

Contesting ubicomp visions through ICT practices: Power negotiations in the meshwork of a technologised city

the International
Communication Gazette
1–17

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DOI: 10.1177/1748048513491911

gaz.sagepub.com



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Abstract

This article discusses the case of the Finnish city of Oulu which is designed and constructed as a prototype of an intelligent city equipped with ubiquitous computing technology. By analysing ethnographic materials, the authors explore how the *strategies*, i.e. the conceptions and goals of urban development by the designers and decision-makers, meet the *tactics* (i.e. the everyday practices of the ageing and young adult city dwellers). By looking at this specific urban space as a *meshwork*, the authors argue that the design visions are based on the assumption that this high-tech city is full of competent and enthusiastic ubicomp users. The stories of the urbanites, however, show that though they utilise and appreciate the ubiquitous technology to a certain extent, they also resist the new enabled practices by refusing to attend to personal matters in public places. The study also unravels the notion that age as a singular category can explain people's relations with information and communication technologies (ICTs).

Keywords

Age, ethnography, ICT practices, meshwork, power negotiations, ubiquitous computing design, urban environment

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Introduction: Stories of a northern techno-city

The city of Oulu in northern Finland is being designed as a prototype of an intelligent city equipped with ubiquitous computing technology such as interactive public displays and different wireless networks. With this new technology, the designers of the UBI (UrBan Interactions) Program aim to improve the everyday lives of all citizens, as well as enhance their sociality in urban space (UBIOulu, 2012). With its northern location and just 140,000 inhabitants, Oulu is quite an atypical city for an urban ubiquitous computing (henceforth 'ubicom') infrastructure, as most of the time it is implemented in metropolises such as New York and Tokyo (Dourish and Bell, 2011). However, the vision of ubicom remains the same: to install pervasive technology everywhere in order to assist people in their mundane tasks. Therefore, the design of ubiquitous computing, also dubbed as ambient or invisible computing, aimed at affecting people's lives, also requires sociocultural sensitivity (Galloway, 2004; Weiser, 1991).

We understand ubicom here as it was described by Mark Weiser (1991) in his original vision: wide-scale proliferation of computing resources in everyday locations and objects, which creates 'smart spaces' where embedded, invisible technology unobtrusively serves people. Weiser's term, or rather ideology, known as ubicom, refers to *the third wave of computing*. After mainframe computers and PCs, we have arrived in the world of invisible computing, where technology is everywhere in the background of daily life. According to Dourish and Bell (2007), we already live in a ubiquitous society; we just do not recognise it, because the technology and its applications are not as calm, homogeneous and seamless as in Weiser's vision. In the context of Oulu, the ubiquitous city consists of personal devices carried by people, mainly mobile or smartphones, and more experimental public installations, including interactive displays and an open access WLAN called panOULU (UBIOulu, 2012). In practice, these technologies are profoundly entangled in the city space; for example, people can use WLAN or the displays with their smartphones.

In this article, we discuss how the official *conceptions and goals* of the 'ubiquitous city' set by the designers of ubicom and the city's decision-makers actually meet the *everyday practices* of the elderly and young adult urban dwellers. Following the classical conceptualisation of Michel de Certeau (1980), we make a distinction between *strategies* and *tactics* concerning technology's functions. Strategies are linked with institutions and established structures of power; thus, the visions of decision-makers can be understood as strategies. Beyond these official versions regarding technology's functions in public space, there are a vast number of tactics that 'ordinary people' have when using technology. By their everyday practices, people create meanings for things and for their own identities; they negotiate the rules and thus the power relations of social life (see Caron and Caronia, 2007: 217).

To find out what the *strategies* were, i.e. the conceptions and goals, behind the ubiquitous city, we first interviewed 12 key designers and decision-makers of the UBI Program. To scrutinise the *tactics*, i.e. the everyday practices connected to pervasive technology and views on that kind of technology, we conducted life story interviews with elderly urbanites, gathered diaries and conducted focus group interviews with young adults. In this article, we concentrate especially on people's *spatial practices* as 'urban

space' is a central concept for ubicomp. Following Tim Ingold's concept of *meshwork*, we look at how the paths of the technology designers, as well as the ageing and young adult city dwellers, are both interrelated and entwined with the technological infrastructure in this particular urban space. In meshwork, movements and the trails of movement are considered as the essential way of 'being in the world', rather than the routes of passage only. Life happens along these paths and their entanglement forms a knot of stories (Ingold, 2011: 148–154, 160). Therefore, we consider the ubiquitous intelligent urban space through individually lived stories which we (re)construct in our analysis from the stories told by the interviewees in the research encounters (see Davies, 1999).

