
Rhythms of Non-use of Device Ensembles

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Abstract

The proliferation of portable devices has transformed our everyday practices, blurring second and third places. However, almost no research exists on how the perpetual possession of devices impacts how we escape them. In this paper, we explore the notion of non-use of portable devices. Drawing from the results of a multi-step qualitative study, we provide a discussion on how non-use interplays with the dynamics of everyday life. Specifically, we discuss practices surrounding hybridities of portable devices and social circles. The layerings of portables help in de-personalizing interactions through evasions, pretence, and resistance. We argue that non-use is not a reason for failure, but is a form of use in itself.

Keywords

Non-use, Urban computing, device ensembles

ACM Classification Keywords

H5.m. Information interfaces and presentation

Introduction

Our world today is heavily characterized by various forms of portable technologies. With decreased prices and better services, these portable devices have transpired within various cultural, social, and political contexts and travel with us everywhere we go. The transformative power of these devices lies not only in participating in different spaces, but also in creating them wherever we go. Portable devices, such as digital

cameras, MP3 players, mobile phones, laptops, and portable DVD players, will work in concert, like an ensemble of musicians that achieves a total effect greater than the individual performers, called device ensembles [16]. These ensembles aid in temporarily appropriating public spaces for personal use [11] [7], to escape the surrounding physical space by achieving public invisibility [4], or absent presence [5].

With the increased portability of information, these technologies have blurred several boundaries — between work, home, and play, private and public spheres, real and virtual spaces, and individual and shared usage. While these device ensembles create mutable and adaptable transitions, they have permanently affected our lifestyles and day-to-day activities. Previous research has explored transitions of data and locations of portable devices — mobile kits and ubiquitous computing environments [8], movement of laptops in the home [18], and in-between spaces [2].

In this paper, we question the role of device ensembles in our daily lives. In particular, we explore non-use, which is traditionally neglected as much as use is well-documented. With the blurring of boundaries — both geographical and informational, what mechanisms have we developed to escape these devices? When and how do these ensembles become intrusive to us and how do we cope? How is device intrusiveness different from human intrusiveness? How does the perpetual possession of devices affect our day-to-day lives? In the course of this paper, we try to answer the above pertinent questions by drawing on results of a multi-step qualitative study conducted in the U.S.A. and Finland, followed by a discussion on the findings of the study.

Study Design

In order to accommodate for cultural, infrastructural, technical and usage differences, we conducted our study across two different nations — United States and Finland. We recruited a total of 27 informants, both students and professionals — 12 in the United States and 15 in Finland. The informant pool ranged from 23 to 35 years of age, with a median of 25, comprising of 10 females and 17 males. The participant pool leaned strongly towards a younger set since they formed the key demographic of mobile users. The study was designed as follows: 1) an initial round of semi-structured interviews was conducted with 12 informants in the U.S.A and 7 in Finland, lasting about an hour each. The interview questions explored a typical day with device ensembles, how they transition different spaces, various tasks and contexts of use, and the levels of intrusiveness involved. 2) Following Grounded Theoretic analysis of the interviews, two Focus Groups were conducted in Finland to reify the findings. The Focus Groups comprised of 6 and 5 informants respectively, lasting about an hour each. A pre-assignment of jotting down usage of device ensembles throughout the day was given. The discussion questions were based on the usage of devices and user behavior in private and public spaces, especially with respect to socialities, and combating stress and intrusiveness through devices. 3) Finally, a week of photo diary-keeping was administered to document these instances, followed by an exit interview. Camera phones were chosen owing to the merit of high-quality networks and familiarity with usage of camera phones. We recruited 2 males and 3 females from the Focus Groups participants to keep the data consistent. Participants were instructed to shoot pictures during the following situations: while relaxing through portables, relaxing by avoiding portables, and deliberate social signaling. Flickr Mobile was installed on camera phones, and pictures were uploaded to private, individual accounts. Pictures were uploaded as soon as they were taken, and additional comments, titles, and tags were added at the end of each day. Participants were required to

carry the camera phones provided to them for a week, although care was taken to document instances of avoiding when all other devices were isolated.

Non-use

Much of the discourse on Information and Communication Technologies focuses on the dichotomy of technological haves and have-nots and digital divide [12]. Specifically within the realms of HCI, Ubiquitous Computing, and Sociology, non-use is defined as not using computers or internet [13] [14], or going off-the-grid through “disengagement from some pervasive media, information, energy, or financial infra-structure” [9], or a form of resistance [3]. Our study re-enforces that that non-use is complex, fluid, and ambiguous [15]. Non-use involves agency, control, and choice. It is multi-dimensional and episodic. Active users of technology can also exhibit non-use of devices. As we shall see in the following sections, non-use is exhibited under different social contexts through various degrees of deliberate distancing or disengagement with devices.

