

From Freedom to Involvement: On the Rhetoric of Mobility in HCI Research

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Abstract

The concept of ‘mobility’ as it is conceptualized in mobile HCI is scrutinized in this paper. The currently applied understanding is often limited to perceiving mobility as corporeal and in spatial and temporal terms exclusively. While some have attempted to include contextual and social dimensions, their ways of approaching this issue seems problematic and in fact only continue a far-reaching separation between the physical and what is seen as the social or the subjective. These should however not be seen as disparate but rather as co-creators of what one perceives as ‘reality’.

The concept of involvement from phenomenology is introduced to discuss the possibilities of changing contexts to which use of mobile information technology gives rise. To conclude, we argue that mobile HCI needs to be thought of as designing for involvement in these diverse physio-social contexts, rather than as designing technology with a spatial and temporal location.

1. Introduction

This paper will examine not only the concept of mobility, but also its rhetoric. This focus is because it is believed that a few rhetorical figures are currently highly important and influential in the design of mobile information technology and that they as such come to guide research as well as practice. The aim of this paper is hence to increase our understanding of what mobile information technology ‘is’. The argument is that in our current understanding, a few rhetorical figures seem to take on an important role, but that these may be misleading in several respects. Using Merleau-Ponty’s [40] dialectical approach to meaning is to say that mobile information technology becomes both what we find it to be, but also what we create it to be. In the latter process, the way mobile information technology is talked about—its rhetoric—naturally comes to influence the way in which it is perceived; what we believe it to be. In order to find new ways of designing mobile information technology, it is hence necessary to be able to go outside of its current rhetoric, for which it in turn is crucial to first establish and review what the current rhetoric is.

Intending to explore what the concept of mobility implies by drawing on previous research in mobile HCI is however an undertaking anything but straightforward.

Because it as a field of research is still immature, and there are yet comparably few canonized works, the question can yield a host of different answers according to what community and in what circumstance one chooses to pose it. Within the small but rather diverse research community with an interest in mobile HCI, some would argue that the concept of mobility above everything else poses a host of challenging technical issues. These include the need to use different system architectures, lower computational capacity, new standards, more focus on power management, limited bandwidth, intermittent connectivity, distributed database access, platform independency, matters that have to do with data validity, new kinds of security threats, and issues of scalability and reliability [23, 32, 33, 38, 42, 47, 54]. Issues of technological nature, such as those attended by the authors cited above, are a natural and necessary elements of any design discipline; whether it is to do with building motherboards for computers; bridges between neighborhoods; coffeepots for air stewardesses; or buildings for those tied to their wheelchairs. What efforts of research which deal solely with specific technological issues typically do not encompass, however, are well-developed understandings of underlying issues—such as, in this case, mobility—and what the effects are on the individual and the larger society of their technological innovations. Because of this, no design discipline can simply regard issues of technology; it must also deal with people—both as designers and as users of artifacts [8, 18].

Other researchers related to mobile HCI would thus argue that prior to the technical issues are the possibilities for new kinds of work that the concept of mobility brings into play. In the field of Computer-Supported Collaborative Work (CSCW), this conceptualization of the enabling quality of mobility to give rise to new ways of working has tended to govern the discussion. Some of the important previous efforts within this area are a several user centered studies which have primarily focused on collaborative mobile work, of which the most well-known include the work carried out by Luff & Heath [39], Whittaker et al [56], and Bellotti & Bly [6]. In one of the earliest studies in the field as such, Whittaker et al studied in detail the work of two mobile professionals, of whom one was locally mobile within an office environment while the other was also mobile in the local metropolitan area. The importance of local mobility, i.e. the ability to walk between different rooms or buildings at a local site, in supporting communication and awareness

has also been examined in Bellotti & Bly's ethnographic study of a distributed design team. Luff & Heath's studies of staff and management at the London Underground also emphasize issues of awareness and communication in relation to mobility, highlighting not only the importance of human mobility, but also the mobility of artifacts. There is also a relatively small, but growing, interest in focusing on issues of mobile interaction and mobile user interfaces—for instance the matter of displaying and visualizing information on small displays, text input, speech input, ergonomics of use, and new kinds of interaction modalities [25, 43, 46].