When we study 'the mobile age' in a certain location, we must remember that it has very different implications for different people (Green, 2002; Massey, 1999). Hence, when considering space and time in relation to ubicomp, social differences such as gender, age and ethnicity should be discussed as well. Furthermore, people have very different positions in relation to the spatial interconnections and their control over them (Massey, 1999). In this article, we discuss especially how age, as simultaneously individually lived and as a social category, influences people's experiences of the technologised city. Diverse backgrounds of people representing different generations can have fundamental effects on the use of information and communication technologies (ICTs) and activities in public places. If ubicomp intends to be of assistance at a grassroots level, it should address this 'messiness' of everyday life (Bell and Dourish, 2006).

Consequently, we first discuss the visions behind the ubiquitous city centre and the paths that have led the designers and decision-makers to those visions. Through this analysis, we discover the imagined users and usage of this particular urban space, as well as discuss the power positions of the designers. Our main focus in this article is, however, on the stories of the urbanites. Therefore, through our descriptive ethnographic analysis, we go on to discuss the mobilities of the elderly and young adults in this ubiquitous urban space. It is essential to look at the current ICT practices of these groups of people if we wish to understand the meshwork of ubiquitous Oulu, which we then discuss in detail before examining the question of what the ubiquitous intelligent city centre actually means to them. Throughout our discussions, we particularly consider how power negotiations are enacted in the stories of the urban space of ubiquitous Oulu.

Methods and materials

The interviews with designers and decision-makers

All the materials analysed for this article have been collected through the anthropological research project UBI Anthropos (2010–2012). The project started with interviewing 12 key designers and decision-makers of the UBI Program, who represented the city, different disciplines from the university, technological development organisations, the private sector, industry and financiers. The purpose of these thematic semi-structured interviews was to shed light on the goals and background of the UBI Program. We have discussed the results of these interviews in more detail elsewhere (Suopajarvi et al., 2012); in this article, we focus on how the strategies analysed from this material meet the everyday practices of the ordinary city dwellers.

Life story interviews with the elderly

The interviews with the elderly citizens were based on the *life story method* (Caron and Caronia, 2007; Linde, 1993) where the narrations were built around ICTs producing so-called ICT biographies. During the thematic interviews, we discussed, for example, the interviewees' experiences with both landline and mobile phones, and the ways the mobile phone had affected their lives. We also discussed their experiences with using the computer and the internet; their spatial practices in public places, and how technologies were connected to these. This method enables us to scrutinise how interviewees' earlier experiences and personal histories affect their current technology usage and the meanings of ICT in their lives, unravelling thus the meshwork they live in. Anthropological fieldwork aims for a more holistic sociocultural understanding of humans, rather than looking at them merely as users of technology, for instance (see Davies, 1999). On the other hand, at the same time that theorisation is essential in the discipline, anthropological studies do not seek generalisations, but look more at meanings and phenomena as located in specific sociocultural settings.

The elderly interviewees were recruited from a computer course for ageing citizens held at a community centre. During our three visits to the course venue, 13 people agreed to be interviewed, and three of them arranged for their spouses to participate in the study as well. Given that more women than men participated in the courses, our material also represents this gender imbalance, with 11 female and five male interviewees. The reason for recruiting the interviewees through these courses was our interest in studying both the elderly city dwellers' views on the information society and their stories of their personal encounters with ICT devices. In theory, this starting point could have biased the material, in that all interviewees felt positive about digitalisation, for example, but as our analysis further shows, this was not the case. In addition, one of the spouses had never used a computer, and the couple did not own one at the time of their interview.

The age of the elderly interviewees varied from 61 to 87. All except two of them had lived most of their lives in Oulu, and five were even born there. These interviewees had thus long spatial relationships with the city; and they described, for example, the regrettable demolition of its historic buildings, but also the economic growth that preceded the strategy of a high-tech city. Four of the interviewees had an academic education; 10 had studied in a vocational school or had an intermediate level of education; and two had entered working life straight after basic education. Eleven of these interviewees had been employed in the public sector, mainly hospitals and schools; three had made their careers in industry; and two had worked as entrepreneurs.