Themes

In this section, we discuss the multiple dimensions of non-use that emerged from our data. We highlight three manifestations of non-use — avoidance by the user, pretence of usage by the user, and resistance to forceful devices. We position the above cases along two axes — User’s intent and Device status (see Figure 1)

The comparative lens in studying across different cultures proved to be valuable in understanding device practices. U.S.A. and Finland are fairly similar in terms of modernization and economies, but vastly different when it comes to mobile phones and cultural practices. Finland is densely covered by forests and Finns have integrated categorical recreational activities into their day-to-day lives, including Sauna, Berry-picking, Hiking, and weekend summer cottage getaways.

Finland also enjoys 3.5G networks and greater than 100% penetration of mobile phones. Space limitations restrict our discussion on cross-cultural differences.

The following sections elaborate on of the themes:

Avoidance by the user: Given that portable devices have pervaded most of the space we live in, boundaries were clearly drawn around environs of use and non-use. Powering off, silencing, or ignoring devices was common across Finland and the U.S.A. Two forms of avoidance emerge in our data — the *deliberate shutting down* of portables for more immersive interactions with the physical world and *augmenting engagement* with the physical world through device ensembles. Both forms lead to a greater sense of emotional engagement with the experience, directly factored by intrusiveness, worth, and context. Consider P4, a female, who traveled technology-free during vacations — *Once a year (at least) I take a vacation with my family and I purposely vote for really remote locations or international destinations so that nobody can reach me. It's nice to be able to go— well, I can't answer the phone or reply to your email because I don't have signal. For some reason, it's easier to say that than to say, "go away, I need me time".*

Spending time with family greatly factors into cutting down on device interactions. P11 — *Yeah so I do that when I am on vacation. Then I don't bring my laptop. Also when I visit my family in Austria, then I check it infrequently. I see them twice a year, so even though we have Wi-fi, I use my laptop less regularly. Sometimes my phone over the weekend, I put it in my bag but I don't even pay attention so much. Someone called, so it's like yeah that's fine. Spending time with loved ones also impacts spatial arrangements of*

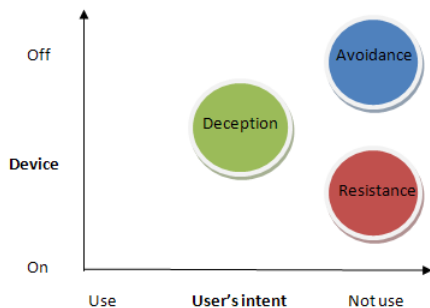


Figure 1: Manifestations of non-use



devices. Consider P9, who set up his living room to demarcate work and entertainment — *Sometimes, my assignments overrun scheduled time and so I will work on my assignment at night while my wife watches T.V. on her laptop. How do I keep entertainment away from work? I setup a Media Center so that I do not mix entertainment with work. Maybe because I wanted a large T.V. Screen, maybe because I wanted entertainment to be away so that I don't read emails while relaxing.*



The photo-diaries revealed specific instances of non-use of device ensembles during the course of a day. Non-use was displayed not only by shutting down devices, but also in subtler and more passive forms of control, such as setting a phone to silent mode or changing status to idle. Figure 2 shows photographs annotated with the following descriptions (from left to right, top to bottom) (sic): (1) *when I watch movies at home or movie theater I don't answer my mobile phone. If someone calls me while I'm at home watching a movie, I press silence button.* (2) *I don't use any technology at sauna.* (3) *At coffee break it's nice to sit with friends and talk, then I don't need any cell phones or portable devices.*



Deception by the user: Portable devices were commonly used for social signaling to avoid socialities and procure safety. The following signaling schemes were employed:

Portables as safety nets: Device ensembles helped in creating a sense of engagement, which is believed to ward off danger in crime-prone areas of cities. P25 pretended to send SMS to her friends at the prospect of danger — *I pretend to write a text message, say in a bus stop, when someone looks shady, especially in*

France. In Finland people are not as interested in others. In France, I either wrote text messages or pretended to write them.

Portables as masks: Device ensembles were appropriated for avoidance of potential socialities. We found that our data agreed with the Media Richness theory but contradicted with the Social Distance theory, to corroborate that face-to-face communication generates more possibilities for deception [6]. We introduce the concept of *Mobile-mediated Deception*, as forms of deception made possible by mobile devices in collocated groups. By creating a sense of technological engagement, absent presence was indicated. Camouflaging into the environment by indicating busyness, especially while passing a group of familiar faces, was common.