2. Different Notions of Mobility

While the research community of mobile HCI—the alleged experts in mobility—seems fairly indistinct as to its object of study, this can be partly explained by noting that although its members seem to be concerned with the same issue, mobility, they are primarily pursuing its influence on various areas of interest. While the influence of mobility has been the focus so far, an equal interest in a systematic unveiling of the notion of mobility is yet to be found. While not often the focus, the notion of mobility—i.e. what one thinks mobility 'is'—nevertheless has influence on the ways system architectures and software applications need to be designed; on the way work can be carried out and supported; and on the ways in which users interact with their computers. But in this focus on what mobility causes, the interest in and understanding of what mobility 'is' seem to have been at best taken for granted—and at worst forsaken.

The view that the concept of mobility itself has not received proper interest and that most mobile HCI research efforts instead have taken on the character of putting out the fires started by mobility, metaphorically speaking, is however not entirely new [31, 25, 45]. In discussing the perceived importance of the concept of mobility in our contemporary world—visible in for instance the pervasiveness of modern transportation technologies—and how it has reshaped the ways in which people live and work, some have stated that: “[In] spite of the upsurge of concern with mobility in our social lives, current research perspectives define the notion of mobility quite narrowly, exclusively in terms of humans' independency from geographical constraints” [31].

The current understanding of the concept of mobility thus pre-assumes that mobility is solely about freeing people from geographical constraints: “Their argument of the significance of mobility, or nomadicity, is clearly confined to the corporeal characteristic of humans freed from geographical constraints thanks to mobile computing technologies and services such as mobile phones and personal digital assistants” [31]. To come to terms with this current limitation, some authors suggest the concept of mobility would be enriched if it would also include the

contextual interactions people establish and the social character of that kind of interaction [25, 31]. According to this, some seek to reframe mobility in terms of three dimensions: spatial mobility, temporal mobility, and contextual mobility [31].

2.1. Spatial and Temporal Mobility

Spatial mobility, the most common way of conceptualizing mobility, mainly denotes corporeal geographical freedom—or the proposed 'nomadicity' of current urban life and work [12, 32, 33, 51, 57]. Nomadicity stems arguable rather from the pervasiveness of modern transportation technology—enabling people to travel with relative ease—than particular advances in information technologies [31]. This new way of living and working has however been found to be rather poorly supported by traditional information technologies, which in turn has provided incentives to invent and design mobile information technology.

If spatial mobility mainly concerns questions of 'where,' temporal mobility answers to questions of 'when.' It seems that the shift in society to an increased level of mobility—of both people and information—makes it both troublesome as well as less crucial to arrange one's work or life in a linear temporal dimension [31]. Their arguments are similar to those of Perry et al: “As with notions of space assumed in the rhetoric of 'anywhere,' the notion of 'anytime' often assumes a linear notion of time, as opposed to the 'anytime' characterized by the social norms and properties of time that affect information access and communication behavior. For example, many people might consider it inappropriate to make a phone call about work-related issues outside a mutually agreed understanding of 'work time'” [45, p. 326].

Several of these temporal issues have been previously raised and discussed within HCI [29, 30], also specifically so in the area of mobile interactive systems design [29, 45]. But in comparison with other dimensions, such as spatiality, the temporal dimension of interactive systems has however been largely ignored. Nevertheless, one immediate concern of temporality that has been found to have an immediate impact on interaction and interface issues arise from the nature of wireless communications are network delays and outages, leading to unpredictable and unreliable temporal characteristics at the user interface [10, 12]. The alleged importance of spatiality and temporality in an understanding of mobility may be further approached and justified by examining the most influential and guiding rhetorical figures that surrounds the design and conceptualization of mobile information technology. In the next section, one of these figures will be introduced and analyzed, as it seems to provide particular insight into some important aspects of the spatial and temporal qualities of mobility.