Diary probes with the young adults

Young adult city dwellers (aged 20–30 years) were studied using the *cultural probes methodology* (see Gaver et al., 1999; Mattelmäki, 2006), which is based on self-documentation and aims at uncovering people's personal perspectives and experiences. In this case, a diary was used as a 'probe' that was sent to collect people's thoughts about their everyday practices concerning mobile phone, smartphone and computer usage in different spaces such as at home or in urban surroundings. Using public UBI displays

was included as well. The diary resembled a scrapbook in the sense that it was designed to be colourful, and participants could for example draw pictures and add cuttings to it. The main purpose was to make participants contemplate their daily life with technology from different angles. After finishing the diary, participants were invited to take part in a group or couple interview; the aim here was to let them share their thoughts and deepen the understanding about ICT practices.

Participants were recruited mainly through mailing lists of different academies in Oulu; 37 of them were women and 11 men. Genders were unevenly represented even though a lot of work was put into involving more men in the study. It is possible that calling the study a 'diary study' was not considered attractive by men; the concept of *diary* is often regarded as feminine in western culture (e.g. Hogan, 1991). However, we consider the amount of men adequate.

The majority of the participants were pursuing higher education or had already graduated from either the University of Oulu or Oulu University of Applied Sciences. Most of them were still studying; a few of them were working full-time; two were unemployed; one was on a maternity leave; and one a stay-at-home mother. Participants represented highly different areas of expertise, from journalism to computer science and midwifery. Compared to the elderly interviewees, it is worth noting that only 16 participants were originally from Oulu; 25 had lived in the city less than five years. This reflects the role of Oulu as the most popular student city in northern Finland (City of Oulu, 2012).

Combining different materials

Slightly different research methods were used while studying the different age groups due to the dissimilar life cycles and goals of research projects. The results of the cultural probe study will also be used in future projects, and thus for example the number of participants is higher and the material more versatile. Even so, we find the materials comparable, since both can be analysed as a pool of stories of everyday urban ICT practices. We look at the stories as produced by individuals in the sociocultural world they live in. Consequently, for instance, the strategy of Oulu, which has constructed the city as a place where ICT-related business and education is highly valued, has partly shaped all the stories in our research material. The stories are told to the interviewers, but also to vaster and diverse imagined audiences, which affects their contents. This means that although the story is 'true', it is based on personal memories and influenced by the political agenda(s) of the narrator (e.g. Portelli, 1991).

A perspective concentrating on different generations and different devices has rarely been explored thus far in the studies of human-ICT interaction. In Finland, Mäenpää (2005) studied people aged 20–60 concerning mobile phone use and urban public places; however, the material was collected in 1997 when the expansion of the mobile phone had only just begun (e.g. Kopomaa, 2000). With a special focus on elderly people, Brittain et al. (2010) have studied more recently the spatial experiences of people with dementia regarding everyday public technologies. Their study is a rare exception in the field where most studies focus on adolescents, examining the question of the mobile phone as an accessory or an 'extension' of a body worn in public places (e.g. Caron and Caronia, 2007; Henderson et al., 2002; Ling, 2004); or the ways mobile phones may empower

especially young girls in places they experience as dangerous or violating (Foley et al., 2007; Katz, 2006; Pain et al., 2005), or reinforce the existing gender hierarchy in the public (Campbell, 2006). Contarello et al. (2007) propose that much attention has recently been given to youth because new users and practices have been considered interesting. In addition, Thulin and Vilhelmson (2007) argue that most studies concerning the actual usage and meanings of a mobile phone have concentrated on specific situations, such as sending text messages to friends. Thus, a broader view is needed if we want to understand the complex ways ICTs are embedded in people's everyday lives in an increasingly urbanised world.

The designers' story: High-tech city and its digitally competent inhabitants

The UBI Program is based on the methodology of a 'living lab' where a new ubicomp infrastructure, in the form of large interactive displays and wireless networks such as open access panOULU WLAN, is implemented in the 'wild' for 'real people' to use it. This way, the users can participate in a design that is still in progress. We have discussed elsewhere the way this methodology has been carried out in the Program (Suopajärvi et al., 2012), but we can conclude here that the users have mainly been left unidentified and their participation in the design has been limited to statistics on their activities on the displays. However, the designers and decision-makers claimed to have quite a clear vision, in that the current users were mostly young laid-back people with no prejudice against technological innovations. The urban space of Oulu was thought to be – at least in the beginning of the project – full of competent and interested users, which made it look like an ideal 'playground' for the designers. But conducting research in a real environment demands considering many other agents operating in that same space; and some of the designers expressed disappointment in the low level of innovativeness they were forced into. Thus, the real users of this particular living lab were not necessarily their ideal users (see Oudshoorn et al., 2004).

