the upload and download of music to certain stations has the potential to change users' commuting habits and modify the level of interaction people have with the Underground itself.

Apart from *undersound*, many of the designs described in Chapter Five address the issue of *engagement*, as discussed in the previous sections of this chapter. Myst-Air, for instance, *mirrors* people's *engagement* with the surroundings in terms of the ways in which they often appropriate part of the environment and symbolically claim it as their own. While the Moo Card, on the other hands, addresses the issue in terms of *altering* the perception of the time spent waiting in the environment, and therefore encourages a higher level of *engagement* with it.

### 6.4.2 Design Suggestions for Engagement

As the ways in which *engagement* with in-between-ness can be achieved are multiple and sometimes very subtle, here a series of practical suggestions that designers should take into account when planning new technologies for these kinds of experiences will be presented. These suggestions are based on both the findings of this dissertation and on current trends that have emerged from the socio-oriented side of urban computing.

***Engagement with whom and with what*** – An important starting point when designing for in-between-ness is to gain a deep understanding of the dynamics at work between people, the regulating authority and the urban environment. This understanding can help designers to target specific aspects of in-between-ness *engagement* that technologies seek to foster and mediate. Is it *engagement* with people in proximity, or remote people? Is it with people in general or a specific subset of them? Is it *engagement* with the environment, with people through the environment, or with objects embedded in the environment? These and more questions should be considered by designers when approaching the planning of new technologies for in-between-ness, in order to find unique and ad hoc opportunities for design, and to better target the technology to the specificities of the experience, which it will become part of.

***Communication has many forms*** – Dealing with *engagement* often implies fostering a certain level of communication between people, be it implicit, explicit, in real-time or asynchronously. Urban environments are often populated with a variety of people, mostly strangers to each other, who often communicate with each other in a number of, typically subtle, ways, such as through gestures, use of objects, posture, way of dressing and so on. The design of new computational technologies for in-between-ness *engagement* needs, then, to acknowledge, and perhaps reflect, the multiple ways in which communication in such environments is usually achieved. Such ways also indicate how people deal with some of the tensions proper of in-between-ness; people might want, for instance, to leave visible signs in the environment, like graffiti, but these might have to involve a degree of aesthetic, or a specific style, and therefore a textual solution might not be optimal for virtual graffiti. People might also want to share resources, but perhaps they would not be very open to exchanging private pictures with strangers nearby, so it becomes necessary to understand what constitute sensible resources to share in a specific situation. In addition to these, there is a multitude of forms of communication that people exhibit and that can be reflected, in a creative way, through the design of new ubiquitous computational

technologies. Together with the advancement of technological progress, it is ultimately up to designers and researchers to experiment with new solutions for design, keeping in mind that it is the complexity proper to human lived experiences, which is often able to provide a wide variety of suggestions and inspirations.

***The importance of leaving a "freedom of engagement"*** – Whatever form the interaction takes, designers need to keep in mind that in-between-ness *engagement* represents a rather complex and delicate topic. As suggested above, people might not want to share certain kinds of resources with co-located strangers, specifically the data, which concerns and reveals too much of their own "real" identity. Augé (1995) sustains that non-places are characterised by a high level of anonymity and that this provides for people a certain degree of comfort and freedom. In Chapter Five the concept of anonymity and identification was brought up both in relation to in-between-ness tensions and to the designs that addressed them. If we consider the most identifiable character of in-between-ness *engagement*, the alternation between *hiding and seeking*, it can be concluded that designs would benefit from offering a balance between identification and anonymity, explicit and subtle interaction, and especially leaving to people what can be called a "freedom of engagement".

As was seen in the review of urban computing projects and the analysis of the *exploration* phases of the empirical study, designers have a tendency to plan technologies that create new *opportunities for socialisation*, not only supporting, but also encouraging a higher degree of communication between strangers, and therefore attempting to *alter* some of the tensions that relate to in-between-ness *engagement*. The motivations behind this trend are numerous, spanning from the attempt to reach a large number of technology users to the effort of creating sociable and enjoyable in-between-ness experiences. However, it is important that, both for the success and potential effect of new technologies, such designs are not highly restrictive in the ways they

allow users to interact with the urban environment and that they remain engaging even when the user chooses not to interact with their surroundings. Providing people with choices for engaging with the surroundings, leaving a channel for interaction open but not imposing it on people, and leaving people the space for keeping their anonymity with the trade-off of giving it away in order to perform certain functions, are important issues to take into account when planning new designs for in-between-ness.

## 6.5 Legitimisation and Urban Computing

Currently, not many commercial technologies and research projects within urban computing address the *legitimisation* of in-between-ness. Yet, it is often the case that the public display of an in-between-ness identity is supported and mediated by the use of artefacts and technologies, personal or embedded in the environment. Rather than designers addressing the issue of *legitimisation*, then, it is more often users who choose to adopt existing technologies, such as mobile phones, game consoles and MP3 players to communicate that they are performing activities that make them feel and look legitimate while being in in-between-ness. This suggests an opportunity, in fact a need, for designers to begin to address the way in which technologies can, and are, used for *legitimisation*.

From the *inquiry* phase of the empirical study it emerged, for instance, how toilet attendants in Amsterdam often decorate their desk with personal objects, pictures, toys and cut-outs from magazines. On the other hand, the man waiting in the park in Orange County was defining his identity not only by coming regularly in the park and sitting in the same spot, but also by bringing along a series of objects that included a radio he used to listen to baseball games. Outside of pubs in Britain is common to see people in groups smoking cigarettes, so that the cigarettes and the act of smoking makes them acquire the temporary

identity of smokers as opposed to the non-smokers sitting inside. Finally, the girl sitting on the sideway eating a sandwich on her luggage in central London was *legitimising* her presence through her personal objects, together with her body posture. These rather common creative adaptations of artefacts and technologies have been so far overlooked for the purpose of planning computational technologies that can serve the same purpose, the one of in-between-ness *legitimisation*.

### 6.5.1 Expanding Legitimisation Within In-between-ness

Though not often addressed within urban computing, *legitimisation* was approached in many occasions during the empirical study. The Moo Card, for instance, provides a way for people to justify the act of waiting without having to demonstrate that they are performing other activities, and therefore aims at *altering* the ways in which *legitimisation* in such occasions is currently being dealt with; being in a Moo Card-approved environment entitles people to wait as long as they want without feeling embarrassed or ashamed to do so. The way people already use cigarettes to support their being "temporarily permanent" in a highly transitory environment, and claiming a space for staying without being disturbed or having to justify the stay, has been, as previously mentioned, *mirrored* by Myst-Air. Both these designs address, in different ways, the disposition of a *borrowed empowerment* in an in-between-ness situation.

Others designs produced within the empirical study focused on specific categories of people that mostly appeared to need tools for claiming their in-between-ness identity. The homeless person occupying a transitory space, the attendant of a public toilet, and the busker in the Underground are all typologies of in-between-ers who already have a rather defined role within a specific in-between-ness situation, but who still need to constantly negotiate this role and its legitimacy, towards peers or the regulating authority. Categories of more *permanent* in-between-ers often

vary from place to place, and need to be identified in order to be then addressed and considered by designers.

Finally, new computational technologies can provide new ways for people to show specific aspects of their in-between-ness identity. For instance, when using *undersound* in-between-ers can define and display their identity by combining their taste in music with their commuting habits. Apart from music, other ways to express people's identity and feelings can be chosen by designers, as a consequence of a deep understanding of the specific characteristics of the experience that is targeted by the design.

### 6.5.2 Design Suggestions for Legitimisation

Because it has not been widely addressed within urban computing, suggestions for how *legitimisation* as a design space can be approached by future designs can be derived from the hermeneutic analysis of the empirical data. Some of these suggestions are discussed below.

***Legitimisation where, of whom and towards whom*** – As suggested for *awareness* and *engagement*, the first step here is to also consider who the technology targets in terms of *legitimisation*, especially because of the high heterogeneity of people inhabiting urban environments. It is important, for instance, to decide whether the technology is for everyone or has a degree of specificity and is directed to a specific category of in-between-ner, such as the toilet attendant, the homeless person, the busker, or the street vendor. In addition to this, it is important to acknowledge who the target users need to *legitimise* themselves towards, whether it is their peers, other kinds of people inhabiting the space, a particular category of people or the regulating authority. For instance, people who feel ashamed of being seen waiting and not performing any other activity attempt to show to passer-bys that they are busy doing things like checking their mobile phones, listening to

music or drinking a coffee. On the other hand, the homeless man on the street needs to show not only to passer-bys but also to the authority that he had gained a right to inhabit the space within a degree of permanence. Finally, it also emerged from the empirical study how the specific space people occupy and the length of their stay matters in terms of *legitimisation*. It is, for instance, rather socially unacceptable to wait in front of a sex shop, as it is unusual for a woman to wait for someone at night on a street populated by prostitutes; it is also rather uncomfortable to wait for someone on the street for more than half an hour, but it is seems fine to be waiting on the platform for a train that has twenty minutes of delay. Therefore, where, who and towards whom are important aspects to consider, when the aim is to address the *legitimisation* of in-between-ners, and the tensions that relate to this design space.

***Who you see is who I am*** – Something that is also important to consider when addressing the issue of creating and communicating an in-between identity is that people see each other often for only a very brief period of time, and detached from any other context that can provide more information about their identity. Much of the curiosity that arises within in-between-ness situations is due to people wondering about others on the basis of how they look and behave there, over a certain period of time. People come and go from the carriage within the Underground, some of whom might look more interesting than others; they often catch other people's attention, according to their personal tastes and interests, or perhaps because of their observable eccentricity. The way people dress, the objects they carry around, how they use them and what else they do during they commuting time represent what their identity is to other people's eyes, during a rather brief period of time that commuting itself often entails.

Designers, then, need to consider that new computational technologies for in-between-ness can add to the level of information people already communicate to others about themselves, to understand how this

information can be *integrated* with, *mirror*, or *alter* the existing one that is being displayed, and, finally, to plan how these additions and mediations can contribute to shape and display people's identities. For instance, if people stand at the platform between trains because they are downloading songs on their mobile phone, the impression could be that they really like music, and perhaps are not in a hurry to go anywhere at that particular time. Designers should, then, not only try to understand, but also try to convey through their technologies the kind of temporary, or/and consistent over time, identity that people might want to construct and show while living an in-between-ness experience.

***The skill of managing multiple identities*** – Another aspect that designers should take into account is that not only the in-between-ness experiences people might find themselves involved in on an everyday basis can be multiple and varied, but also the identities people build and show, consciously or not, while living such experiences. Designers need, then, to acknowledge that a person might want to be *legitimised* for waiting in the street but not in the Underground, for instance, or that he/she might want to be seen using certain objects in a public toilet but not in a queue for the ATM. As much as it important to design technologies that are highly situated and vary depending on the context, it is also important to think of mobile and personal technologies as being able to offer different opportunities and supporting people to manage their identities depending on the in-between-ness experience. For instance, within the Underground people might be open to show, through their mobile phones, a music-based identity, but not to share personal information about themselves. On the other hand, Myst-Air can adapt to the need people might feel to suddenly display an identity of "non availability" while being in the middle of a street.

In addition to this, in-between-ness identities can become more or less visible and manifested to co-located people. For instance, users of the Moo Card carry around their identity of "willing to wait longer", but they only temporarily communicate this identity within the location where they

decide to stop and use such technology (e.g. at the supermarket). The same happens, with very different modalities and consequences, for users of the Tuckatruck, a more conspicuous technology, which is (hypothetically) recognised by both peers and the authority as carrying a certain role and meaning within an in-between-ness experience. In sum, computational technologies can be used to express different aspects of in-between-ness identities in more or less explicit ways, which could be widely accepted or be rather new and subversive.

## 6.6 Reflecting on Design for In-between-ness

So far the urban experiences have been categorised in terms in-between-ness, which has been made actionable through grouping the tensions that contradistinguish it into three different, but overlapping, sites for design, the ones of *awareness*, *engagement* and *legitimisation*. It has then been shown how these sites, and the tensions they relate to, can be approached in different ways by designers, through the planning of computational technologies that aim at *integrating with*, *mirroring* or *altering* specific aspects of in-between-ness. The in-between-ness sites for design have been then used to contextualise research projects and commercial technologies that fall into the domain of urban computing, and to identify opportunities for improvements, by providing a series of suggestions designers are advised to take into account when designing for in-between-ness experiences.