2.1.1. Rhetoric of ‘Anytime, Anywhere’. Arguable, one of the most widespread rhetorical figures that persist in the conceptualization of mobility, in research as well as in more practice-oriented literature, is that of ‘anytime, anywhere.’ This rhetorical figure seems to capture the spatial and temporal dimension of mobility. One of its chief proponents, Kleinrock [see 32, 33], has argued that: “The combination of portable computing with portable communications is changing the way we think about information processing ... We now recognize that access to computing and communications is necessary not only from one’s ‘home base’, but also while one is in transit and/or when one reaches one’s destination. Indeed, anytime, anywhere access” (33, p. 351)

His claim is that advances in technology—primarily the amalgamation of information and communication technologies, the miniaturization and the steady improvements in processing power, the growth of the Internet, distributed computing, global positioning systems, and so on—will help realize the vision of access to information and services ‘anytime’ and ‘anywhere’. At the heart of this rhetorical figure is the vision that people should be able to carry out their computational or communicatory activities independently of the hour of the day—i.e. anytime—as well as doing so not being confined to a specific spatial location—i.e. anywhere. Hence, the goal of mobile HCI, according to this vision, seems primarily to be one of technological mediation. Mobile information technology should strive to allow the user to be connected to one or many networks at all times, to be ready at all times to provide the user with appropriate information and services.

The appropriateness of ‘anytime, anywhere’ to guide research and development in mobile HCI has however not remained unquestioned. Wiberg & Ljungberg [57] notes the similarity between the vision of ‘anytime, anywhere’ and a simple model frequently applied in the field of Computer Supported Cooperative Work (CSCW) to denote different kinds of computer supported collaboration applications and their spatial and temporal aspects [e.g. 24, 48]. This model suggests that collaboration supported by computers may take place dependently or independently of time as well as dependently or independently of location. Two persons sessioning in front of a single computer jointly composing a paper is dependent on both space and time, according to this model. Second, if the two were taking split shifts, sitting in for each other in writing the paper, they could be said to still be dependent on space but independent of time. Third, if they each from a specific location were simultaneously writing on the same paper using a collaborative computer support tool, they would be dependent on time while independent of location. Finally, if they were writing different parts of the paper at any given location, while every now and then sending each

other bits and pieces of it to one another by for instance e-mail, they could be said to cooperate independently of both time and place.

The latter of these examples, where the two users are independent of time as well as place, is clearly most similar to what is argued in the vision of ‘anytime, anywhere’. Nevertheless, as with applications of CSCW, this is by no means the only way of in which the phenomenon of mobility can be understood. Wiberg & Ljungberg’s [57] study of mobile telecommunication engineers shows that the mobile service workers they studied were actually often dependent on both time and location to be able to carry out their work, and some practical limitations of having ‘anytime, anywhere’ as a guiding vision for the design of mobile information technology thus come into view. Travel cannot always be avoided, since workers have to be physically present at certain locations for some tasks—for instance attending to telephone poles, customer buildings, network routers, and locations where new cables need to be drawn. Neither are the workers independent of time, as certain tasks were tied to specific time frames—rebooting the telephone network had to be done during night time and customer service had to be provided out within 24 hours of reporting [57]. In other words, some practical limitations of the nature of their work make it impossible for the mobile telecommunication engineers to conduct work ‘anytime, anywhere.’

In a similar fashion, Perry et al [45] argue that the notion of ‘anytime, anywhere’ seems to be one of the major premises of mobile technology, in that it promises to remove the bonds between a person’s location in space and that person’s information and communication resources. However, they see the notion primarily as a rhetorical device which contributes—and in some ways even founds—a common discourse within the mobile technology industry from which narratives of mobility are produced [7, 45]: “These narratives embody a set of simplistic assumptions about the nature of mobile work. In the absence of a real understanding of what constitutes mobile work, these narratives are the only fallback in justifying and shaping design” [45, p. 325].

As primarily a rhetorical figure for promoting and selling mobile technology, the ‘anytime, anywhere’ construct seems to serve an important function, while “in terms of understanding technology use in mobile work and informing design through this understanding, such a construct may not be quite so useful, since it misrepresents the reality of the difficulties faced by mobile workers” [45, p. 324—325].