On the other hand, some of the designers wondered whether elderly people might also use the new displays. They thought that this group had more time to familiarise themselves with the new technology than busy working adults. However, these interviewees suspected that elderly people might not be competent and confident enough to start using the displays in a public place. Although the public infrastructure was designed with the intention that it would serve everybody, the designers themselves surprisingly argued that the user interface of the displays was too difficult for some ordinary city dwellers. The designers nonetheless assumed that the occupants of the city centre would eventually become more interactive with each other, with city officials and with ICT, due to the novel infrastructure (see Dourish and Bell, 2011).

The imagined usage constructed in the designers' stories, and the services offered by the displays depicted Oulu as a place where people have sudden information needs. They may need to know where a certain restaurant is located and its opening hours. The ubiquitous Oulu was described by the designers as a space where both young and retired urbanites were spending their extra time. The designers themselves expressed powerful agency in this space, since they could change it for others by their design and decisions.

Though different and somewhat contradictory stories were composed in their interviews, they were all based on a strong belief in the continued success of the high-tech city where the city dwellers gladly welcome new technological innovations. This becomes understandable in the light of Oulu's recent history, and the way the ICT industry has benefited the economy of the region. Oulu has for three decades determinedly built its industry and image around high technology; and in 1984, it declared itself as a city of technology (Äikäs, 2001: 197–208). This strategy has been successful, and the powerful discourse of a high-tech city undoubtedly affects all inhabitants of Oulu.

The key decision-makers in the UBI Program had been part of the earlier success stories produced by the so-called triple-helix strategy, which relies on a strong cooperation between the city, research institutions and local industry in order to create new innovations (see Triple-Helix Final Report, 2007). In the framework of Ingold's meshwork theory, these past events can be seen as paths leading to the current strategies chosen by the designers and decision-makers. The stories of the designers are highly place-binding, and they have constructed both individual and shared trails which the designers are partially reusing in the new programme (see Ingold, 2011).

Age and technology-mediated urban mobility

Viewing the public space as a meshwork means considering the tight interconnectedness between more private places, especially home, and public places, such as streets, supermarkets and libraries. As Ingold puts it: 'lives are led not inside places, but through, around, to and from them, from and to places elsewhere' (Ingold, 2011: 148; see also Ingold, 2000). The power relations are negotiated to some extent through the design of space because the material infrastructure affects the (lack of) access and mobility of different kinds of city dwellers (Freund, 2001: 690; see also Galloway, 2004; Massey, 1999). Here, we especially consider how age(ing) matters in relation to micro-mobility in urban space.

The most important device in public places for both the elderly and young adults in our study was unquestionably a mobile phone or smartphone. However, only one of the interviewees over age 60 had an internet connection on her phone, and this woman said that she used it only at home to read the news online. Whereas exactly half of the young adults owned a smartphone and used the internet with it; three of these participants used both a mobile phone and a smartphone.

Elderly city dwellers

Ageing changes spatial practices and experiences: for example, a 64-year-old woman talked of being afraid in the city centre of Oulu after 9 p.m., which she did not remember being as a young student. In his studies on urban space and ageing, Peter Freund (2001: 699) also noted how 'previously "friendly" spaces' become 'potentially dangerous and uncomfortable'. A 75-year-old woman described how her decision to give up cycling due to her body getting frailer had narrowed her area of mobility substantially. On the other hand, many interviewees described themselves still being constantly 'on the move'. The ageing had, nevertheless, brought along a feeling that you cannot totally rely

on your own body: some had been through heart surgery; others had bad asthmatic symptoms; and most had leg or back problems. Due to the changes in their mobility, a mobile phone had become very handy, since it provided a feeling of safety.

All elderly interviewees said that they were consciously striving to stay mobile. The fittest of them still practised sports such as aerobics and skiing, and the ones with physical constraints walked on a daily basis. Their ageing bodies demand exercise to keep on going; and that is why even the interviewees with severe health issues said that they would plan errands to stay mobile. This kind of description about micro-mobility prevailed: elderly people need a reason to move. For example, an interviewee who was quite capable of using online banking said that she would rather cycle to the nearest bank office to pay her bills.

Another feature common to the elderly interviewees' mobility was that they plan it carefully, and in their stories, they actively constructed the links between their home and the city. They described making lists based on the order of places they needed to visit; thus, they already had a specific route in mind when they entered urban space, and this route was often repeated. They also checked beforehand the opening times on the internet and the locations on maps, though many claimed that they knew the city centre well enough to find all the places. Occasionally, some spent time at the marketplace or shopping, but they usually had a clear purpose for their short city visit, and returned home directly afterwards.