In order to more clearly explicate the way in which in-between-ness can encompass, and help to create a dialogue about, a broad range of urban computing technologies, Figures 21 positions the designs emerged from the empirical study within the design space of in-between-ness in relation to the ways this space can be approached. For instance, we can see how Myst-air focuses mainly on the *legitimisation* of in-between-ners, while the Toilet Chatterbox focuses both on providing *awareness* of other people who are inhabiting, or have inhabited, the space, and encourages

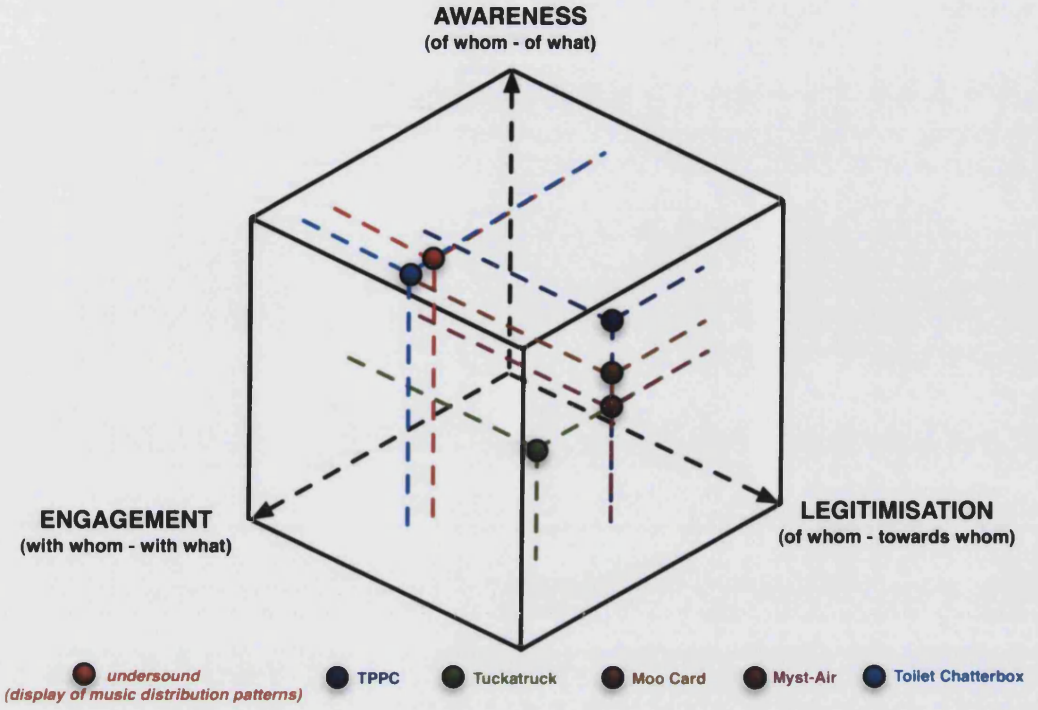
people to *engage* more with the surrounding environment. We can also notice how the Toilet Chatterbox attempts to *mirror* people's behaviour within public toilets, the leaving of messages on the doors in the form of graffiti, and it has the potential to *alter* people's behaviour because it encourages *engagement*. On the other hand, the Moo Card has the goal of *altering* the current state of in-between-ness by modifying people's *disposition* towards of waiting time. Finally, we see how *undersound*'s public displays showing music distribution patterns were planned to be *integrated with* the experience of commuting by the London Underground. Positioning urban computing projects and technologies within the in-between-ness design space does not imply assigning a specific role or meaning to them, nor to predict their potential adoption. Instead, in-between-ness constitutes an opportunity for researchers/designers to discuss these projects and technologies in relation to each other and to the specific aspects of urban experiences in which they are meant to be used.

It is important to point out again that new everyday computational technologies can at the same time address all three sites for designs proper to in-between-ness and focus on specific aspects of them. In the same way, such technologies can be planned to *integrate* with, *mirror* and *alter* different aspects of in-between-ness experiences simultaneously. In any of these cases, new computational technologies, because of their non-neutrality, will change the current state of in-between-ness and affect the tensions that characterise it, providing people with new forms of *mediation* and new affordances for negotiating and dealing with such tensions. It should be stressed that these tensions need not to be taken as problems to be solved, but as the manifestation of the richness and complexity of urban life. Even if the researchers/designers does not explicitly seek to solve a tension he/she will often bring their *understanding* of the lived experience to bear upon the way in which they approach and attempt to negotiate these tensions through design. Indeed, the empirical study and analysis of this dissertation revealed that researchers/designers who create new technologies for in-between-ness often attempt to support people in

reaching and showing a certain degree of comfort while living such experiences.

For instance, the designs produced as part of the empirical study address the tensions in a way that attempts to provide tools for people to read and interpret the environment, and other people's behaviour, in new and different ways (i.e., to facilitate *awareness*), to socialise with co-located people and claim their own space in terms of "public intimacy" (i.e., to encourage *engagement*), to feel more *in control* and at ease with the situation, and finally to feel *permanent* in a *temporary* situation (i.e., to support *legitimisation*). More specifically, the designs seem to address the tensions of in-between-ness *awareness* by rendering the environment more open to different types of in-between-ners (as Tuckatruck does), providing more tools to support social interactions (as *undersound* attempts), and allowing city dwellers to better read the affordances of the environment (as in the case of the Toilet Chatterbox).

Concerning the tensions characterising in-between-ness *engagement*, the designs encourage people to *show* themselves instead of *hiding* (as *undersound* does), promote collaboration instead of competition, appropriate the environment without *subverting* it (in the case of Myst-Air), contribute to actively change the environment by leaving sings for their presence (as the Toilet Chatterbox and the TPPC do) and encourage users to engage longer with other people and the environment, therefore prolonging their stay in in-between-ness. Finally, the designs address the tensions proper of in-between-ness *legitimisation* by attempting to allocate a positive value to the time spent in the environment (in the case of the Moo Card), provide tools for people to be socially accepted by others (as Tuckatruck attempts) and allow people to feel more *in control* of the situation and to achieve a sense of ownership towards the environment they inhabit (as Myst-Air and the TPPC do).



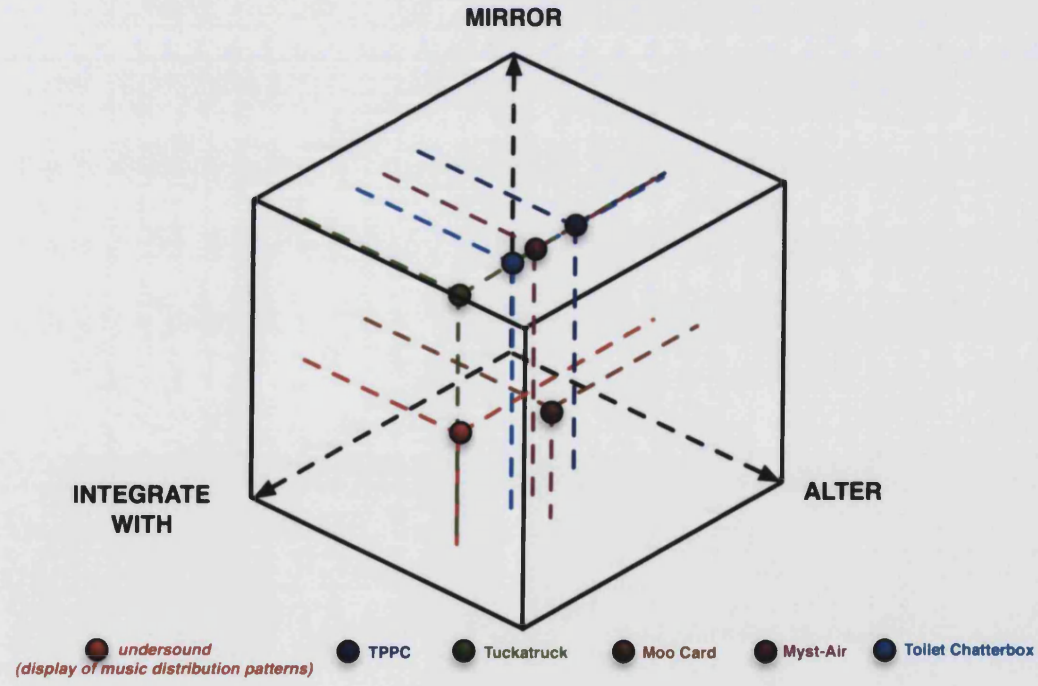




Figure 21 – Summary of how in-between-ness serves as an actionable category for the design of new computational technologies. Top figure refers to the sites for designs proper to in-between-ness (*awareness*, *engagement* and *legitimisation*) and contextualises the designs produces within the empirical study in relation to such sites. A similar process is showed in the bottom figure,

which summarises the three different approaches designers can take toward in-between-ness and its tensions (*integration*, *mirroring*, *alteration*), in relation to the fieldwork designs.

Such trends suggest that researcher/designers are inclined to make judgments of what has the potential of providing comfort while living in-between-ness experiences, so that such experiences become not only important but also an enjoyable aspect of people's everyday life. Supporting the experiential side of urban life, providing tools for dealing with the in-between-ness tensions and attempting to push urban experiences towards the comfortable side are indeed aspects of the potential of ubiquitous computing technologies that this dissertation has helped to identify. However, the introduction of new technologies within in-between-ness experiences is an even more complicated and nuanced process, and so are its effects. For instance, providing comfort for someone might imply creating discomfort for someone else (e.g., the TPPC has the potential to foster comfort for toilet attendants but discomfort for toilet customers who might feel "spied upon"). Also, by attempting to alleviate certain tensions, new computational technologies can actually contribute to creating new ones (e.g., if people wait for too long to download songs at the platform using *undersound*, or if people spend too much time at the supermarket using the Moo Card). Finally, it is possible that the positive value attributed by researchers/designers to the potential effects of their designs might not be shared by the majority of people who will use such technologies in in-between-ness experiences. In sum, the design of new ubiquitous computational technologies for in-between-ness ought to be approached as a process that leads to changes that cannot be seen as either purely positive or negative, but rather should be viewed as organic to the ongoing creation and negotiation of meanings and understandings that results from the situated aspect of lived experiences, of which technologies play a major part.

In-between-ness, therefore, as previously mentioned, should not be seen as a static categorisation. Rather it requires further work not only to

deepen our understanding of the categorisation and to unpack its nuances, but also to define its ongoing relevance to the design of new ubiquitous computing technologies. The next sections of this chapter will be dedicated to further discussing in-between-ness in the context of how urban life has been conceptualised and addressed within urban computing, both from a techno-centric and a social computing perspective. In particular, I will demonstrate how in-between-ness expands the techno-centric view of urban life as something to be seen as *homogeneous*, a *void* to be filled with data access anytime, anywhere, or as creating *problems* that can be addressed by new technologies. In relation to the socio-oriented side of urban computing, I will discuss how in-between-ness represents a chance to bring together different efforts and trends that consider urban life in terms of its diversity and acknowledge its various specificities.

In addition, in-between-ness will be further discussed in relation to how urban life has been categorised by borrowing concepts from other disciplines, and, specifically, it will be compared to Augé's notion of non-places. Within urban computing this conception, as discussed in Chapter Two, has been mainly interpreted as a collection of physical places, which present similarities, such as airports and train stations, or in terms of public paces in general. However, if we begin to deeply engage with Augè's description of non-places, we notice how such a categorisation presents similarities with respect to in-between-ness. In particular, non-places address specific aspects of in-between-ness, such as the relative absence of history, the lack of social relations and the tendency for people to feel a lack of identity. However, I will show how in-between-ness, as described within this dissertation, has the potential to expand the notion of non-places and to highlight that urban life presents a range of aspects that relate to both *presence* and *absence*, embodied within the tensions presented in Chapter Five. Further, I will highlight how both the techno-centric and the socio-oriented sides of urban computing address, in different ways, such a range of aspects. For instance, the idea of accessing data anytime, anywhere pushes forward what I will call the *centrifugal* side of in-between-ness, while many of the social computing

projects focus on the more "centripetal" aspect of it. By considering these efforts and trends within the categorisation of in-between-ness, we can try to reach a more holistic, rich and nuanced understanding of urban life that can encompass different design approaches and design spaces, and finally become a more cohesive category for design similarly to the way in which the categories of work and home have become beneficial for the design of new ubiquitous computing technologies.

## 6.7 Moving Beyond Current Conceptualisations of Urban Life

In this section I will begin to explicate the ways in which in-between-ness extends the current conceptualisation of urban life with respect to both the techno-centric and socio-oriented perspectives of urban computing, which have been reviewed in Chapter Two.

### 6.7.1 In-between-ness: More Than a Homogeneous Experience, or a Problem to be Solved

Chapter Two indeed revealed how a more techno-centric view of urban computing tends to consider urban life as being rather *homogeneous* or void, constituting an opportunity for providing data access anytime, anywhere. This suggests that the situated aspect of technology use hardly matters, and that the main goal of new computational technologies is to provide the opportunity for people to access their personal data (such as emails and music) or data provided by third parties (such as Internet websites and newsfeeds) in any occasion while traversing an urban environment. The phenomenological perspective adopted within this dissertation has helped to look, instead. towards the diversity of urban life and the situations in which technology use take places. Approaching different lived urban experiences by stressing their situated aspect (in terms of perception and *understanding*, *actions* and

*interactions*, and *dispositions*) has lead to uncovering the nuances of urban life and highlighting the fact that it does not constitute just a *homogeneous* or *void* experience, to be filled with new computational technologies.

In-between-ness as a categorisation points to the diversity of urban life because it is characterised by a series of tensions that vary depending on how the relationship between people, the environment and its regulating authority is perceived, understood, acted upon and felt. Because of the variety of people, places, and authorities regulating the urban environment is rather high, the way such tensions manifest themselves and are negotiated varies greatly depending on the situation. As previously noted, computational technologies draw upon these tensions and are understood and used accordingly; therefore, the way they are designed and implemented needs to take into account the contextual and situated nature of this technology use. The variety of designs that were produced within the empirical study begins to show the potential for ubiquitous computational technologies that acknowledge the diversity of urban life in terms of in-between-ness, and do not only provide data access anytime, anywhere.

In addition, the tensions proper to in-between-ness show how urban life can also not be consider solely in terms of generating *problems* that can be addressed, and partially solved, through technological interventions, a view, which, as Chapter Two demonstrated, is often adopted within the techno-centric side of urban computing. Tensions can indeed be perceived and understood as being problematic in some ways, but this does not fully encompass the complexity of in-between-ness. The phenomenological perspective adopted within this dissertation suggests that people's *disposition* towards the urban experience, and not merely the technologies they use, will determine whether they perceive the tensions as being, or not being, problematic for them, and even this variety of *dispositions* leads to tensions in itself. Of course designers' *dispositions* toward in-between-ness can lead them to consider specific aspects of it as being problematic, as shown in relation to some of the

designs produced during the empirical study. The design approach of *alteration* is often, but not always, adopted in such cases, in order to plan technologies that act as tools, which allow people to deal with the problematic aspects of urban life. However, the other design approaches previously discussed, *mirroring* and *integration*, suggest that there are aspects of in-between-ness that designers consider inspirational for design, and, therefore, not solely problematic, but worth preserving or enhancing with new technological opportunities.