From these studies, it becomes clear that a conceptualization only concerned with mobility as geographical independence may completely neglect or overlook its temporal dimension. Reviewing the notion of ‘anytime, anywhere’ has shown that one must be careful not to consider the dimensions of spatial and temporal

mobility as separate, since they are most often highly related and influence each other in intricate ways.

2.2. Contextual and Social Mobility

Despite the alleged importance of situated action and the social context of use promoted by the CSCW community, one of quite few attempts at providing a framework for thinking about mobile use of information technology based on context rather than on detached notions of time and space is the model of the different types of mobility discussed by Kristoffersen & Ljungberg [35]. Interested primarily in issues of neither the exact location of the user nor the time of the day, their framework rather focuses on properties of the place in which mobile users, because of their corporeal mobility, find themselves situated—as well as the different requirements different kinds of mobilities have on mobile information technology. They suggest we acknowledge at least three kinds of modalities of mobility—traveling, visiting, and, wandering—each with its own impacts and requirements for both users and environments.

Approaching context from a somewhat different perspective, Harrison & Dourish [13, 14, 25], among a few others, have argued that the notion of space brought to day by considering the dimensions of spatiality and temporality typically constitutes a fundamental aspect of also how we design and think about modern technologies. Not only in terms of mobile information technology but in effect for all sorts of interactive systems: “Systems designers create spaces of all sorts; virtual ones such as ‘name spaces,’ and real ones such as the two-dimensional computer ‘desktop’ on which files and icons are arrayed. Across these different sorts of spaces, there are certain common elements. For instance, things generally appear within the space. There can generally be only one object at any given point in space. Things tend to stay where they’ve been put. Spaces define distances; things can be nearby or far apart once they’re in the space” [14, p. 88].

The use of space as an organizing principle in interactive systems design is not a random pick. Drawing on the work on metaphors carried out by Lakoff & Johnson [36] is to suggest that spatial notions of distance and direction are basic and important aspects of human cognition, and as such a potentially useful resource for interactive systems design. In CSCW, the notion of space as an organizing principle has in effect been particularly influential [14]. For instance, a ‘shared workspace’ has become a common and expected feature of many collaborative tools, which use “space as a way for people to manage their accessibility, orient toward shared artifacts, and provide a ‘setting’ for particular forms of interaction” [14, p. 88]. In addition, it is well established that Virtual Reality and some Internet technologies, including online communities, the World Wide Web, and online multiplayer computer games, create virtual spaces

for their users. In some of these online communities, spatial notions are used to steer and guide interaction, for instance by requiring two users who want to interact with each other to move their avatars in the virtual space so that they stand close to and face each other [3, 5, 8, 50]. In some online communities for instance, spatial notions are used to steer interaction by requiring two users who want to interact with each other to move their avatars in the virtual space so that they stand close to and face each other.

2.2.1. Rhetoric of ‘Spaces and Places’. In spite of the pervasive use of different kinds of spaces in interactive systems design, Harrison & Dourish [13, 14, 25] argue that while the notion of space is still important it is typically not the most important organizing factor when it comes to interaction. Partly based in sociology, they propose making a distinction between those interactive phenomena which are consequent of the nature of the space in which they occur and those that stem from the inhabiting of a certain place [25]. Space, in Harrison & Dourish’s sense, seems for the most part be concerned with the physical—including metaphorically physical—properties of a given location, an understanding of the physical configuration of people and artifacts in this particular setting. As they argue: “Spaces provide physical constraints and affordances, based on things like the fact that it is easier to go downhill than up, that people cannot walk through walls, and that light passes through glass” [25, p. 26].

If spaces are configured in different ways, different kinds of behaviors can be supported as well as expected. A small meeting room with comfortable chairs and a round table may support a particular kind of conversation which can be expected to be very different from the kind of activity supported by a large auditorium.

But the concept of space alone—focusing on physical properties—is not enough to grasp the different kinds of behavior that appear in different contexts, according to Dourish: “Two settings with the same physical configurations and arrangements of artifacts may engender quite different sorts of interactions due to the social meaning with which they are invested. For example, although the stage of an academic conference is physically configured in ways very similar to a concert hall, it is generally not appropriate to get up and sing there” [14, p. 89].