Young adult city dwellers

Previous studies have shown how mobile phones are part of young people's safety management in public places (Foley et al., 2007; Pain et al., 2005). Unlike the elderly, young adults did not mention carrying a mobile phone on them in case of accidents. Instead, many described how they felt that something horrible would definitely happen to them or their loved ones if they did not have their phone around or if they ran out of battery. Without a phone, they felt insecure or alone. This feeling was surprisingly strong and common among the participants and tells us how a mobile phone is a substantial part of everyday life for this generation; the continuous connection is already a norm and breaks in it are considered as something threatening. Katz and Aakhus (2002) have called this phenomenon 'perpetual contact'; it is a mode of communication based on always being socially available. The sheer potential of the connection was the most important thing, as many confessed that they actually used a mobile phone quite little when on the move away from home.

Having the phone always available was at the same time considered a duty; a woman born in 1990 described that it would feel like a protest to leave the phone at home, 'like I wanted to rebel against the system'. A few actually wanted to rebel and sometimes left their phones at home because they found the dependence distressing; but as a consequence, their family or friends got angry. People who frequently miss calls said that they are rebuked by others. Thus, being constantly available is not just a personal issue; rather, it is a communal rule. In 2000, Kopomaa (2000: 53) argued that keeping a phone on silent mode and not answering is understandable and part of the Finnish mobile phone user culture. This rule seems to be changing: some of the interviewed young adults

were extremely annoyed if they did not notice the incoming calls or other people did not notice their calls; these people kept their phones close to their body to be able to feel the vibrating alert at all times.

Young adults also planned their visits to the city centre beforehand. On the other hand, it was obvious that smartphones had reduced their need for careful planning and further increased their flexibility and spontaneity, already enabled by mobile phones. The possibility to access the internet anywhere was valued relatively highly among the younger participants. Some mobile phone users claimed they did not need a smartphone for that because they could always call a friend who could check things for them on the internet. The phone itself acted as a portable reminder for many; it enabled making written notes or photographing things one needs to remember.

Contesting the boundaries between private and public with ICT practices

The interconnectedness between private and public places, as well as between different public places inside the city, are entwined in the stories of all the interviewees regardless of their age. Thus, the meanings of a place are connected with other places, like they are shared with other people as well (Rodman, 2003). Though we focus here on ICT practices in public places, which for the elderly participants refers solely to mobile phone usage, while some of the young adults were also using other portable devices and new displays, we also look at the paths between places and the practices along these paths.

How people experience the ubiquitous intelligent city and ICT usage there is related to their past experiences with both ICT and socially accepted behaviour in public, but also to the way they experience using ICTs at home. In our analysis, we noted how both the elderly people's and the young adults' communication on their mobile phone in a public place differed substantially from the calls made at home. Home was described by all as a place for intimate long calls.

Elderly city dwellers

Some of the elderly interviewees refused to talk on a mobile phone in public altogether, keeping the phone on silent mode, but still carrying it with them 'just in case' someone important might call. Those elderly interviewees who used phones in public, such as in a supermarket, kept the calls short, and if the situation required concentration on some other task, they checked who was calling, but did not necessarily answer. The mobile phones were used only to make calls to family members to check whether they needed something from the place the caller was in, or to find a lost spouse. The portability of the phone was utilised especially when the interviewee was expecting a call, for example, from a doctor. Brittain et al. (2010) argue that vulnerable people are affected by the disability to use technologies in public places. The fear of embarrassment connected to mobile phone usage, for instance, can increase the feeling of being an outsider and further isolate marginalised people. A woman born in 1947, who was quite a competent mobile phone and computer user, reminisced about her reluctance to start using a mobile

phone on a bus: she was 'terrified of answering the phone'; and after answering, she was too nervous to understand what the caller was saying due to the place she was in.

Many studies have shown that loud talking in public places is often perceived as annoying or violating (e.g. Humphreys, 2005; Kopomaa, 2000). This notion is reinforced in our study as well, but when considered through a meshwork, the issues of privacy emerge, especially from the interviews with the elderly city dwellers. Those elderly interviewees who were not eager to use a mobile phone publicly at all explained that they put high value on privacy because in working life they had been required to look out for their patients' or pupils' privacy, for example. A minor reason for some was the image from the 1980s when using a mobile phone publicly was connected to 'yuppies'. They especially considered the use of a laptop in a train or other public place as showing off a higher economic status. Thus, the acoustics of public space are an essential part of the spatial power negotiations, but they are entangled with past experiences, not only with occupying the public, but also with privacy.