By addressing the diversity and complexity of what it means to inhabit and traverse an urban environment, the categorisation of in-between-ness expands the techno-centric conceptualisation of urban life. Simultaneously, it also supports and resonates with some of the socio-oriented work, discussed in Chapter Two, which has been conducted within urban computing. The next section will discuss how in-between-ness has the potential to bring together various social computing projects, which have addressed the diversity of urban life from a variety of perspectives.

### 6.7.2 In-between-ness: Reflecting the Diversity of Urban Life

The previous sections of this chapter highlighted some of the trends within the socio-oriented side of urban computing in relation to the categorisation of in-between-ness. It was shown, for instance, how several design projects that seek to uncover, and create, *opportunities for socialisation* in the context of urban life address both the *awareness* and the *engagement* of in-between-ness by providing information about co-located people and communication tools for socialising with those people. In doing so, such designs can be seen as attempting to *alter* some of the tensions proper to both *awareness* and *engagement*, in that they are meant to lead people to perceive the urban environment as offering new tools for social interactions and to encourage them *to be seen* instead of *hiding*. On the other hand, some of the design projects

that consider the city in terms of *opportunities for playful and creative interactions*, such as mixed-reality games, attempt to integrate with the current state of in-between-ness *engagement* by respecting, and taking advantage of, the existing affordances of the urban environment. Such designs also have the potential to *alter* aspects of in-between-ness by encouraging different kinds of *cooperation and competition,* and different levels of *permanence and transition* within the urban environment.

These observations show how different trends within the socio-oriented side of urban computing, which have already contributed to challenge and expand the techno-centric side of the field while remaining mostly individual efforts, can be brought together and discussed in relation to in-between-ness. Such a categorisation, therefore, acts as an opportunity to strengthen urban computing, and to open up a more holistic space for design. In-between-ness seeks, then, to incorporate, and bring closer to each other, the efforts that the socio-oriented side of urban computing has conducted so far. In addition, it acknowledges and enters into a dialogue with the relevant and related conceptualisations of urban life that have been carried out within other disciplines, such as sociology and cultural geography, already in part considered within social and urban computing (see: Dourish, Anderson, and Nafus 2007).

### 6.7.3 In-between-ness: Reflecting the Existence of Urban Tensions

Chapter Two discussed how various studies within sociology and cultural geography have investigated the practice, and the experience, of traversing and inhabiting places, including urban environments (see: Tuan 1977; Lefebvre 1991). Within the socio-oriented side of urban computing a handful researchers have been inspired by, and engaged with, such literature (see: Brewer 2009; Williams and Dourish 2006), even though they remain a minority within the field. One of the hurdles, however, to drawing from this body of knowledge, which relates to urban life is perhaps the fact that studies coming from sociology and cultural

geography rarely relate to design issues that are perceived to be relevant for the urban computing community, and thus it is challenging to effectively interpret such work to provide insights regarding the design of new computational technologies.

In relation to in-between-ness, these studies, however, can become relevant for addressing urban life in terms of existing and ongoing tensions as they bring a complimentary perspective to the topic. More concretely, within sociology and cultural geography urban tensions are mostly considered in terms of large-scale phenomena that involve the power relationship generated between citizens and institutions, which attempt to impose, also through the use of technologies, their strategies of control and regulation, affecting citizens' use and interpretation of the urban environment (Scott 1998; Massey 1993). Still mostly focused on large-scale dynamics, the presence of tensions has also been related to the relationship between different ethnic and social groups within cities, or different paces of life (Suzuki 1976; Hubbard and Lilley 2004).

In-between-ness resonates with the work produced within this tradition, as it stresses the existence of various types of tensions as one of its most prominent characteristics. This acknowledgement strengthens the results presented in the previous chapter, Chapter Five, and contributes to validate them as able to reflect aspects of urban life that can be generalised. However, compared to the approaches of sociology and cultural geography, in-between-ness focuses more on the small-scale dynamics of urban life. The categorisation of urban life presented in this dissertation was born out from a qualitative empirical study, and, consequently, it supports the idea that the more mundane and ad hoc instances of everyday life, often overlooked within technology-related research, have the potential, once identified, to provide new insights for the design of computational technologies. In addition, and most importantly, in-between-ness is described in terms of the tensions proper to urban life that are already relevant for design, because those tensions have been investigated with a *design disposition*. Therefore, although it supports the creation of an ongoing dialogue with the work produced

within disciplines such as sociology and cultural geography, in-between-ness also stresses the need to better tie investigations of urban life, and its categorisation, with aspects and issues that might be most related to, and relevant for, the design process.

Finally, with respect to sociology and cultural geography, in-between-ness expands the conception of the role that technologies play within the urban tensions. It was discussed in Chapter Two that, within sociology and cultural geography, technology is often conceived as playing an instrumental, or even negative, role, one in which it acts as a tool for imposing institutional strategies aimed towards maintaining order and control within cities, and, for directing the interpretation of space by citizens. Within social computing Dourish et al. (2007) have already attempted to challenge this view of technologies, claiming that as much as technologies can be used to achieve institutional strategies, they can also be used in a tactical way (see: De Certeau 1984) and creatively by people who inhabit and traverse urban environments. This standpoint is further supported by the existence, and creation, of "tactical media", that is, the work of artists and activists who repurpose the same technologies already adopted by institutions in subversive and critical ways (Garcia and Lovink 1997).

Recent studies within cultural geography (see: Swyngedouw 1996; Gandy 2005) also attempt to move away from attributing a rather negative connotation to the role technologies play within urban life. For instance, such role has been described as having created a "cyborg urbanization" (Gandy 2005), where the concept of cyborg, previously explored within other research contexts (see: Haraway 1991), refers to the complex relationship (and the creation of tensions that this relationship causes) that links, through the use and spread of technologies, people living in cities with the urban environment and the authorities regulating it. Even beyond that, the cyborg metaphor brings technologies to the foreground, by acknowledging its contribution to the shaping of urban life and the cultural, social, political and economical dynamics associated with it. The idea of the cyborg could partially

resonate with the one of in-between-ness in that it attempts to encompass the urban experiences that are often "forgotten" and overlooked by the cultural geography literature. Gandy (2005) supports the idea that:

> An emphasis on cyborg urbanization extends our analysis of flows, structures and relations beyond so-called 'global cities' to a diversity of ordinary or neglected urban spaces. The cyborg city is, in other words, closer to an interpretative analytical framework that can connect analysis with the cultural and ideological realm of everyday life and include those 'unconventional' urban landscapes that have emerged outside the core metropolitan regions of the world economy and where incongruities and displacements are an even more pervasive feature of the urban experience (*ibidem*, p.36).

However, this view seems, once again, to render these "unconventional" urban landscapes in rather negative terms, as "incongruities and displacements" that have arisen also as a consequence of an ongoing use of technologies. Despite wanting to convey the complex ramifications of technology use within urban environments, the metaphor of the cyborg still seems to lean toward a rather dystopian view of technological process that resonates with the dark atmospheres of Ridley Scott's *Blade Runner* (1982) or of the 1980s cyberpunk literature.

Despite the fact it partially reflects some of the view on urbanisation, which have emerged within the cultural geography literature mentioned thus far, the concept of in-between-ness also presents distinctive features that allow urban computing to complement and expand such literature: first, the idea that, while computational technologies are not neutral, they do not either have solely a negative effect or instrumental role within urban life; second, the acknowledgement that technologies are used, implicitly and explicitly, to negotiate the tensions of in-between-ness; and, finally, the consideration that technology use unavoidably provokes new tensions. This conceptualisation of urban life,

supported by a phenomenology-oriented analysis, clearly holds implications from the design of new computational technologies.

To further explore the potential of in-between-ness and to situate it within the current dialogue of urban computing, it is worthwhile to compare the categorisation that this dissertation proposes to the one that has been adopted from sociology, Augé's notion of non-place. In the coming section, then, I will describe the ways in which in-between-ness both resonates with the categorisation of non-places and has the potential to expand beyond this categorisation.

## 6.8 From Non-places to In-between-ness

Chapter Two highlighted the ways in which the concepts of the third place and non-places have been adopted within urban computing by researchers attempting to categorise urban life from a broader perspective. However, as mentioned, both the ideas of third places and non-places have been approached and used mostly to refer to the specific locations they encompass, for instance restaurants, bars, trains and airports, or in terms of wholly generic public spaces. Neither of them have been fully exploited according to their original sociological and political meaning and connotation, perhaps because it was not consider as relevant for inspiring the design process. Considering both the locations to which they refer, and to their original conceptualisations, the notion of non-places seems to most resonate with the categorisation of in-between-ness, as described within this dissertation. The coming sections, then, will explore the parallel between the three sets of tensions that are proper to in-between-ness (*awareness*, *engagement* and *legitimisation*) and the main characteristics of non-places according to Augè's description (their lack of history, social relations and unique identities). Further, the resonances between non-places and the set of experiences that were approached within the empirical study, which led to the categorisation of in-between-ness, will also be discussed in order

to bring to light the ways in which the categorisation presented in this dissertation both encompasses and expands Augé's work in order to facilitate the design of new technologies. As shown in Figure 20, the sociological aspects of non-places can be seen as the results of the situated experience of in-between-ness and the generation of tensions that this experience leads to, tensions which are dealt with by people living such experience, ad addressed by designers in a variety of ways. Below I will discuss how these tensions put in a new light the sociological aspects that Augé's attributes to non-places.

Augé motivates his work on non-places by highlighting the fact that contemporary societies drive people to spend an increasing time out of their homes and their work environments, as they travel around, between highways, airports and train stations. Such places, according to Augé, hardly have a distinct character; rather, they are interstitial and mostly recognizable for their transitional aspect. Non-places are then considered as such because they often refer to other places (e.g., the destination of a journey, exotic places advertised by posters, etc.), they mediate people's experience of their surroundings through words and text (e.g., public displays, street signs, etc.) and they invoke an overall experience of solitude and anonymity. These and other aspects of non-places present similarities with the tensions proper to in-between-ness, and allow us to approach in-between-ness from a different perspective and further expand its conceptualisation. However, it will be shown below how non-places stress only a particular side of the tensions that are proper to in-between-ness, specifically those that relate to the absence of history, social relations and unique identities of people living the experience.

### 6.8.1 Towards the Outside, Back to the Centre

Augé therefore conceives of non-places primarily as connections between meaningful places, where individuals are projected towards such places,

and where the mediation of text and words creates constant references to an even different set of places. People at the airport look forward to arriving at their destination, and, while they move toward their gate, they are exposed to a series of posters promoting trips to exotic locales. In a similar way, people waiting for their train in the Underground can find themselves thinking about the work meeting they're heading to while they read a poster about cheap flights to Turkey. And where every station constitutes a reference to a different neighbourhood people are traversing, but which they cannot see, so that on the highway streets signs announce every exit in reference to the place it leads to. This, interpreting the words of Augé, makes non-places have a *centrifugal* effect, as they point to something outside of themselves and encourage people to do so as well. A non-place is one where people are there but are not really there, where perception is mediated by text, and solitude is the norm (Augé 1995).

While these can be considered to be also characteristics of in-between-ness, the findings of this dissertation show how this notion of non-places covers only part of the spectrum of what an in-between-ness experience is. More than a "not-being-there" state, we can talk about an ongoing tension between "being-there" and "not-being-there", which can summarise most of the tensions described in Chapter Five. Certain aspects of in-between-ness and people's attitude towards it surely have centrifugal tendencies, while other aspects imply and encourage a high degree of involvement of people with the experience they are living. On the way home from work drivers in Orange County might be projected towards their destination, but in the meantime they interact with other drivers on the freeway or with the attendant at the toll booth if they drive on a toll road, they can attempt to go as fast as possible while keeping an eye out for police cars, and finally they can make a deviation to stop at the nearby drive-through to get a coffee or some food. According to its peculiarities, rules and affordances, every in-between-ness experience involves a certain degree of situated involvement, which has to be constantly negotiated with its *centrifugal* counterpart.

### 6.8.2 On Histories, Relations and Identities

According to Augé, non-places do not present what traditional, anthropological, places offer, namely, a history, relations between people and a varied and creative construction of identities. However, this dissertation has demonstrated that such aspects are, in fact, deeply related to the sites for design identified as being part of in-between-ness, *awareness*, *engagement* and *legitimisation*. Specifically, in-between-ness experiences are shaped by the ways in which rules and affordances of the environment are perceived and *understood* by people, how these understandings support and limit the range of *actions* and *interactions*, which include socialising with other co-located people, and people's *disposition* toward the experience itself, something that often leads to the construction of "ad hoc identities", mainly because of a temporary lack of role. Such aspects of in-between-ness imply the ongoing negotiation of various tensions, which vary depending on the in-between-ness experience considered.

If compared to Augé's definition of non-places, then, we can see that in-between-ness experiences generate tensions because of an alternation between the *absence* and *presence* of history, social relations and unique identities. In particular, the *absence* or *presence* of in-between-ness history, relating to the tensions proper to the design space of *awareness*, depends on how the affordances and rules of the urban environment manifest themselves, are perceived, mediated by technologies and interpreted by people living the experience. Both rules and affordances can be determined by a regulating authority, they can be culturally specific, socially constructed or resulting from people's *actions* and *interactions* over time, which have left signs in the environment. As the history of a place makes it unique and identifiable, the history of in-between-ness defines its distinctiveness, and challenges Augé's assertion that non-places are generally indistinguishable. From a designer's perspective, it is important to deeply understand the history of in-between-ness and how an *awareness* of it can be conveyed through new

computational technologies, in a way that sets opportunities and constrains for people's *actions*, *interactions* and *dispositions*.