Rather than being guided only by the physical properties of the settings in which we are, our behavior is as much guided by social norms and agreements. While ‘space’ refers to the context’s physical organization and characteristics, ‘place’—according to Harrison & Dourish—rather refers to the way in which we are framed by social conventions to behave accordingly. Hence places, contrary to spaces, provide an “appropriate

behavioural framing; [...] engender a set of patterned social responses" [13, p. 25—26].

3. From Spaces to Places (and Back?)

But is space then different from place? Waterworth [53] agrees with Harrison & Dourish in that first, socializing in places entangles the individual in conventions of what is socially acceptable and thus appropriate behavior, and second, that all social places do not need to be spatial. But on the contrary to them, Waterworth argues that: "[A] 'place' in normal usage does not of itself imply what they mean by 'placeness.' A place can simply be a location. To avoid this confusion, we need to be explicit about whether we mean by 'place' a particular location, or a social occasion to which a set of conventions applies. [...] To use the term 'place' to mean the latter seems to me confusing, since we are really talking about appropriate behaviour for a social occasion, wherever it takes place. The expression 'behaving out of place' refers metaphorically to a time when different social occasions took place in different places (in the sense of location in space)" [53, p. 135].

With this, it is suggested that two similarly configured spaces, such as Dourish's concert hall mentioned in a previous passing, do not result in different behaviors because of place but rather because they are simply different kinds of social occasions. Thus, according to Waterworth, a concert hall as a place facilitates singing as well as conferences, they occur in the same place as well as in the same space, but it is the social occasion that determines what the appropriate behavior is. In this way, it seems that the metaphorical use of place that Harrison & Dourish advocate—in expressions such as 'behaving out of place'—may easily be confused with its literal meaning—i.e. 'your place or mine?'

The issue of how social conventions govern our behavior and the change new kinds of media and information technologies has brought by is explicitly and thoroughly tackled by Meyrowitz's ostensibly ignored *No Sense of Place* [41]. In this work, Meyrowitz discusses electronic media in relation to spaces and places: "Before electronic media, there was ample reason to overlook the difference between physical places and social situations. [...] A given place-situation was spatially and temporally removed from other place-situations. It took time to travel from situation to situation, and disturbance was a measure of social insulation and isolation. Since rooms and buildings can be entered only through set doorways, people once could be included in and excluded from situations in clearly observable and predictable ways. Electronic media, however, make significant inroads into the situations once defined by physical location" [41, p. 116].

'Modern technologies'—inclusive of information technology—in this way seem to influence the way in

which people can change their involvements in different contexts in at least two ways [51]. First, change in involvement can take place because of corporeal mobility of people. This suggests that the mobile human being—by virtue of some level of freedom in terms of spatial and temporal location, typically amplified by modern transportation technologies—can physically appear in very different contexts, even on the same day. In previous societies with less well-developed transportation technologies, the possibilities of rapidly changing contexts were considerably more limited than in today's world. It is however obvious that social boundaries between people of different social classes, ethnical or cultural backgrounds, or which simply have different educations or interests, still exists and still greatly impedes people's possibilities of being mobile. Today, with the ease of transportation and communication, it might even be that social and cultural issues of mobility are the most difficult issues to overcome. Second, current technologies such as modern transportation systems and not least various kinds of information technologies also provide the means for humans to be able to appear in a multitude of social context, sometimes simultaneously, without needing to appear there physically. Meyrowitz suggests that "Communication and travel were once synonymous. Our country's communication channels were once roads, waterways, and railroads. Communication speed was limited to the speed of human travel. [...] With the invention and use of the telegraph, the informational differences between different places began to erode. [...] Physical distance as a social barrier began to be bypassed through the shortening of communication 'distance.' [...] Movement from situation to situation and from social status to social status once involved movement from place to place. A place defined a distinct situation because its boundaries limited perception and interaction. Like all electronic media, the telegraph not only defies limits formerly set by distance, but also bypasses the social rite of 'passage,' that is, the act of moving both physically and socially from one 'position' to another" [41, p. 116]. Hence, numerous recent technological advances in what is sometimes referred to as Computer-mediated Communication (CMC), such as the previously mentioned Internet technologies—e.g. e-mailing, instant messaging, discussion boards, mailing lists, multi-user dungeons (MUDS)—as well as technologies such as cellular phones and video-conferencing, help people communicate despite of being physically dispersed and they may accordingly never meet physically [50].