Though the majority of the elderly interviewees did not use an internet connection with their mobile phones, they nevertheless used features other than just calling, such as sending text and multimedia messages, but these practices were connected to private places. Interestingly, most of them owned a laptop, but they did not intend to use it publicly. The reasons for purchasing one had been either home related, as it did not require much space and was easy to hide, or related to mobility between private places, such as taking it to one's summer cabin. Consequently, in the stories constructed by the elderly, their own lived spaces are still quite strongly divided into public and private spheres, and these spaces do not currently overlap in the way the designers had presumed they would.

Young adult city dwellers

For the clear majority of the young adults, a mobile phone or smartphone was an essential device in public places. One young interviewee even defined sophisticatedly that a phone is 'part of a navigating self-image' and thus 'a cybernetic part of her' (a woman born 1987). The most important way to use it appeared to be 'social navigation', or finding and getting in touch with important people. Spontaneous encounters with friends, enabled by mobile devices, were associated especially with summer when young adults tend to spend more leisure time outside. On the contrary, the cold weather and darkness in the winter reduce the living sphere and turn computers at home into a 'campfire', as a couple of participants aptly described. Phone use varied broadly from casual calling and text messaging to the usage of different smartphone applications. More imaginary social practices also existed; for example, a woman born in 1981 related that she and her friends had developed a game where the goal was to secretly take pictures of friends' friends in public places and publish them on the internet. Thus, the ways mobile phones were shaping the young adults' experience of the city differed greatly.

The phone's internet capability was a topical feature that almost everyone wanted to comment on; most of the smartphone owners were excited about it. Some with a mobile phone were dreaming about a mobile internet and thought it would be handy in urban public places. For example, a man born in 1988 pondered throughout the interview

whether he should get a smartphone because ‘it is nowadays a necessity’, and finally named himself ‘a stubborn jackass who still uses [an] old Nokia’. A few represented a totally opposite discourse and strictly stated that they never wanted to have a smartphone. This opinion was expressed especially by the participants who overall felt that ICT has already been given too big a role in everyday life. In addition, four participants said that they had a smartphone, but refused to use the phone’s internet capability. One of these latter interviewees described herself as ‘the representative of the old school’ (a woman born 1985); the other one complained angrily that her smartphone connects to the internet in public places without her noticing it (a woman born 1990). She clearly felt that she is not in charge of the technology. Interestingly, quite a few of the young adults felt that they were not using current new technologies effectively enough, or that they cannot keep up with the rapid development. This feeling caused anxiety for some and made them suspicious towards the newest innovations; they also described themselves using words such as ‘granny’ following the discourse of the incapable elderly.

Young adults associated laptops with home and found them too clumsy and heavy to carry around. A couple of participants had recently started to use tablet computers, but its role in their everyday life was still quite unclear; they were considered a bit awkward and linked to home as well. Some used their own (mini) laptops when studying at the university, but only a few took them regularly with them to the centre of the city; these participants were high-tech savvy and also studying/working in fields related to communication and technology. However, ‘the dreamers’ formed a small but interesting group; these participants were fantasising about the usage of a lightweight laptop in a public place, mainly in a cafe or in a park. Creative and social aspects (communal writing, listening to music, dancing) were connected to these visions. Anyway, the fear of breaking the expensive device and/or it getting stolen were thought to be the main obstacles to this kind of usage; participants also considered the weather conditions of Finland too harsh for portable computers.

For young adults, private and public spaces were overlapping in a sense that social digital space was an essential part of the public space, much more than in the elderly interviewees’ stories. Still, the clumsiness or impracticality of technology was considered an obstacle for using it even more. Negative feelings towards the pervasiveness of technology were also expressed quite often. At least a quarter of the young adults were distressed due to new communication technologies; some repeatedly said how computer usage was consuming all of their time; others felt that the demands of being constantly available were like shackles; communication technologies were also blamed for the feeling of restlessness or being constantly in a hurry. Thulin and Vilhelmson (2007) interviewed young people aged 18–20 in Sweden in 2000–2002 about mobile phone practices and found similar negative attitudes very rare. The increase of digital communication during the last 10 years or so might be now being experienced as overwhelming by some of the people.

Towards a new ubiquitous city?