P10 used her iPod and mobile phone to mediate her social presence, to escape social interactions — *basically, if I am like avoiding certain people, in certain situations, because our office is like so far, you have to pass so many people. Not that people bother me by saying 'Hi', but I don't want to be obligated to talk to anyone. I take the time to check my Voicemail, even though they are messages that I have heard. Other times I play a game or pretend to do something. My MP3 player, I really do listen to it. Sometimes when I see someone I'll just use my mobile phone.*

Resistance by the user: The third class of non-use involves resistance by the user when the device goes "on". This phenomenon is synonymous with intrusiveness, which is defined by the Merriam-Webster dictionary [1] as "characterized by intrusion or intruding where one is not welcome or invited". Intrusiveness occurs when technology is unnecessary,

Figure 2. Non-use in diaries

unwelcome or forced upon the user. Intrusiveness can result due to various factors – cultural issues, access model, context, are some. What is considered to be intrusive in one culture may not be considered to be so in another. Intrusiveness is also a factor of whether a portable device is shared or personal. Another important factor to take into account is the location of the user, which determines whether the same activity is socially acceptable or not.

In order to shed some light on device intrusiveness, we compared it with intrusiveness caused by humans. An Operating System popping up a confirmation dialog 5 times in a row is inherently different from a mother wanting to know where her teenage son is. P2, on how technological intrusiveness is different from social intrusiveness — *like with my OS, I will postpone it to when I want to do it. Not the same with my parents. Like once a day type of thing I'll usually call and say Hi. That is not annoying. If I wanna update my computer but there is no substance to it, like somebody that you love for instance. You won't get too mad.* P5, who recently landed a job at a firm, had concerns of impression management — *if someone keeps calling me, which can get annoying. Just leave a message and I'll get back to you when I get back to you. The devices don't really have an impression of me, so I am not really worried. But people, I guess, especially my colleagues, it is important that they have a good impression of me.* P8, a student, on the differences — *I don't mind technological intrusiveness as much because people are much better at being annoying than technology. And technology is stupid, you can hack it, but people are harder to deal with.*



Figure 3. Diary Photos on intrusiveness.

It was commonly held that device intrusiveness was controllable, and that intrusiveness was caused by the people using the devices, not the devices themselves. Exceptions of technological inappropriateness, such as alarms going off during presentations were considered normal. From our analysis, three forms of intrusiveness emerged: *intrusiveness caused by others*, such as peeping to look at monitors and unanticipated intrusion into a private space, *intrusiveness caused to others*, such as talking over the phone amidst public and the subsequent neglect, and *socially-accepted intrusiveness*, such as phones going off during class and meetings. As P13 comments on socially-accepted intrusiveness — *I guess it becomes intrusive if it (the mobile phone) rings when I am in school, but nowadays people only smile at that.*

P23 and P19, who were diary participants, noted instances of intrusiveness while socializing, in the pictures in Figure 3, P23 — *Drinking some beer and wine and just relaxing, when a friend on holiday gets an email from his boss asking about reports.* P19 — *Others playing Mini-golf, when I get a call from a colleague at work asking about some settings he forgot to mention before his vacation started.*

Discussion

Our findings strengthen the case for non-use as a field of its own right. It is a goodness-of-fit measure guided by social circumstances. User experiences for device ensembles should be designed with and without devices. Device ensembles are embedded in ecologies that form a system of people, practices, values, and technologies in a particular local environment [10]. It is necessary to design for non-use with ensembles, since individual devices are selectively turned on and off by

the user. As we noted above, there are various degrees of non-use, such as powering off, silencing, or faking, which should be accounted for in designing user experiences. Evaluations should not only pre-suppose that successful adoption of technology implies usage, but also non-use. Posing questions on non-use helped us understand the increasingly acceptable technological inappropriateness and accommodations of it; this reflects an oversight on our part as designers.

Conclusions

With this research, we have highlighted manifestations of non-use, which is a critical, yet neglected area of design. By acknowledging that good user experience design should take into account the multiplicity of portable devices and potential phases of disengagement, we seek to provide a starting point for fruitful design. The percolation of portable devices, cutting across infrastructures, time, space, and user groups, dynamically creates novel practices and patterns. By moving away from the stereotype of single-mindedly studying usage of portable devices, we hope to have contributed a rich, additional dimension to the design of devices.

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