Similar to the issue of spatiality and temporality, the importance of context to interactive systems is not unique to mobile devices. It has already been reflected in various ways in interactive systems research related to HCI. Some of the fields which have been especially concerned with contextuality are ubiquitous and pervasive computing [52,

54]; tangible computing [14, 28]; social computing [14, 16, 22]; wearable computing [1, 34, 43]; augmented reality [2, 21]; and obviously the previous efforts in Artificial Intelligence [15, 16], which however seems often neglected in these fields. Several attempts have been made to prototype context-sensitive devices which hold some kind of awareness of their location, their physical context, other devices in the spatial and temporal vicinity, and whom their user is [9, 10, 52], e.g. the Xerox PARCTab [52], a system aware of its location from which some simple but allegedly valuable services are provided. While the focus of these efforts so far has been that of designing specific devices and applications, a more theoretical understanding of the role of context—and thus involvement—in mobility has however not been presented [12].

3.1. Being-in-the-world

From the proposed distinction between spaces and places, one is easily led to believe that there is a disparity—hence a kind of parallel co-existence—between the two constructs, between two different ‘worlds’. In one of these worlds, only ‘physical’ things seem to count; things have locations in time and space, weight, and shape, but nothing more. In the other world, seen as the social or ‘subjective’ world, human volitions are supposed to roam. But in light of the phenomenological attitude which pervades this work, it becomes both possible and necessary to question this view of the world, which sees the world as largely twofold. Hence, to unveil any dimensions of mobility, the relationship between these two proposed ‘worlds’ must thus be further analyzed. To begin this examination, and instantaneously relate it to some previous findings in HCI, it is obvious that on a basic level Harrison & Dourish’s [13, 14, 25] argument has some relation to Suchman’s [49] finding that human action is a largely situated activity—that the specific context or circumstance in which humans are situated are of the highest importance for understanding human action. For our purposes, this may be translated into a suggestion that human beings are not only mobile in spatial and temporal terms, but that they are also so in terms of their involvements in contexts.

One of Heidegger’s [27] most valuable claims, and one to which this work returns many times, was his assertion that one must not understand a human being’s (*Dasein*) existence (*Being-in-the-world*) as simply a matter of spatial and temporal location with respect to other objects. *Dasein*’s being-in-the-world is fundamentally different from the being in the world of objects such as trees, stones, and bridges. In other words, human mobility must be thought of as different by nature from the mobility of a car. But in what way is it different? While the car could also be said to be mobile in terms of the spatial and temporal dimensions—one travels with the car from home

to work, leaves it in a parking lot throughout the day, and then takes it back at night—its mobility is different from the mobility of a human being in that the car is not involved in the world in the same way as is a human being. In some sense, this difference seems to be precisely what Harrison & Dourish are arguing with their proposed distinction between spaces and places. Different contexts involve different sets of people and circumstances; different ways of doing and thinking; different cultures, codes, and moods; different use of language and degree of mutual recognition, and so on, in which and with which the human being—contrary to the car—gets involved. Thus, mobility for a human being is not only a matter of spatiality and temporality—but even more important is that mobility is a matter of shifting contexts; of changing involvements. The suggested importance of mobility as involvement is further supported by and in line with some previous research carried out into issues of mobility and collaboration, where it has been established that one of the main reasons for people to want to be mobile is to have face-to-face meetings with others [6, 37, 45]. Thus, rather than striving to be independent of time and location, people on the contrary become mobile in different ways—not only corporeal—to be able to get involved in different physical and social contexts.