The most visible part of the new ubiquitous Oulu is the large interactive displays, which the designers expected would change people’s spatial and social behaviour. On the other

hand, the wireless networks such as panOULU WLAN are totally invisible. In the physical urban space, using the displays means interacting with a large immobile screen which is exposing its content also to the passers-by. In order to understand people's reactions towards this kind of technology, we have to take into account certain social rules prevailing in urban space. The anonymity of people moving around in the city has been a recurrent theme in the discussions about modernisation and urbanism (Goffman, 1966; Karp et al., 1991). Mäenpää (2005: 84–88) explains how anonymity becomes a social norm in public space leading to the minimisation of an open contact, such as verbal or eye contact. This indifference enables people to create personal space in an otherwise congested environment.

Elderly city dwellers

The new interactive displays were not discussed a lot by the elderly interviewees since only four of them had used them so far. Some had not even noticed the displays even though they lived in the centre and moved around there frequently. This led a 71-year-old woman to ponder that the displays were not aimed at the elderly in the first place. Those interviewees who had noticed the displays had not used them because they presumed that they were meant mainly for tourists, or were screens for advertising. When asked how they would feel about using these displays, they responded quite positively: they did not mind that passers-by might witness their actions, though some women said that they would rather use the displays in the company of someone else. However, a woman who had used a display said that 'you don't wanna stand there for a long time', thus experiencing this practice as a performance on a public stage (see Goffman, 1966). A 69-year-old man had nevertheless familiarised himself with new displays more thoroughly, but commented that 'an old inhabitant of Oulu seldom needs' the services offered by them. Thus, the publicity of the technology did not matter that much; instead, the needs of elderly people and the current applications did not quite intersect. The perception of the UBI displays was one of the topics that most divided the elderly interviewees' opinions: some appreciated them as symbols of innovation appropriate to Oulu, while others considered them as a waste of money, investments in 'toys' for teenagers.

'A space may be *physically* accessible, yet given its meanings, be experienced as oppressive', Freund (2001: 697) writes, meaning that for example new ubicomp technologies have the possibility to affect the social organisation of space. If new public technology is designed for younger people, this urban space might feel more and more uncomfortable for the elderly. Though our elderly interviewees stated that they do not necessarily want to spend time hanging around in the city centre, they still emphasised the need to stay mobile and utilise the services that are situated there. The space also needs to feel safe enough for older people to utilise it; and though this would be technically possible, it might not be considered socially and politically important (see Freund, 2001; Joyce and Mamo, 2006).

The elderly interviewees saw the continuous technological change mostly as a 'natural' state of affairs: societies must 'develop' and one sign of this was the intensifying development of all sorts of technology. Instead, they were concerned what this development would

mean to the oldest members of society. If a measure of full membership of society and competent citizenship is computer literacy (see Uotinen, 2003), people without these skills are undoubtedly put into a marginal position. However, our analysis shows that considering all elderly people as lacking computer skills is an oversimplification. The elderly interviewees were using computers in multiple ways: from emails and online banking to ordering travel tickets and enjoying art exhibitions. Still, they belittled their computer skills, which, according to Richardson et al. (2005), is connected to the way elderly people are seen in society: if the elderly are regarded as an economic burden with poor computer skills, they themselves reproduce this image in their stories of their encounters with ICT.

Young adult city dwellers

The cultural probe study included a task whereby participants were asked to try out interactive displays and write down their experiences. A majority considered the public use of a large display distressing; information seeking was thought to be private business; and the fear of failure was mentioned several times. Usage was experienced as a public performance that can tell disturbingly much about the user. A couple of participants had been horrified when an advertisement about the *Twilight* movie appeared automatically on the screen when they were using the display. In addition, a woman born in 1990 described how she felt like ‘an old fart’ when a display was not responding and there were some teenagers nearby. The huge public interactive screen does not have a predecessor in the mediascape of these young adults; it is breaking down the boundaries between small, interactive private screens (mobile phones, computers) and large non-interactive public screens (cinemas, adverts).

Public displays expose the content personally chosen by the user to a wider audience, which breaks the anonymity of urban public space discussed earlier; thus, even checking trivial information such as bus schedules was experienced as distressing by most young adults. However, we have argued that the public nature of a place affects technology use, but the same works vice versa; the presence of technology can also have an effect on a public space and change its socio-spatial structures (Dourish and Bell, 2007; Höflich and Kircher, 2010). The social norms are constantly negotiated as new devices enter urban public space.

All in all, most of the participants of the study considered that displays could bring some added value to the city and be useful at least for tourists. Similar to the elderly, some young people also thought they were reinforcing the image of the high-tech city. Quite a few were positively surprised with the content, but some also commented that they could get the same information by using a smartphone. The most positive reactions came from those who had tried the display with somebody; some high-tech-savvy participants also liked ‘playing with the displays’ just because of the novelty of the technology. Thus, social aspects, playfulness and creativity were emphasised in positive accounts; interestingly, the same things appeared in ‘the laptop dreams’.