Augé also supports the idea that non-places are characterised by an absence of social relations and a generalised condition of solitude. However, in-between-ness *engagement* highlights the ways in which people often subtly socialise with co-located, and often unknown, people. Solitude might constitute a side of the experience of in-between-ness, but it is balanced by a counterpart that encompasses a wide range of interactions that occur among in-between-ners. The interplay between solitude and sociality is often negotiated in a rather ad hoc way, and is affected by rules and affordances at work in the in-between-ness environment. As discussed in the previous sections of this chapter, there are numerous opportunities for new designs that address the sociality of in-between-ness, and it is important for designers to take into account the tensions proper to this specific kind of sociality, which implies an alternation between *wanting to be seen* and *trying to hide*.

Finally, Augé asserts that non-places foster a shared and uniform identity for their inhabitants, as opposed to the highly diversified identity formation that is proper of anthropological places. The tensions proper to in-between-ness, however, highlight the ways in which people create a variety of ad hoc identities, mainly depending on their dispositions towards the experience they are living. Yet, one aspect of Augé's idea of identity within non-places could be applied to in-between-ness; while describing how people experience a temporal anonymity and lack of identity, he suggests that people often enjoy the role playing induced by non-places. People find themselves within a social system that partially defines the roles of its participants, but mostly leaves the freedom for in-between-ners to creatively and dynamically construct their in-between-ness identity. Because of the high density of urban environments, and the heterogeneity of people inhabiting them, the process of identity construction becomes partially "performative", borne out and manifested in front of people or the regulating authority. The environment becomes, then, the stage for a role-playing game where people might want to

adopt the identity of, for instance, an invisible man, a conspicuous superhero, an eccentric comedian, a serious businessman or a committed hip-hop fan.

This in-between-ness notion of identity resonates, then, with the work of Goffman (1959) on the presentation of the self in everyday life, where the author compares everyday life to a stage where people perform their role in front of an audience. While this notion can be applied to various aspects of everyday life, it is especially true for in-between-ness experiences, because of the need, but also the relative freedom, people have to constantly rework their identity, depending on the situation and co-located people. In some cases, in-between-ners' identities can be bounded to the varied activities they are performing in the environment, and, in other cases, to their role and responsibility of local workers; even in the latter case the performative aspects still play a major role in the process of identity construction. Both the toilet attendant who had put pictures of magazines on the wall next to the public toilet she was guarding, and the attendant who had placed her personal pictures and other objects on her desk, are making statements that are far more public compared to an office worker decorating his/her cubicle. While in the latter case only few colleagues are likely to come across the desk decorations of the office worker, in the case of the toilet attendants, thousands and perhaps millions of different people are exposed to their workplace decoration. Further, the buskers performing in the Underground, the man in front of the sex shop in London, the homeless man living, and the man waiting regularly, in the park in Orange County, develop and manifest rather strong identities that are different from other people inhabiting the same space. Finally, the subtle performative aspects of fashion and the choice of personal objects carried by commuters contribute to building people's transient urban identities.

This comparison between Augé's non-places and the experience of in-between-ness shows both the similarities and the differences between these two categorisations of urban life. While the idea of non-places mostly highlights the aspects of urban life that relate to *absences* (of

history, relations and unique identities), in-between-ness demonstrates that there is an interplay, and alternation, between both *absences* and *presences*, and the range of possibilities that connect such extremes. In sum, in-between-ness, as a categorisation, represents an acknowledgement of, and a respect for, the complexity of urban life, while providing inspiration for the design of new computational technologies.

Returning, then, to a discussion of design-related issues, it is important to consider the potential of in-between-ness to foster a variety of design approaches and design solutions, not only those coming from social computing but also the approaches, which are adopted by the techno-centric side of urban computing. Indeed, the complexity of urban life that emerges from the categorisation includes both of these perspectives, and, encourages a dialogue between them, instead of considering them in antithesis. In the following section, then, I will discuss the ways in which the techno-centric perspective tends to support the non-places side of in-between-ness, that is its *centrifugal* aspect, while social computing, together with the designs, which emerged from the empirical study, tends to contribute to the *centripetal* aspect of urban experiences.

## 6.9 The Centrifugal and Centripetal Sides of In-between-ness

As demonstrated, in-between-ness both challenges and expands upon the notion of non-places, by introducing a categorisation of urban life that acknowledges and reflects the co-existence and interplay between *absence* and *presence* of history, social relations and unique identities. This section will further discuss the role of new computational technologies in their capacity to approach, reflect and mediate the complexity of in-between-ness.

### 6.9.1 Anytime, Anywhere and the Centrifugal Side of In-between-ness

As previously discussed, in-between-ness serves to expand the techno-centric perspective on urban life, often considered in terms of a *homogeneous* experience or a *void* to be filled with data access anytime, anywhere. If we consider Augé's notion of non-places, and the aspects of in-between-ness it highlights, we begin to see that the approach of anytime, anywhere can be considered in terms of supporting the *centrifugal* aspect of in-between-ness. More specifically, this implies that providing data access anytime, anywhere can contribute to bringing people's attention away from the situated experience they are living, and towards people and places that are far away. Augé notes how this *centrifugal* effect is partially provoked, and mediated by, the presence of textual media, such as posters and signs that advertise different locations compared to the one where people are situated. Ubiquitous computational technologies can also have this effect when they encourage people to connect to others at a distance and access information about other places or issues that are relevant to them. Such technologies can also produce the phenomenon of "absent presence" (Gergen 2002), hinting to a distant engagement, as opposed to a situated one. Fostering absent presence also implies supporting the experience of solitude proper to in-between-ness, as it provides a way for people to avoid interacting and socialising with co-located people. In terms of mediation, anytime, anywhere can foster a relationship of *alterity* (Ihde 1990), happening when technologies are immersive or project the user elsewhere, as in the case of television or virtual reality; when *alterity* happens, the lifeworld where the user is situated is shifted to the background and the technology, together with the world it connects to, becomes the main focus of the user's attention.

### 6.9.2 Situated Technologies and the Centripetal Side of In-between-ness

On the other hand, ubiquitous everyday technologies produced from a social computing perspective can be seen as often supporting the *centripetal* effect of in-between-ness, that is, the tendency to deeply engage with the situated aspect of the experience being lived. As previously discussed, social computing-inspired technologies, including the ones, which emerged during the empirical study, are often planned with the intent to increase the comfort of in-between-ness. Part of this comfort is fostered when technologies mediate and improve the *awareness* of, *engagement* with and *legitimisation* towards the surroundings, considered in terms of the environment, co-located people and the regulating authority. Technologies that provide information about co-located people and new opportunities for socialisation, aim at changing the perception of time spent in in-between-ness from negative to positive and prolong and legitimise the permanency of people within urban environments, all address the *centripetal* side of in-between-ness experiences. In terms of mediations, such technologies tend to foster relationships of *embodiment* and *hermeneutic* (Ihde 1990), as they extend people's bodies and the objects people already use to legitimise their presence, and provide new ways to read and interpret the information, rules and affordances present within the environment.

To consider techno-centric technologies in terms of supporting the *centrifugal* aspects of in-between-ness, and social computing technologies as focusing on the *centripetal* aspects, does not imply that technologies coming from these different perspectives necessarily belong to two separate, distinct categories. Indeed, techno-centric technologies that attempt to solve the problematic aspect of urban life (e.g., in terms of dislocation) can sometimes have the effect of supporting the *centripetal* and not the *centrifugal* aspect of in-between-ness. For instance, accessing one's email account on an iPhone while walking on a street provides a *centrifugal* effect, as it brings people further from engaging with the surroundings; on the other hand, checking one's

directions using Google Maps on an iPhone while walking provides a *centripetal* effect, in that it supports a mediated engagement with the surroundings. Despite the fact that the boundaries of these categories are difficult to draw, highlighting trends that have emerged within urban computing in relation to the characteristics of in-between-ness allows us to see both techno-centric and social computing technologies, and the design approaches that led to their development, as lying within the scope of such a categorisation, and addressing different aspects of it.

In the previous sections of this chapter, both techno-centric and social computing designs have been already discussed in terms of how they approach the three sets of tensions proper to in-between-ness, relating to *awareness*, *engagement* and *legitimisation*. Talking about these designs in terms of addressing either the *centrifugal* or the *centripetal* side of in-between-ness (see Figure 22) constitutes a further step in the direction of creating a dialogue between what seem to be antithetical perspectives within urban computing. In-between-ness reflects the complexity of urban life and its apparently contradictory nature, resulting in the co-existence of *presence* and *absence* of history, relations and unique identities, and of *centrifugal* and *centripetal* tendencies towards the experience itself, all leading to tensions that require constant negotiation. Such complexity can accommodate not only different design approaches, but also both a techno-centric and a social computing perspective, opening up the potential to provide a variety of technological tools for people to achieve such negotiation, and tackle specific aspects of in-between-ness that all eventually contribute to define the experience.

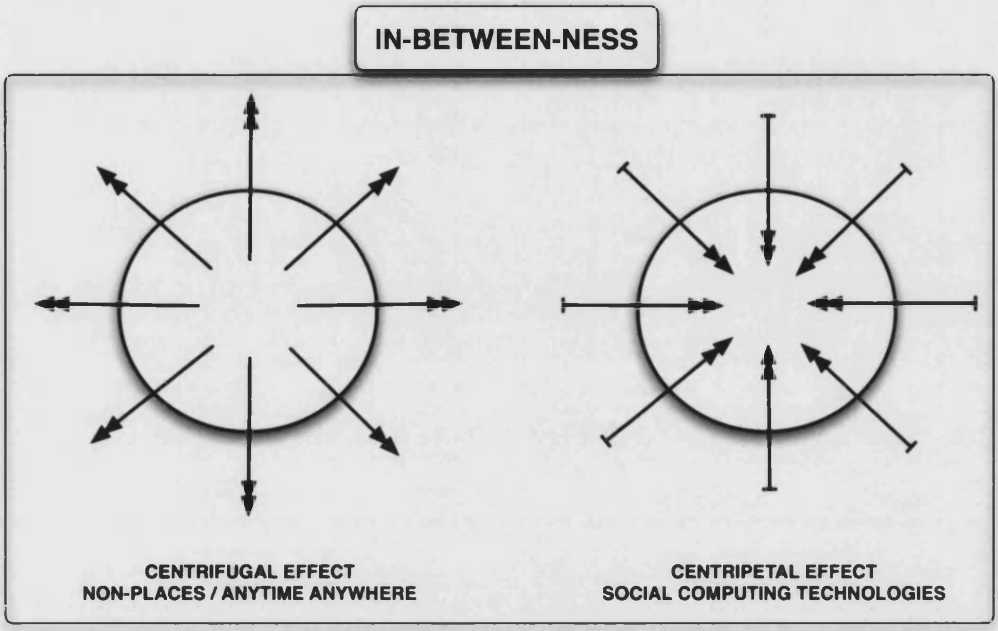



Figure 22 – In-between-ness includes both a *centrifugal* effect, stressed by the notion of non-places and mostly addressed by the techno-centric perspective of urban computing, and a *centripetal* effect, often addressed by a social computing perspective. The circle can be seen as representing the lived urban experience, in relation to, which computational technologies, together with other factors, can contribute to bring people's attention and engagement either toward the inside or toward the outside of the experience itself.

In sum, in-between-ness allows us to move beyond and expand current conceptualisations and categorisations of urban life within urban computing, and also to provide a space for both a techno-centric and a social computing perspective to enter in dialogue with each other and contribute to continually redefine the experience of in-between-ness. After having conceptualised and explored this experience, especially in relation to Augé's notion of non-places, it is important to reflect on the extent to which in-between-ness strictly refers to urban life, or if it could be also extended to non-urban situations. The next section of the chapter then brings the discussion on in-between-ness to a higher level of generalisation, by extending its reach beyond urban computing.

## 6.10 In-between-ness and Urban Life

The main research question that has driven this dissertation explicitly brings the focus to a specific human experience, the one of living in and traversing urban environments. Throughout Chapter Two the literature review has set the scope of the research, by excluding from urban life the experiences of being at work and being at home, already widely explored within the technology design-related research community. In contrast, the emerging field of urban computing has been reviewed as focusing on urban experiences that go beyond being at home and being at work, such as the ones of being in non-places and third places. In-between-ness as well has been conceptualised to encompass all those urban experience that characterise the experience of living within urban environments beyond home and work, such as commuting, waiting, in public places, visiting public toilets and so on. Mainly, the experience of in-between-ness has been described as emerging from an ongoing relationship that is created between people inhabiting or traversing an environment, between people and the environment itself and between people and the authority, which manages the environment. This ongoing relationship and interaction give rise to a series of tensions that are negotiated often in *ad hoc* or socially constructed ways, and in which computational technologies play a key role.

Because of these characteristics, it is easy to associate in-between-ness experiences with urban life, which is typified by a multitude and variety of people, a heterogeneous and varied environment, and a series of authorities that regulate it. However, it is difficult to set boundaries to in-between-ness, which can also encompass situations that go beyond urban life. Among the empirically observed experiences, for instance, the one of *being in transitional spaces* in Orange County already extends the concept of urban life, in that Orange County has been addressed, as explained in Chapter 4, as a "post-urban" environment, a centerless region (Kling, Olin, and Poster 1995) or a megalopolis (Preston 1967). This shows how urban life itself is hard to address in a unified way and that we experience a variety of "urbanities" in modern life. In addition,

these considerations suggest that in-between-ness can relate to experiences that take place outside of urban environments. For instance, travelling in a busy highway that connects two major cities can constitute an in-between-ness experience, in a similar way in which the highway itself can be seen as a non-place in Augé's terms.