5. Aspects of Freedom versus Involvement

Some further implications from perceiving the world as a simultaneously spatial, temporal, and social setting for human action have been provided by Merleau-Ponty [40], and specifically from recalling his notion of the human being as a body-subject. As noted, the view of space as different from place promotes a view of the world where one sees the human as concurrently being part of two quite different worlds; first, a physical world—an ‘objective’ world, in which humans are seen as any other object—and second, a social world—a ‘subjective’ world, created by each and every individual. Merleau-Ponty took off from Heidegger’s [27] argument that human being-in-the-world must because of *Dasein*’s inhabiting character be understood as a question of involvement over inclusion, and that *Dasein*’s being-in must accordingly be distinguished from an object’s being in as the first by way of being is involved with things while the latter’s being is indifferently ‘occurrent’. But, which is Heidegger’s point, there is a human tendency to interpret ourselves in terms of the objects with which we deal, and in this conceals our active involvement with our world. Merleau-Ponty too holds that human subjects actively inhabit the world. But if we inhabit the world in the way suggested by Heidegger and Merleau-Ponty, it cannot easily be seen as distinct from us as perceivers, and likewise we as perceivers cannot see ourselves as distinct from the world. This character of involvement in the world made Merleau-Ponty conclude that body-

subjects do neither solely impose meanings on the world, nor do they simply find suitable structures of meaning in the world, but rather that body-subjects through interplay with the world both find as well as create meaning. Hence, according to Merleau-Ponty, to inhabit is to create meaning and structure as a result of a dialectical relationship in which the human subject and the world are fundamentally intertwined and come to structure each other. In Dourish's [15] example of the concert hall that is being used for both purposes of singing and conferencing, this would be to say that whether or not a specific event is a concert or a conference is neither something one simply finds in the world (i.e. that it is not simply a quality of that place in itself); nor is it something solely created in the minds of those involved (i.e. without physical and structural elements). It is rather the interplay between a shared mindset of people situated in an appropriate setting which allows the mindset to come about and nurtures it along the way. The event of either a concert or a conference is thus necessarily based in both physical and social elements, simultaneously and inseparably.

Hence, social occasions, such as conferences or concerts which call for appropriate behavior according to cultural conventions, cannot be seen as detached from either what Harrison & Dourish [25] call space or place. The problem with the argument of a conference or a concert as simply a social occasion, drawing on Merleau-Ponty, is that the world is then thought of as external to the minds of the conference attendees holding the idea of the conference event, something which brings back Cartesianism in terms of the human subject—the thinking subject—as detached from the world—the body. The conference is not purely a subjective phenomenon; its taking place also necessarily needs to be founded in features of the occasion itself which allows it to be found as a conference by human subjects, some of which are physical or structural features. A conference cannot generally take place in certain physical settings, e.g. a duck pond or at the local fishmonger's—even if the attendees try to persuade themselves and act as if it could. This is simply because a conference is a conference both because one sees and thinks of it as a conference as well as the event itself through embodying certain physical and social properties allows itself to be seen as a conference. Thus, conferencing in the duck pond will be carried out by the involved as a conference-in-a-duck-pond—unlike a conference carried out in a setting which allows itself to be seen as a place for conferencing. Some of these latter properties include social elements, such as people acting and behaving in certain ways, as well as necessary physical elements, people sitting in certain ways, chairs and tables organized in accordingly, and appropriated rooms and buildings. In this way, the body-subject and the world—of which the latter must be understood as both physical and social—are highly intertwined, and it

becomes even more clear why one cannot be understood without the other.

6. Mobility as Interplay between Freedom and Involvement

In this paper, it has been suggested that the context in which humans are founded, the immediate physical contexts as well as the various social contexts in which they simultaneously roam plays an as important role for the concept of mobility as do the dimensions of spatiality and temporality, which are comparably well-documented within mobile HCI. The spatial and temporal dimensions are two important dimensions of mobility, useful especially for understanding the corporeal mobility of human beings and artifacts. But mobility cannot and should not only be understood as a matter of location in time and space. Perhaps more important is understanding mobility's way of altering the user's context; of allowing the user to involve in different contexts. As the latter parts of this paper have shown, a 'context' is by definition both physical and social, and is so at the same time. Capturing one's physio-social context computationally for providing input into interactive systems is however a challenging, if not an impossible, undertaking. As the Cartesian way of understanding space is much easier to represent and deal with in a computer application, the shift to a focus on the physio-social context in which a human being is situated and involved rather directs attention to questions of meaning, at which computational systems are notorious [15, 16].