Social aspects were even further underlined when young adults were asked what they wanted from future ICTs. A few mentioned actual portable devices ‘that would include everything’; most of the accounts were more abstract. The continuous and unstoppable development was seen as a natural state of affairs, and speed and efficiency were mentioned

relatively often. Many participants wished, however, that technology would become more ecological; the word 'natural' was also used relatively often to describe the ideal human–ICT relation. Remarkably, one group of dreams clearly resonated with the original aim of ubicomp (see Weiser, 1991), i.e. the desire for technology to settle in the background of daily life, become more invisible and adjust to people's routines, and not vice versa.

Conclusions: Negotiating power in urban practices

In this article, we have argued that the intelligent ubiquitous city of Oulu consists of the designers' and decision-makers' *strategies* and ordinary city dwellers' *tactics* that do not entirely meet or even contradict with each other. The designers assumed that this particular city space would be full of competent and interested users who would happily welcome new ubicomp innovations. In particular both young and elderly people were depicted as the presumed users without questioning the differences within these age groups. Our analysis shows, however, that a significant part of both the elderly and the young adults interviewed for this study felt that as users they were incompetent or not using new ICTs efficiently enough. Moreover, some of them were not interested in new devices such as smartphones, and the anxiety towards the overwhelming role of ICT in everyday life was expressed relatively often. We might therefore question how eagerly they act as testers, or even as audiences, in the living lab of the ubicomp environment.

The designers and decision-makers stressed how it is up to users to start appropriating new technology. We, however, argue that this agency is not equally accessible to all; instead, people's capabilities and willingness to take advantage of the new services differ substantially. Thus, new ubiquitous technology affects the power dynamics of the public space. If technology is deterministically expected to change people's lives, this change may not be equally positive for everyone. For example, the imagined usage of public displays is founded on the premise that people have sudden information needs. This tendency is reinforced by the usage of smartphones, which makes young high-tech-savvy adults the potential users. For elderly interviewees, whose mobility tactics included careful prior planning, the instant information offered by new ubicomp technology was quite insignificant. Hence, in addition to offering people new means to construct urban practices, ubiquitous technology may actually limit social agencies.

The designers are powerful agents in constructing the ubiquitous city; however, through their own practices, urban dwellers interpret the prevailing spatial order, and both strengthen and resist it. Using the public panOULU WLAN with a smartphone seemed to be a battlefield where young adults were either welcoming the available technology or resisting it. However, active resistance or just the fact that they were not among the first ones to acquire a smartphone, clearly made these young people feel old-fashioned. It can be argued that the hegemonic discourse of technological progress also actualises its power with respect to this feeling. On the other hand, the elderly, who were accustomed to quite a strict distinction between private and public spheres, found this new hybrid space confusing and that it changed the norms they were used to. By refusing to use mobile phones and interactive displays in public, people resist the norms also created by the ubicomp design.

In a meshwork, people are ‘inhabitants’ for whom ‘things do not so much exist as occur. Lying at the confluence of actions and responses, they are identified not by their intrinsic attributes, but also by the memories they call up’ (Ingold, 2011: 154). In the ubiquitous city of Oulu, this means that past individual and shared experiences as well as future expectations significantly affect the spatial practices of city dwellers. New pervasive open access technology and its affordances are perceived in relation to other devices, but also to the social norms connected to a public place, meaning that technology does not automatically change the way people use or experience the urban environment it is embedded in. The stories our interviewees constructed about ubiquitous Oulu and their spatial ICT practices are tightly entwined with the paths they have travelled on their way to this particular space. Furthermore, reading the interviews of different generations in parallel unravels the notion that age as a singular category could explain people’s ICT relations. On the contrary, the trails of experiences with landline and mobile phones and with different public places in both age groups, as well as the experience of ageing and the changing mobility among elderly interviewees, all compose the current relationship these citizens of the information society have with ubicomp. Thus, in order to respect the original egalitarian vision, technological applications should be carefully localised and rooted in the everyday practices of the inhabitants, which differ substantially from each other.

Acknowledgements

We would like to thank our interviewees for sharing their views and time with us; as well as the reviewers of our article for their incisive comments.

Funding

The results presented in this article are published within the UBI Anthropos and UBI Mingle research projects funded by the Academy of Finland.

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