While this dissertation has then explored in-between-ness mainly in the context of urban environments, the results of this research suggest that in-between-ness can also be considered beyond the scope of urban life, and that urban computing itself has perhaps presented blurred boundaries in terms of what falls in and out of its scope. Within urban computing, for instance, other researchers have previously explored Orange County and attempted to capture its non-conventional kind of urbanity (see: Anderson et al. 2006). Within this dissertation, the broader reach of in-between-ness, which leaves space for further investigations, has been in part made possible by the phenomenological conceptualisation of urban life itself, which attempted to find the core characteristics proper to a lived experience, constituting the basis of an urban experience as well. In relation to such conceptualisation, it is now important to discuss how the theoretical standpoint adopted within this dissertation relates to, and advances, the ways in which phenomenology has been used within social computing to understand human experiences for the purpose of informing the design of new computational technologies.

## 6.11 Theoretical Considerations

The following sections of this chapter will then introduce and discuss how the categorisation of in-between-ness is borne out from an original adoption of a phenomenological perspective, and how the phenomenological constituents of a lived urban experience, as described in Chapter Three, define the starting point of every in-between-ness experience (see: Figure 20). As far as the original adoption of

phenomenology goes, first, such perspective has been applied, in the course of this dissertation, to the context of urban life, thus expanding the scope of the application of this perspective beyond current social computing inquires into either a more generic human experience (Dourish 2001) or the experience of being at work (Suchman 1987). Second, Heidegger's concept of "situatedness" has been here not only approached from the perspective of its external side, the one that concerns people' *actions* and *interactions*, already widely explored within social computing, but also from the perspective of its internal side, referring to people's *disposition* towards the lifeworld. Third, while within social computing phenomenology has been mostly directed towards understanding users' experience, this dissertation attempts to discover how urban life is understood by researchers/designers who can approach the lifeworld with a special kind of *technological disposition*, a *design-oriented* one. This perspective has been applied with the aim of generating a categorisation that can be, by its very nature, relevant for the design of new computational technologies, because it approaches the experiences with a *design disposition*. Finally, the phenomenological standpoint adopted by this dissertation highlights the importance of considering computational technologies used within, and planned for, in-between-ness in terms of their role of *mediating* the perception and interpretation of the lifeworld. In particular, by considering computational technologies in terms of Ihde's set of existential relationships (Ihde 1990), we can see how technologies planned with either a socio-oriented or a techno-centric view foster *mediations* that either strengthen or diminish the *centripetal* and the *centrifugal* aspect of in-between-ness.

### 6.11.1 Phenomenology and Urban Life

Chapter Three highlighted the ways in which phenomenology has already been adopted within social computing for understanding the way people engage with the lifeworld and make sense of it. This dissertation has demonstrated how a phenomenology-oriented conceptual framework can

be successfully applied not only to investigate the experience of being at work, but also to better understand urban life (and beyond), and the experience of in-between-ness, for the purpose of designing new computational technologies. In particular, a phenomenological perspective proved to be useful in this context in order to reflect the heterogeneity of in-between-ness, and to bring to the foreground the concept of lived experience and the fact that while people might have different experiences of the same place, they can also have similar experiences of different places. As discussed in Chapter Five, such similar and contrasting experiences often give rise to urban tensions. In relation to *legitimisation*, for instance, the homeless man and the man waiting for his son at the park in Orange County had rather different experiences of the place as one was afraid he would have been asked to leave and the second was rather comfortable as his stay was legitimate. At the same time, they both considered the park as being their "comfort zone", and, in terms of *engagement*, they both used personal objects to claim, symbolically, their physical space. In relation to *awareness*, workshop participants had a similar experience of the pier and the shopping mall, which both appeared to be places for fun and entertainment, but were perceived to actually be very regulative in terms of the set of behaviours that were allowed there.

Adopting a phenomenological perspective also facilitated the focus on, and uncovering of, the subtle, socially negotiated, and often instinctive ways (Dreyfuss 1992) in which people deal with being in in-between-ness. For instance, it was discussed in Chapter Five how places that often seem to lack explicit forms of communication and socialisation, such as the London Underground and public toilets, actually present a number of subtle ways of socialising, such as the sharing of newspapers and message exchanges in the form of graffiti. At the same time, it was noted how in these places people *cooperate* with each other as part of a series of tactics used for coping with unexpected occurrences, as the presence of wet seats in the Underground (see Figure 4 in Chapter Five) or the need to gather coins to enter public toilets (see Figure 5 in Chapter Five).

In particular, phenomenology allowed the understanding of the micro dynamics of in-between-ness to emerge by stressing the importance of considering the situated aspects of the urban lived experience. This dissertation sought to fully engage with the phenomenological concept of "situated-ness" by not only focusing on the behavioural aspect of it, but also by considering the *dispositions* people have towards in-between-ness. The following section will further stress the advancements to current social computing approaches, which this dissertation presents.

### 6.11.2 Phenomenology and the Situated Experience of In-between-ness

As discussed in Chapter Three, Ciborra (2006) notes how Heidegger's concept of befindlichkeit (Heidegger 1962), which can be translated with the term "situatedness", refers to how people find themselves, in terms not only of *actions* and *interactions*, but also of personal disposition, in a specific situation. The concept of being situated, then, involves both an internal (i.e., *disposition*) and an external (i.e., *actions and interactions*) aspect, which need to be acknowledged and analysed side by side, as they, together, constitute the basis of a lived experience. However, Ciborra points out how, within social computing, the external side of situatedness is often considered (Suchman 1987; Orlikowski 1996), while the internal side, perhaps more difficult to study, remains widely unexplored.

Because both aspects of the urban situatedness have been taken into account within the conceptual framework of this dissertation, the results of the analysis of the fieldwork data also show a connection between the external and the internal side of an in-between-ness experience. The way in which urban tensions have been described, and addressed for design purposes in terms of *awareness*, *engagement* and *legitimisation*, demonstrates how these tensions relate not only to people's *actions* and *interactions* within urban environments, but also to how people's

*disposition* is generated and manifested as part of the experience of living the urban experience. In particular, the tensions that address the need people feel to *legitimise* themselves within urban environments refer to their *disposition* towards the in-between-ness experience. Such a *disposition* might be a consequence of how the urban environment has been read and perceived, and, can be manifested in the way people engage with others and the environment itself. For instance, for the homeless man in the park, the *disposition* of being *legitimised* in the space is explicated not only in words (i.e., when workshop participants interviewed him), but also through his act of using objects to claim part of the space itself. At the same time, the feeling of being *legitimised* coexists with the fear of being asked to leave at any time, provoking a tension in terms of the man's disposition towards the experience. Similarly, in Chapter Five we also saw that the workshop participants felt a tension between the freedom in terms of *actions* and *interactions* on the pier that they experienced and the freedom that they expected to have. Tensions can then be generated in terms of *disposition* when people's expectations about an in-between-ness experience do not match with their situated *understanding* of it. Finally, the data analysis highlighted the way different ways in which people feel towards the experience of waiting in in-between-ness, which can be approached with a *disposition* that can vary on a continuum from meditation to extreme anxiety.

With respective to previous work conducted within social computing, this dissertation, then, fully embraces the phenomenological concept of situatedness and uses it to allow the emergence of both the external and the internal aspects on in-between-ness experiences, and, the creation of a strong relationship between these aspects that cannot be separated from each other if we want to reach an *understanding* of the experiences themselves. Especially through the introduction of the site of *legitimisation*, it then becomes explicit how the acknowledgement of people's dispositions towards in-between-ness is not an end to itself, but serves to inform and provide further knowledge for the design of new computational technologies.

The importance of stressing the situated aspect of human existence finally lies in the fact that situatedness can be seen, as shown in Figure 20, as the starting point and the basis of every in-between-ness experience, leading to the generation of tensions which define not only design opportunities but also the sociological aspects proper to in-between-ness. Acknowledging this aspect also helps to find out how situatedness also represent the starting point for designers to understand and interpret urban life and in-between-ness in a way that can be relevant for their design work.

### 6.11.3 Phenomenology and the Design of Computational Technologies

As already stressed throughout this dissertation, the phenomenological perspective adopted to generate a new categorisation of urban life was chosen for its potential to highlight the aspects of urban life that are, and can be relevant for, the design of everyday computational technologies. Existing studies within social computing, which have contributed to acknowledging the situated aspects of human life, have mainly focused on understanding lived experiences from the perspective of technology users. For instance, as discussed in Chapter Three, Dourish (2001) introduces within social computing the concept of embodied interactions, suggesting that designers, when planning new computational technologies, focused on the lived and situated aspect of users' experiences in the world.

While acknowledging these advancements within social computing, I sought instead to focus on the situated experience of designers/researchers involved with the design of computational technologies. As discussed in Chapter Three, a phenomenological perspective suggests that designers/researchers, as much as users, are situated in the lifeworld, and perceive it, *understand* it, *act* and *interact* in it, and have certain *dispositions* towards it. Even more than users,

however, they have a sensibility towards finding and assigning meanings to the lifeworld that are, potentially, related to the design of new designs. In particular, they have a *design disposition*, which relates to the *technology disposition* that characterises the modern human being, in this case directed towards aspect of the lifeworld that can be used as opportunities for planning new designs. This conceptual standpoint acts as the basis for creating a categorisation of urban life that is rooted in the *understanding* that researchers/designers have of it. In-between-ness, then, does not merely incorporate aspects of urban life that have previously been identified by researchers within disciplines such as sociology and cultural geography; it relates directly, and gains relevance, to the design of new computational technologies, because it already reflects the *design disposition* of researchers/designers. This has allowed in-between-ness to become a beneficial conceptual construct for discussing design issues, in relation to not only future designs, but also to existing projects that have been created within urban computing. In-between-ness is the experience of urban life that reflects the human side of researchers/designers, who approach the lifeworld on an everyday basis as everyone else does, apply tactics to negotiate urban tensions, and become experts of specific aspects of urban life that are closer to themselves. In-between-ness is, finally, a design space where researchers/designers' *understanding* of urban life becomes the starting point for novel experimentations into the design of new everyday computational technologies.

Finally, in discussing the original contribution that this dissertation has made with respect to the ways in which phenomenology can be used to inform the design of new ubiquitous computational technologies, it is important to emphasise how this approach highlights the *mediating* role played by computational technologies within in-between-ness.

### 6.11.4 The Mediating Role of Technologies

It was previously discussed how computational technologies have been considered within this dissertation as being two-sided (Arnold 2003), that is, not just causing problems or becoming instrumental to power, as pointed out by various social science-oriented studies (see: Graham 2005; Massey 1993), or just being able to solve *problems*, as often considered by the techno-centric perspective within urban computing (Cheverst et al. 2000; Ho and Intille 2005). Instead, computational technologies are considered by this dissertation as tools for negotiating the urban tensions on an everyday basis, and as causing tensions themselves, because of the often contradictory and paradoxical effect their use carries. In addition, computational technologies have been considered, throughout the dissertation, and as a consequence of the theoretical perspective adopted, in terms of the *mediating* role they have within in-between-ness. In particular, this role has been considered in relation to Ihde's existential relationships (Ihde 1990) of *embodiment*, *hermeneutic* and *alterity*. It is important to stress, once again, that considering technologies in terms of *mediations* does not imply the fact that they do not have an active role in shaping a lived experience. Instead, it stresses the role of technologies in terms of allowing people to interpret and act upon the lived experience in different ways, thus attributing to technologies themselves a certain degree of agency, though not strictly through an actor-network theory conceptualisation[21] (see: Latour 1987; Callon 1986).

In relation to the results of the fieldwork study, and the discussion carried out within the previous sections of this chapter, we can see how computational technologies can mediate and support the dual aspects of in-between-ness. It was shown in Chapter Five how the designs, which emerged from the fieldwork can be seen as primarily fostering relationships of *embodiment* and *hermeneutic*. Such relationships

[21] Much more than in phenomenology, in actor-network theory technologies are thought of having an agency as humans do in shaping reality.

generate a *mediation* especially towards the surrounding environment, as in the case of *embodiment* technologies become an extension of the user's body, and in the case of *hermeneutic* relationship, they provide information, and aid, or mislead, the interpretation and *understanding* of the environment itself. For instance, in Chapter Five we saw how a technology such as the Myst-Air allows people to symbolically, but also physically, claim a personal space while being in an in-between-ness situation, fostering a relationship of *embodiment*. On the other hand, the Toilet Chatterbox provides a new level of information about public toilets, created by messages that people who have traversed and engaged with the space over time have decided to share with others; the technology, therefore, mainly generates a *hermeneutic* relationship with its users. This acknowledgement resonates with the idea that computational technologies produced with a social computing perspective tend to support the *centripetal* side of in-between-ness, encouraging a higher degree of *engagement* with the surroundings, and/or attempting to provide more *awareness* of specific aspects of the contingent situation.

On the other side, if we consider computational technologies produced according to the ideal of anytime, anywhere, they can be seen as often fostering a relationship of *alterity*, where the technology becomes immersive because it opens up a space filled with information that can, but need not, be related to the situation the user is experiencing. For instance, technologies that allow people to access their work data in any occasion provide the chance to work theoretically in every situation, including while being in in-between-ness. This process can provide a relationship of *alterity* in that the technology and its content, in this case work-related data, claim most of the attention from the user who ends up being less engaged with the immediate surroundings. Such effect resonates with the *centrifugal* side of in-between-ness that can be then supported by technologies that foster a relationship of *alterity*, mostly planned according to a techno-centric perspective.