Any notion of mobility applied in mobile HCI must because of the physio-social nature of context not adopt the naïve Cartesian model where the world is solely thought of in temporal and spatial terms. While these are the dimensions of mobility which are highlighted by the pervasive rhetorical figure of 'anytime, anywhere', it is important not to conceal the situatedness and involvement of human action, in which the physical and social setting, the context, of human action is of highest importance. The importance of context in mobile HCI would resemble in many ways phenomenology's interest in the life-world; the world as experienced by someone being in a specific setting. As the life-world is made up of a complex system of meaning patterns, some which transcend individuals and form social patterns, it is intrinsically difficult to grasp for any computational system [15, 16].

A conclusion of this paper must thus be that, first, mobile HCI needs to be concerned with three elements of interaction; human, computer, and world. But second, while that these form a relationship in which all are of interest for mobile HCI, it is a relationship which must be conceptualized and treated as non-neutral because of the computational difficulties involved in capturing context; i.e. forming any kind of computational understanding of

world. Context-awareness has typically been pursued through designs which try to capture and interpret what goes on in the users' close physical vicinity, intending to provide them with appropriate information or services accordingly. While it has been noted that this is a highly challenging and difficult trait to follow, there is also the possibility of designing not primarily for the system to be able to interpret the user's context, but rather design the computational systems in such a way that they do not interfere with their users' contextual activities. This is to say, computational devices which do not intend to grasp human involvements, but which have been designed according to a basic understanding which suggests that for the situations and circumstances in which mobile devices become used, the context constitutes an important element and determines both what is wanted as well as what the user finds appropriate. This could be to argue for a design philosophy of mobile HCI in which devices are aware of their users' being-in—physical and social involvements—which sometimes make certain behavior of the system inappropriate and unwanted.

The most obvious example of this, of course, is the mobile phone. While the mobile phone's buzzing interacts with its user as a notification that someone wants to communicate, it is also likely to disturb and distract other people in the vicinity—the context, or world in which this particular instance of interaction takes place. At times, the buzzing of a mobile phone is a useful and direct way of notifying its user, but in certain situations it is just the wrong thing to do. When listening to a live concert, when giving a keynote at a conference, when gazing in awe at Michelangelo's Pietà, or when just trying to get some sleep, are all examples of when a loud buzzing just is not the right way of notifying the user. But the mobile phone does not know whether it is at home, at a conference, in Basilica di San Pietro, or at the local fishmonger's. Even if the cell phone knew this, it would still not know whether the specific situation would allow it to bleat out 'Here Comes the Sun'—whether its user is waiting for the phone to ring; sleeping; taking a guided tour; or in a sensitive argument with the user's fiancée. Similarly, it does not know whether or not its user is listening to the keynote, giving the keynote, or cleaning up the place afterwards. And if it knew that its user is at the fishmonger's, it cannot know what the user is doing there, or even if the user is the fishmonger. While these are all things that the mobile phone does not and cannot know, the solution is however not as simple as to tell our mobile information technology devices to start to notice and pay attention to their contexts and their user's involvements. As have been noted, catching the physio-social context is computationally difficult—understanding context in terms of human involvements seems computationally impossible [15, 16]. But that does not mean that we, like Heidegger fears, must resort to understanding ourselves in light of the objects with which we deal.

The obvious significance of the proposed concept of involvement for Human—Computer—World Interaction, acknowledging the inherent difficulties involved in catching and interpreting it computationally, hence promotes a design philosophy which seeks to recognize its importance but does not necessarily attempt to develop ways of understanding it fully, and where it partially attempts to do so realizes that it can never have a complete understanding of meaning in a human context. Such a design philosophy would promote designs which seek to enhance—or at least which do not interfere with or literary get in the way of—any possible human interactions that may arise because of involvement in a particular physio-social context, of which the system is not and cannot be fully aware.

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