Once again these differentiations should not be taken as rigid and mutually exclusive. Often, everyday computational technologies foster

more than one existential relationship, especially because of their complexity and as a consequence of a process of convergence. In addition, a clear separation between social computing and techno-centric computing in terms of producing technologies that support relationships of, in the first case, *embodiment* and *hermeneutics* and, in the second, *alterity*, cannot be made, as there can be exceptions. However, this argument serves to show how computational technologies planned for in-between-ness can be thought of in terms of *mediations* according to a phenomenological perspective. Such *mediations* reflect the dual and contradictory aspects of in-between-ness, and become tools that either reinforce or diminish the *centrifugal* and the *centripetal* effects of such experience. Both the socio-oriented and the techno-centric perspective within urban computing contribute to planning computational technologies of different kinds, producing different kinds of *mediations* that follow the trends previously outlined. Reflecting on these issues is crucial for advancing the relevance of urban computing, bringing an improved sensitivity to the field, and contributing to open up a dialogue between its seemingly contrasting sides.

## 6.12 Concluding Remarks

This dissertation has addressed the following research question:

***How can the design of new computational technologies benefit from an improved understanding of urban life?***

In order to answer such question, the dissertation has adopted a social computing perspective to approach urban life, in attempt to generate a new categorisation able to inspire the design of new everyday computational technologies. Social computing has already contributed to improve the understanding of urban life, and to expand the design space of urban computing. By adopting a phenomenological approach to investigate urban life, in terms of gaining a situated understanding of

lived urban experiences, this dissertation has introduced the notion of in-between-ness to address and describe what a novel categorisation of urban life might look like. The dynamic and design-oriented aspect of such categorisation reflects the richness and complexity of urban life, and has the potential of both guiding the design of new computational technologies and creating a dialogue between different trends and perspectives existing within urban computing. In sum, this dissertation has demonstrated that an improved understanding of urban life can become beneficial for the design of new computational technologies if it leads to a more holistic and comprehensive categorisation of urban experiences, expressed in design-oriented terms. The dissertation has attempted to do so by introducing and discussing the categorisation of in-between-ness, creating a strong link between this categorisation and the work already produced within urban computing, and providing a series of guidelines for future designs.

Despite the fact that it clearly adopts a social computing perspective, this dissertation shows that a more holistic categorisation of urban life does not need to exclude part of the work that is being produced within urban computing, even if that work is inspired by a techno-centric perspective. On the opposite, the dissertation demonstrates that this techno-centric work needs to be included and discussed within a broader context, in order to asses the overall direction toward which urban computing is currently heading, and the potential for future improvements. A more holistic categorisation of urban life can also serve the purpose of strengthening the field of urban computing, especially in comparison to other more established categorisations of everyday life, such as the ones of work and home, which have been extensively explored, discussed and finally turned into rich design spaces.

It is important to acknowledge that in-between-ness, as described within this dissertation, is not meant to represent a final assessment of what constitutes urban life and how it can be approached by design. Even more than that, it was discussed how in-between-ness can also address lived experiences that fall outside of urban life itself. In order to broaden

its reach and further understand its dynamic aspects, in-between-ness needs future work to reflect the on-going changes urban life is subjected to, and the role that the introduction of new computational technologies plays in affecting these changes. In addition, in-between-ness can benefit from additional work aimed at expanding its conceptualisation, and providing further suggestions for researchers/designers who plan to address it. Finally, in-between-ness constitutes an actionable category for design as it is described in terms that can be related to design issues, but it does not provide guidelines in terms of what specific technologies can be planned and how they can be implemented. It will be up to researchers/designers to interpret in-between-ness according to their needs and motivations, and take from it the inspiration and knowledge they need in order plan new everyday computational technologies.

## 6.13 Summary of Chapter

This chapter has discussed the results of the empirical study, as presented in Chapter Five, by contextualising them within the current state of urban computing research. The term "in-between-ness" was introduced to address the categorisation of urban life, which emerged from the analysis and is based upon a series of tensions that become actionable when addressed as the design sites of *awareness*, *engagement* and *legitimisation* and the design approaches of *integration*, *mirroring* or *alteration*. In-between-ness was then discussed in terms of its potential for including a variety of technologies and design projects that have been produced within urban computing. The categorisation acquires an importance not only in relation to the results of the empirical study, but also more generally in the context of urban computing. To this extent, this chapter has also discussed how in-between-ness expands on the ways in which urban life has been so far conceptualised and categorised within urban computing, from both a techno-centric and a social computing perspective. In particular, in-between-ness has been compared to one of the categorisations adopted by urban computing,

Augè's notion of non-places. By engaging with the original description of that categorisation, this chapter demonstrated that while the idea of non-places encompasses characteristics of in-between-ness, it only stresses some aspects of it, specifically the ones relating to the absence of history, social relations and unique identities. However, highlighting the tensions proper to in-between-ness draws attention to the fact that urban life presents both an *absence* and a *presence* of these and other seemingly contradictory aspects that co-exist and need to be constantly dealt with and negotiated by the people living the urban experiences.

This chapter has then addressed how such a complexity and range of aspects proper to in-between-ness leaves space for a techno-centric and a social computing perspective, which tend to support, in turn, the more *centrifugal* and the more *centripetal* tendencies of in-between-ness. Considering such perspectives as also co-existing within the space of in-between-ness, and in dialogue with each other in terms of addressing different but interrelated aspects of it, represents a starting point for generating a more cohesive and holistic categorisation of urban life within the emerging field of urban computing. Even beyond that, in-between-ness holds the potential to encompass situations that do not properly belong to urban life, but present the characteristics that have been described in both Chapter Five and Six, namely the tensions that arise from an ongoing interaction between people, a surrounding environment, a regulating authority, and which involve the ongoing use of technological artefacts.

Finally, this chapter has engaged with theoretical considerations, by discussing how the phenomenological perspective adopted within this dissertation advances the way the philosophical tradition has been so far used and interpreted within social computing. In particular, it demonstrated the novelty of applying phenomenology to the understanding of urban life, of reaching such understanding by focusing not on users but on the perspective of researchers/designers, of considering the concept of situatedness in terms of not only *actions* and *interactions* but also of *disposition*, and, finally, of addressing

computational technologies as provoking different kinds of mediations. Such a novel approach creates the basis for expanding the potential phenomenology has to continue to inspire the design of new everyday computational technologies.

To summarise the conceptualisation of in-between-ness that has emerged from this dissertation and been discussed within this chapter, we can now refer back to Figure 20. This Figure shows the essence of an in-between-ness lived experience, which begins with a phenomenology-conceived situatedness (in terms of *actions*, *interactions*, *disposition* and *understanding*) which sets the basis of the experience itself. The Figure then shows how this situatedness leads to the generation of a series of tensions - emerged from the empirical study – which are dealt with and designed for in a variety of ways (i.e., through *mirroring*, *integrating with* and *altering* the tensions) and give rise to a number of sites for design (*awareness*, *engagement* and *legitimisation*). Last, the Figure shows how these tensions contributes to defining the sociological aspects of in-between-ness, which can be seen as an extension of the ones Augé attributes to non-places (i.e., history, relations and identity), exhibiting a dual nature of *presences* and *absences* that reflect both the tensions and the complexity of in-between-ness. The loop created by the ongoing interaction between situatedness, actionable tensions and sociological aspects reflects the dynamic, ever changing and difficult to grasp nature of in-between-ness

# Chapter Seven – Conclusion

This chapter will conclude the dissertation by providing an outline of the main points covered throughout it, a summary of the contributions it has made to the research community, a view of the limitations of the approach adopted, and, finally, suggestions for conducting further research on the topic.

## 7.1 Overview of the Dissertation

This dissertation has been motivated by the increasing presence of computational technologies in everyday life, generating new challenges to the research community that seeks to understand and improve the design of such technologies. In particular, this dissertation has focused on a specific aspect of everyday life, the experience of living in and traversing urban environments, and was driven by the research question:

***How can the design of new computational technologies benefit from an improved understanding of urban life?***

In attempt to answer this question, this dissertation began by positioning its enquiries within the body of existing literature on the topic. It first specified the technological domain being approached, everyday and ubiquitous computational technologies, and then reviewed the two main research perspectives that are applied to the design of such technologies, techno-centric and social computing. While the first perspective has been presented as being mainly concerned with the implementation challenges that the research domain present, the second has been described as bringing forward a sensitivity towards issues that relate the human and

social side of technology design and adoption. Social computing has then been reviewed as including a variety of approaches that have addressed *foundational* issues, with the aim of conceptualising the spread of computation and its implications, provided *inspiration* for the design of new technologies, and finally contributed to generate knowledge about the design process from a more *practical* perspective. One of the challenges faced by both techno-centric and social computing research efforts was identified as being the categorisation of everyday life for the purpose of designing new computational technologies. The importance of categorisations was then stated in relation to their potential of capturing the richness of everyday life and, at the same time, reducing its complexity in order to provide inspiration for the design process.

Within research on the design of ubiquitous computational technologies, two main categorisations of everyday life were identified, the ones of work and home, which have been widely researched both from a techno-centric and from a social computing perspective. In the context of such research, social computing was shown to have stressed the nuances and the situated aspects of what it means to be at work and at home. Urban life was then presented as a recent but increasingly important category of everyday life that led to the emergence of a field named urban computing. A predominant techno-centric perspective towards urban computing has been shown to consider urban life as being rather *homogeneous*, a *void* to be filled with data access anytime, anywhere, or as leading to *problems* that can be partially overcome by new ubiquitous computational technologies.

In opposition to this view, social computing has been presented in terms of considering urban life as rich and *diverse*, focusing on *specific types* of experiences (e.g., the one of mobile workers), finding *opportunities for socialisation*, or for *playful and creative interactions* and highlighting the *socio-cultural specificities* within cities. These research efforts were, however, found to be quite disconnected, providing a view of urban life that is varied but also quite fragmented. The notions of third place and non-places were discussed as having been adopted by urban computing

from other disciplines, in attempt to provide a more comprehensive categorisation of urban life. Such notions have, however, proved to be often reinterpreted by researchers/designers in terms of the specific locations they refer to (e.g., restaurants or airports), or generically in terms of public places.

In order to produce a categorisation of urban life, which is able to reflect its richness and complexity, but also to reduce such complexity to become useful for the design of new everyday computational technologies, the dissertation then proposed to adopt a phenomenological perspective. Phenomenological concepts have been presented in order to conceptualise a lived experience, according to its situatedness (in terms of people's *actions*, *interactions* and *disposition*), to how it is *understood* and rendered as meaningful through perception and reflection, and finally how it is *mediated* by technologies and interpreted through a *technological disposition*, which is proper of the contemporary world. This conceptualisation constituted the basis for approaching empirical instances of urban life, and for analysing them with the aim of creating an actionable categorisation for ubiquitous computational technology design.

In order to make such a categorisation relevant for the design of everyday computational technologies, a phenomenological perspective was then used to support the idea that designers themselves should be considered as human beings, who understand their lived experiences and project onto them a specific type of technological attitude, a *design disposition*, which leads to turn such understanding into opportunities for design. Designers' understanding of lived urban experiences was therefore seen as being already directed toward highlighting the aspects that are most related to, and relevant for, the design of new computational technologies.

The dissertation then described how, according to such a conceptualisation of a lived experience, a series of urban experiences, varied but presenting similarities with each other, have been approached

over the course of an 18 months empirical study. In particular, *waiting in public places* in London, *being in transitional spaces* in Orange County, *visiting public toilets* in Amsterdam and *commuting* by the London Underground have been explored using a design-oriented and qualitative methodology. An interdisciplinary group of researchers and designers was involved in such an exploration, conducted over three workshops and a long-term design project. Researchers and designers engaged, in person, with the lived urban experience and with design activities, through *fieldwork*, *discussion*, *design experimentation* and *design critique*. Such activities were chosen for the purpose of contributing to the *inquiry* and *exploration* phases of the design process, aimed at understanding urban life and opening up a design space to address it. Hermeneutic phenomenology and reflexivity have then been presented as the approaches used to analyse the data produced throughout the empirical study, with the goal of identifying the meanings attributed to the urban experiences during the various activities and exercises, and highlighting their relevance for the design of new everyday computational technologies.

The analysis of the data produced during the *fieldwork* and *discussion* activities was then presented, in terms of a preliminary categorisation of urban life expressed through a series on ongoing tensions, which emerge from the variety of ways in which people perceive and *understand* the urban experience, *act* and *interact* within in the urban environment and have a specific *disposition* towards the experience itself. The analysis of the data generated during the activities of *design experimentation* and *design critique* was outlined with the aim of showing how such tensions have been, often implicitly, addressed by researchers/designers, in the process of planning new designs targeted to the urban experiences explored. Such analysis began to show how the categorisation of urban life produced as a result of the empirical study holds the potential of becoming actionable from a design perspective.

Creating a stronger hermeneutic cycle between the analysis of the *inquiry* (*fieldwork* and *discussion*) and the *exploration* (*design experimentation*

and *design critique)* sides of the empirical study was then shown as able to further stress the design-oriented aspect of the categorisation of urban life. As a result of this further analysis, the preliminary categorisation was expanded upon and reframed in terms of three main sites for designs, *awareness*, *engagement* and *legitimisation*, able not only to encompass the tensions previously described, but also to highlight the design issues that relate to such tensions. The hermeneutic analysis also allowed for the identification of three design approaches that researchers/designer have adopted when addressing the urban experience, reflecting the aim of planning technologies that *integrate with*, *mirror* or *alter* specific aspects of the experience.

In order to answer the main research question of the dissertation, and therefore support the relevance of an improved understanding of urban life for the design of everyday computational technologies, this dissertation has introduced the categorisation of "in-between-ness", and discussed it in terms of the characteristics of urban life that most relate to the design of new computational technologies. Specifically, in-between-ness is meant to include all those instances of urban life that fall outside of the contexts of being and work or at home, characterised by a series of tensions that are negotiated on an everyday basis and that can become relevant for design if expressed in terms of *awareness*, *engagement* and *legitimisation*. The designs produced within the empirical study and existing projects and technologies within urban computing have then been discussed in relation to the categorisation of in-between-ness, its sites for design and design approaches. This led to highlighting not only how the tensions proper to in-between-ness have been addressed so far, but to generate suggestions about how they can guide the design of new everyday computational technologies.

In relation to how urban life has been conceptualised and categorised so far within urban computing, the dissertation has then compared in-between-ness with both the techno-centric and the social computing sides of the field. In particular, it was shown how in-between-ness considers urban life as being more than just *homogeneous* or a *void* to be

filled by data access anytime, anywhere, and also more than just generating *problems* to be addressed by new ubiquitous computing. Also, in-between-ness serves to bring together different social computing studies that have so far stressed the *diverse* aspect of urban life and explored a variety of its instances, but still remained rather separated efforts. In relation to the study of urban life conducted within other disciplines such as sociology and cultural geography, in-between-ness has been shown as reflecting concepts already explored, such as the presence of urban tensions. On one hand, then, in-between-ness echoes this work, thereby strengthening the validity and generalisability of such categorisation. On the other hand, the dissertation has pointed out how, compared to studies within sociology and cultural geography, the tensions proper to urban life have been approached, in the context of in-between-ness, focusing on the small-scale and ad hoc-ness of urban life, considering the dual effect of technology use and stressing the aspects that most directly relate to the design of new computational technologies.

Also, in-between-ness has been demonstrated to be able to expand on current categorisations of urban life adopted within urban computing, especially Augé's notion of non-places. Augé's categorisation has been considered not as it has been reinterpreted within urban computing, as a series of urban places with similarities (such as airports and train stations) or as the generic public sphere, but also according to Augé's original conceptualisation. To this extent, non-places have been discussed as presenting various aspects in common with in-between-ness, especially in terms of the *centrifugal* effect that such experiences can lead to, and a generalised absence of history, social relations and unique identities that is proper to the experience. However, identifying the tensions proper to in-between-ness also demonstrated how urban life presents both a *centrifugal* and a *centripetal* side, and the *absence* and *presence* of history, social relations and unique identities, together with other apparently contradictory aspects that co-exist, and need to be constantly dealt with and negotiated by the people living the urban experiences. Such complexity and the range of presences and absences that are proper to in-between-ness have been considered within this

dissertation as leaving space for both a techno-centric and a social computing perspective, the first of which tends to support the more centrifugal side of in-between-ness, while the second seems to focus on its *centripetal* side. Seeing these apparently antithetical perspectives of urban computing as co-existing within the space of in-between-ness, and in dialogue with each other, because of their potential to address different but interrelated aspects of the experiences it encompasses, constitutes a starting point for the generation of a more cohesive and holistic categorisation of urban life within the emerging field of urban computing. Even beyond this, in-between-ness has been discussed as having the potential to encompass a larger range of lived experiences, compared to the ones that strictly relate to urban life.

Finally in-between-ness has been discussed in relation to the advancements it brings to social and urban computing in terms of how phenomenology has been used to support the generation of this categorisation. First, it was stressed how the philosophical tradition has been here applied to urban life, as compared to a more generic human experience or specifically to the context of work. Second, it was pointed out how the Heideggerian concept of situatedness has been considered within this dissertation in terms of both its internal and its external aspects; as compared to social computing, it has then not only focused on people's *actions* and *interactions*, but also on their *dispositions* towards lived experiences. Third, it was discussed how urban life has been approached from the perspective of researchers/designers instead of users, with the aim of bringing the enquiry closer to the heart of design-related research.

## 7.2 Summary of Contributions

This dissertation contributes to the understanding of the contemporary experience of living in and traversing urban environments, but most importantly it provides useful knowledge for the design of new ubiquitous

computational technologies, a task, which is becoming increasingly challenging and interdisciplinary. The dissertation can be beneficial to researchers and designers involved with, or interested in, the emerging field of urban computing. While this work mainly draws mainly from its social computing side, it is meant to create a dialogue between not only the social computing but also the techno-centric view of urban computing, and therefore can be relevant to both audiences. Below is a summary of the contributions provided by the dissertation, divided into theoretical, practical and methodological contributions.

### 7.2.1 Theoretical Contribution

The fist contribution of this dissertation is the creative adoption and use of phenomenology to conceptualise a lived urban experience, and direct the understanding of this experience toward design-related issues. It was previously discussed how within social computing phenomenology has been so far mainly used to understand the ways in which users engage with the world and with technological artefacts (see Dourish 2001 and Ciborra 2002). Instead, this dissertation focuses on researchers and designers engaging directly with lived urban experiences, and understanding them in ways that are, because of their *design disposition*, relevant for the design of computational technologies. By living the urban experiences and designing for them, researchers and designers contribute to the ongoing production of meanings, and of the ever-changing nature of urban life.

In addition, the dissertation takes a particular stand toward the conceptualisation of lived urban experiences in general, by bringing together concepts from fundamental phenomenological theories, as well from social computing approaches, which have adopted phenomenology. A lived experience has been approached by acknowledging its situatedness, for what it concerns the perception and understanding of the experience, the interrelation between the *actions*, *interactions* people

perform and the *dispositions* they have toward the experience, and the *technological attitude* that leads to render technologies as being meaningful in the context of the experience. Such a conceptualisation of a lived experience can not only become useful to approach urban life and also the situated nature of design practices, but it can also be used as a sensitising tool for studying other kinds of everyday experiences with the aim of designing ubiquitous computational technologies.

The main theoretical contribution of this dissertation is, however, the categorisation of urban life in terms of "in-between-ness". Such a categorisation acknowledges and reflects the richness of urban life, while attempting to reduce its complexity for the purpose of guiding the design of new computational technologies. In-between-ness contributes, then, to the understanding of urban life, described in relation to the tensions proper to it, which need to be negotiated by people (and designers) in ongoing ways. The co-existence of a *centrifugal* and a *centripetal* effect within in-between-ness, and of *presences* and *absences*, especially in terms of history, social relations and unique identities, not only reflects the richness of urban life, but also allows us to open a dialogue between the techno-centric and the socio-oriented sides of urban computing, depending on the ways in which they tackle different aspects of in-between-ness and provide different tools and mediations for negotiating its tensions. In-between-ness, therefore, is meant to be a design space open to different, even seemingly antithetical, approaches and perspectives, and the starting point for bringing together different urban computing trends, discuss them according to how they relate to each other, and see how they address aspects of urban life, considered in holistic terms. This constitutes a step in the direction of establishing urban computing as an area of inquiry as rich as the experiences of "being at work" and "being at home".

However, in-between-ness should not only be seen as a theoretical construct around which it is possible to generate a dialogue between different trends and approaches proper to urban computing. Indeed, in-between-ness should also be seen as a dynamic and actionable category,

able to guide the work of researchers and designers who choose to address urban life.

### 7.2.2 Practical Contribution

This observation leads to the practical contributions of this dissertation, which are of particular importance, especially as the main research question addressed throughout this dissertation reflects the need for the research to be beneficial for the design of new everyday computational technologies. In-between-ness not only serves to discuss different trends within urban computing, but it also offers practical support for the *inquiry* and *exploration* phases of the design process. The category has been described in terms of sites for design, *awareness*, *engagement* and *legitimisation*, which can be addressed with the intent of *integrating with*, *mirroring* or *altering* the tensions that characterise such sites. By contextualising the designs produced within the empirical study of this dissertation, together with other projects and technologies that have emerged within urban computing so far, it was possible to see how describing in-between-ness in these terms highlights design issues that not only relate to existing technologies, but also provide rather practical suggestions for addressing the design sites, through the identification of unexplored areas, which can be approached. In addition, in-between-ness allows researchers and designers to structure their approaches, and actively reflect on the role of their designs within the broader field of urban computing while creating those designs. This provides an opportunity for urban computing to work towards the generation of a more cohesive and holistic design space, rather then produce a series of design projects that mostly remain unrelated and independent from each other.

### 7.2.3 Methodological Contribution

From a methodological perspective, this dissertation provides suggestions in terms of a phenomenology-derived methodology for exploring everyday life in a way that can be beneficial for design. The first implication of the phenomenological perspective adopted was the direct study of the researchers/designers who live, understand and help to shape through their designs, everyday urban experiences. The methodology used to involve researchers/designers in the explorations of urban experiences consisted of focusing on the *inquiry* and *exploration* phases of the design process and conducting the activities of *fieldwork*, *discussion*, *design experimentation* and *design critique*. The contribution of the methodology used within this dissertation is, then, the creative use and combination of these activities, inspired by previous work within design research and social computing, and both selected and combined because of their potential to be related to the phenomenological perspective adopted. From an analytical standpoint, the dissertation suggests the creation of a hermeneutic cycle between the activities of *inquiry* and the ones of *exploration*, in order to identify and strengthen the link between the understanding of lived urban experiences, and the ways such an understanding leads to the design of new computational technologies. This analysis also acknowledges and reflects the interconnected nature of various aspects of the urban life, and renders these aspects legible for the design process.

## 7.3 Limitations of Research Approach

There are a number of limitations that can be found within the research conducted as part of this dissertation, most of which have been discussed throughout it. From a theoretical perspective, phenomenology has been considered to be a suitable approach to understand everyday experiences, for the purpose of providing inspiration to the design process. However, phenomenology cannot be considered as the only

theoretical standpoint that could have been chosen for this purpose. Indeed, this dissertation does not attempt to compare and assess different theorisations of everyday life that have been suggested within social computing so far, but it stresses the suitability of the phenomenological perspective.

From a practical point of view, the suggestions provided within the dissertation for addressing the category of in-between-ness remain quite abstract and high-level, and do not lead to the choice of specific designs, nor suggest solutions for their implementation. However, because of the increasingly interdisciplinary nature of ubiquitous computational technology design, especially when adopting a social computing perspective, these suggestions are seen as rather important for guiding the initial phases of the design process, especially the *inquiry* and *exploration* ones. In addition, in-between-ness addresses one of the main challenges of social computing that has been identified within the literature review, lying in the difficulty of linking the understanding of everyday life to the identification of its aspects that are relevant for design. Finally, this research has attempted to create a design space broad enough to inspire and lead to the development of not just a few, but many, technologies that follow different design approaches and perspectives. It is ultimately the responsibility, then, of researchers and designers to develop and test specific computational technologies.

From a methodological perspective, the approach adopted has been rather novel and exploratory, and therefore could be seen as being difficult to replicate; however, it also draws from a number of existing studies and finds validity in the exploratory nature of social computing and the methodologies it encompasses. The personal involvement of the researcher in the empirical study also makes the data analysis rather challenging; however, such involvement constitutes a direct implication of the hermeneutic phenomenological perspective adopted within the dissertation, and has been proven to be beneficial for interpreting the urban experiences and what it means to design for them. Finally, the workshop format that has been used within the empirical study presents

the challenge to select a suitably interdisciplinary and diverse group of participants that are willing to share their opinions, openly show their perspective, and also put into perspective their views. However, if this challenge is met, such workshops allow a rich, diverse and interesting set of results to emerge even from a short-term study.

It is then important to point out that the work conducted within this dissertation represents only a starting point toward a more holistic and comprehensive categorisation of urban experiences within urban computing. Therefore, further research needs to be conducted on the topic of in-between-ness, in order to explore different aspects of it, provide new insights for designs, and establish it as an actionable categorisation within urban computing.

## 7.4 Opportunities for Further Research

In a world where technological changes are almost a daily routine, inquiries into ubiquitous computational technology design and adoption need to follow a fast pace, take on increasing research challenges and constantly elaborate and test new theories, methodologies and design approaches. This is one of the reason why social computing and information systems are such dynamic fields, which need a constant research effort in order to not only contribute to the research community, but also provide practical insights to the "real world", especially in terms of policies and design suggestions.

In order to maintain its promises to provide theoretical, practical and methodological contributions to urban computing, the results produced by this dissertation would certainly benefit from further research, especially directed to turning in-between-ness into an actionable categorisation of urban life that is well-recognised and addressed, not only within the urban computing research community, but also among a wide range of design practitioners. The design team that was involved in

the empirical study, which is part of this dissertation, together with other researchers interested in the topic, are for instance conducting further explorations of in-between-ness experiences (e.g., Bassoli, Brewer, and Taylor 2008), and the results of this dissertation will most likely feed into the process.

In order to further explore in-between-ness future research could then adopt a similar approach to the one proposed by this dissertation, both from a theoretical and a methodological perspective. However, the topic could also be approached by applying different theories and perspectives already used within information systems and social computing or adopted from the humanities, able to see in-between-ness in a different light and discover aspects of it not already covered within this work. Similarly, a different methodological approach could be used to explore new in-between-ness experiences, such as an ethnographic or even a quantitative one. Finally, further studies of in-between-ness could lead to the development of specific technologies that are then evaluated within the experiences targeted in the first place; such studies could test the potential of different technologies and systems for in-between-ness, and demonstrate the usefulness and the limits of in-between-ness in terms of its sites for design and design approaches.

Augé concludes his essay on non-places by calling for research efforts that address the solitude of the contemporary individual, partially an outcome of inhabiting and navigating such non-places. Instead, this dissertation ends with the suggestion of conducting further research within urban computing on the peculiar experience of in-between-ness, an increasingly important aspect of contemporary urban life, which cannot be considered only in terms of its absences or its *centrifugal* effects, but ought to be acknowledged in terms of the contradictions and tensions it presents, which include the co-presence of solitude and sociality, interaction and isolation, the ongoing negotiation of rules and affordances present in the environment, and the challenging creation and manifestation of ad hoc identities. The design of new everyday computational technologies, conducted from either a techno-centric or a

social computing perspective, needs, then, to take into account all these aspects of in-between-ness, and provide new tools for people to negotiate the tensions proper to in-between-ness in a variety of ways, all of which will contribute to changing the dynamic nature of everyday life.

# Appendix

## Workshop Schedule and Tasks and Breakdown of Participants

### Why Wait?

| Day One | Day Two |
|---|---|
| 10.30 - Speed dating | 09.30 - Quick recap, outline design task |
| 11.30 - Group up, accept tasks and maps | 10.30 - Design activity |
| 11.45 - Groups go out for observations | 12.30 - Presentation of designs |
| 15.00 - Groups look over documentation | 13.30 - Concluding Remarks |
| 15.15 - Groups present observations | |
| 15.45 - Discussion | |

Table 6 – Why Wait? Workshop schedule

## A Public (In)convenience

| | |
|---|---|
| 1. Find someone doing something in the toilet that they wouldn't do in their toilet at home<br><br>2. Find something in a women's toilet you couldn't find in a man's & vice versa<br><br>3. Find an unexpected use of personal technology in the toilet<br><br>4. Find an unexpected use of public technology in the toilet<br><br>5. Ask someone on the street for a toilet recommendation<br><br>6. Find something in the toilet you've never seen before<br><br>7. Find a social interaction in the toilet<br><br>8. Find someone using the toilet not to pee | 9. Try to get into a for-pay toilet for free<br><br>10. Find a toilet where you wouldn't expect<br><br>11. Find a toilet that uses unusual materials<br><br>12. Find a toilet that is breaking the rules<br><br>13. Do something in the toilet that's taboo<br><br>14. Find an interesting offer in the toilet<br><br>15. Participate in a toilet communication<br><br>16. Buy something in the toilet<br><br>17. Take something from the toilet<br><br>18. Find someone breaking toilet rules<br><br>19. Find an unfair toilet<br><br>20. Try to jump a toilet queue<br><br>21. Find a mobile toilet |

Table 7 – List of tasks for fieldwork from A Public (In)convenience

## Participants' Sectors

Total: 42 (including organisers)

| | |
|---|---|
| **- University** | |
| Architecture/ Computer Science | 2 |
| Architecture/ Design | 2 |
| Architecture/ Urban Planning | 1 |
| Computer Science/ Human-Computer Interaction | 5 |
| Communication | 2 |
| Information Systems | 4 |
| Geography | 1 |
| Informatics | 3 |
| Computer Science/ Interaction Design | 3 |
| New Media | 1 |
| Design | 2 |
| Geology | 1 |
| **- Industry** | |
| Research Labs | 2 |
| Product Development (user experience, interaction design, architecture) | 3 |
| CRM Consultancy | 1 |
| **- Cultural Associations** | 3 |
| **- Freelance** | |
| Interaction design | 5 |
| Photography | 1 |

Table 8 – Breakdown of workshop participants based on their sector

## Participants' Affiliations

- ISIG, London School of Economics and Political Science
- Bartlett School of Graduate Studies
- DISC, Brunel University
- Culturally Embedded Computing Group, Cornell University
- Computer Science, University of Bath
- Computer Science, University College London
- Institute of Geography, University of Edinburgh
- London Knowledge Lab
- Royal College of Art
- Donald Bren School of Informatics, University of California, Irvine
- Interactive Technologies Group, Pompeu Fabra University, Barcelona
- University of California, Berkeley
- Communication and Science Studies, University of California, San Diego
- Communication, Stanford University
- University of Queensland, Australia
- Geology, Universiteit Gent
- Design Academy, Eindhoven
- Media and Design Lab, EPFL, Lausanne
- ASRO, Catholic University Leuven
- New Media and Digital Culture, Utrecht University
- Helen Hamlyn Research Centre
- Socio-Digital Systems Group, MSR, Cambridge UK
- Research and Venturing, BT
- Tyler Hayhurst Architects and Designers
- YRM Architects
- Experientia
- Waag
- Virtueel Platform
- Fattoria Mediale
- Superficiel
- Tiny Pictures
- Graham Technology
- Samsonite Europe

Table 9 – Lists of universities, associations and companies of participants

# Images from Workshops and Underground Study

## Activities

Figure 23 – A Public (In)convenience: design activity° (left) and preparation of the fieldwork presentation° (right).

Figure 24 – Betwixt: research speed dating° (left) and presentation of fieldwork observation° (right).


Figure 25 – Why Wait?: discussion of the tasks during fieldwork° (left) and design activity° (right).

## Workshops' Designs


Figure 26 – Why Wait? designs: *Waiting Traces*° (left) allows people to see where other people have been waiting, by using their mobile phones like a magnifying lens; the traces are left by people using shoes with embedded sensors and gps; different colors show different intensity of waiting, for instance depending on the time people spent in a particular location; the design is supposed to help people find the best spot to wait. The *Tube/Bus Message Board*° (right) allows people to both leave and retried messages while being in the Underground carriage or while waiting for the bus; the application is supposed to provide a way for people to creatively kill time while waiting to get to their final destination.

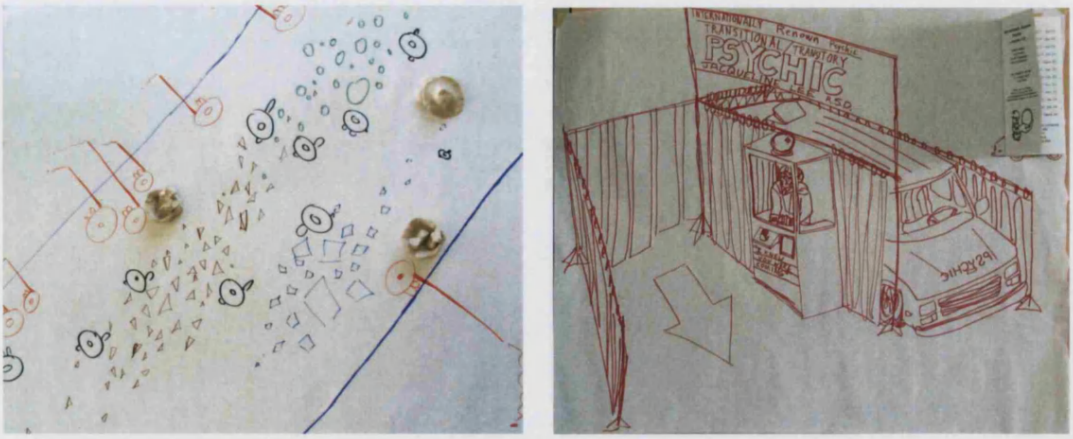



Figure 27 – Betwixt designs: *Pier-to-Peers*° (left) allows both fishermen and passer-bys on the pier to share information about the quantity of fish they have catch; the information of how many fish have been caught by each fisherman is collected through sensors, and transmitted throughout the pier by people walking back and forth; the pier itself has a interactive floor that displays different colours depending on the quantity of fish caught; the technology is meant to provide awareness of the fishermen activity, and it could increase the competition between them. The *Drive-Through Fate*° (right) is a technology built for transient psychics; costumers arrive through velvet curtains and place their hand on a platform with embedded sensors, which helps the psychic to read their palm; the technology supports the transient nature of many shop owners in Tustin, Orange County.

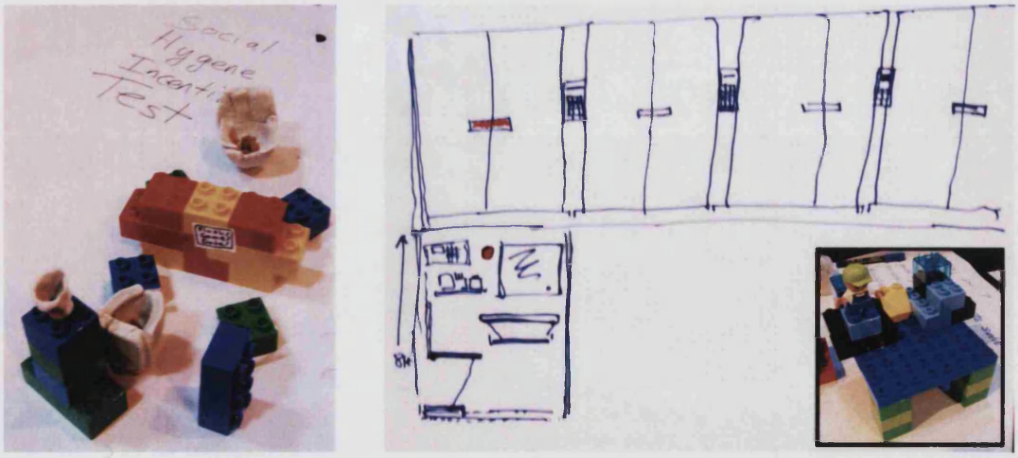



Figure 28 – A Public (In)convenience designs: the *Hygiene Social Test*° (left) is a psychological game similar to the prisoner's dilemma, but with a higher cooperation factor; the goal of the game is for people using two different public toilet cubicles (which could be remotely located) to flush the toilet; in order to do so people need to press one of the two pedals positioned in front of them, trying

to guess which one the other person has decided to press; the technology is supposed to increase the awareness of other people visiting public toilets. The *E-Toilet*° (right) is a high-tech public toilet, which require a RfId card with identification in order to be accessed; once inside, people can decide whether to remain above or go under ground for more privacy; people can also personalise the cubicles and add features to it, such a video screen; this toilet is meant to improve the way people treat public toilets, through personalising the toilet and imposing the identification of people using it, and to open the access to public toilets to different kinds of people who could have problems using them, such as mothers with small children and disabled people, through offering not only privacy but a high range of features.

### *undersound*


Figure 29 – *undersound* logo and website banner° (http://www.undersound.org); the website was part of a strategy aimed at obtaining feedback from not only the research/designer community but also from early adopters; the project was indeed covered in few mainstream technology-related websites and weblogs (such as BoingBoing and Gizmodo) and obtained feedback in terms of readers' comments; such comments and suggestions were discussed during the design process and within the research diary.

# Extract From Research Diary

## Extract One: Exploring Different Design Choices for *undersound*

(Tuesday 6th June 2006) Going back to the design of *undersound*, K and I - after many discussions throughout few days - came up with the following idea. The idea is the outcome of a reflection on a specific scenario of usage that would consider actual behaviour and the potential consequences of a design intervention.

One idea that K suggested (inspired by another design project) was that the quality of songs would degrade when people copy songs from each other. For instance, if I collected a song in Brixton and someone downloads it from my mobile phone, s/he would get a copy of the song that has worse quality. Another idea would be to have the quality of the song degrade in both devices of the person offering and the one downloading the song when only one "transaction" is being made. In this respect, people would have to 'negotiate' the download of songs, meaning that if I want to copy a song from another person, this person has to give me his/ her permission, and if s/he does not want to lose the quality of the songs s/he has, s/he has to ask for another song in return. While this interaction could support interesting behaviour in terms of cooperation, it results quite incompatible with the limit of songs a person can have. If I want to keep my song full quality only if I receive another in return, but I have already reached the limit of songs I can have, this might imply that I refuse the download of the song from another person. When people leave a song at an access point to download a new one, this song has a memory of what happened to it, that is the number of times it had been copied and its origin.

(Wednesday 7th June 2006) J would raise interesting issues about our design choices. First of all, she says she doesn't agree with the

degradation of songs. She understands our intent to give more value to songs and try to make people reflect on this value and negotiate a mutual exchange of songs with strangers based on this principle, but she introduces an interesting argument. She is in favour of attributing to digital content its own right, and to distinguish its characteristics from the ones of analogical content. Digital content has the characteristic of not losing its quality, and to be easily reproduced and copied an almost infinite amount of times. Moreover, she is not in favour of the limit we are imposing on users concerning the number of songs they can download and have in their *undersound* application. A benefit of MP3 players such as iPods, and mobile phones in a near future, is that a person can store a very high amount of music in them, and have a wide choice. She would not like herself an application that limits the number of songs she can have in her playlist. To make the application even easier to be integrated with how current practices seems to be nowadays, J suggests to have *undersound* as a playlist of a general music application such as iTunes, where people store all their songs

I didn't like the idea that people could have *undersound* just mixed with their all purpose music collection, because it would make the application not as specific and situated as we wanted. J suggested then that people could have a limited number of songs in their *undersound* playlist, songs they could share with others while riding the tube. I liked this idea very much, but I considered it as almost a different idea from the one we were trying to work on. I like the idea of people sharing their 'tube tunes', but in this case there would be little relationship with the place, unless they could only have in this playlist the songs they have downloaded from the stations. This almost sounded like a compromise.

## Extract Two: Different Perspectives on Commuting

(Friday 21st July 2007) I spend some time in the Underground with J, who's doing her ethnographic work for Intel. She is observing behaviours

and taking pictures to document the experience of riding the Underground. I try to acquire an analytic approach, but realise it is difficult. As I spend already a lot of time in the Underground, my instinctive approach is the one of a commuter. I tend to walk fast, to not pay attention to the small details, to observe people but more out of curiosity than to better understand their behaviour. I find myself a bit lost in trying to focus on things to capture with my camera, because everything seems very familiar, and I cannot really detach myself from this attitude. On the other hand, for J travelling by Tube is quite a new experience, and I can see from her pictures that she notices behaviours and details that, once stressed and analysed, make sense and make me reflect on aspects that I took for granted so far. I can also see how the Tube and people inhabiting it are different than in other Underground systems that I have visited. Previously, we had conversations about different Underground systems around the world. J was trying to argue how the Tube is more 'symbolic' and important for Londoners than Underground systems in other cities. Once again, I try to make her reflect on the fact that we cannot compare aspects of different cultures and societies without having conducted comparative studies on that. She believes, on the other hand, that our personal experience and the information we have on other cities could be enough to make comparisons, even if they are not rigorously supported by studies. We notice that a wider variety of people travel by Tube than, for instance, by the New York Subway, where middle and upper class people maybe take taxis for moving around the city. J knows New York quite well. Paris seems a bit like that, my friend F was saying. J and I end up assuming that in London locals use less taxies as they are incredibly expensive.

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