The Connected Home: probing the effects and affects of domesticated ICTs

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ABSTRACT

Homes were connected electronically to the outside world less than 100 years ago. And now, (as if the home has not been burdened with enough responsibility), it is asked to play a major role as a communications node in a global network of interactive media – a role which creates particular challenges for our understanding of the design and appropriation of sociotechnical systems. This paper describes a method to inform ICT design through collaboration with the household in an investigation of the effective uses of technologies, the affects of this use, and how the household domesticates technologies.

Categories and Subject Descriptors

K. [Computing Milieux] K4 [Computing in Society] K4.2 Social Issues. K8 Personal Computing

General Terms

Design, Experimentation, Human Factors.

Keywords

Domestic Technologies, Telecommunication, Research Methods.

1. INTRODUCTION

The domestic landscape painted by LG, Motorola, Sony, and Microsoft, depicts a multitasking teenager in her bedroom plugged into a streamed music pod whilst texting her friends in the next street to review the day, and keeping half an eye on the "Michael Jackson is Innocent" discussion group. Perhaps she and her mates will swarm tonight at the HiFi bar, or perhaps someplace else. Then again, she hasn't found it necessary to leave the house for quite some time now. In the next room her brother has turned off the DVD on his plasma screen, and is playing an interactive first-person-shooter. Right now he is supposed to be accessing this week's Competency Nodule from the Learning Provider – but he'll come to that later as his electronic organizer sends ever more insistent reminders. The picture continues with Mum sitting in the kitchen doing the home-management jobs - checking the week's purchases with the "smart" on-line refrigerator, checking banking transactions with her "smart agent"

software, perusing the images of the school concert she missed last week. Dad is in Singapore for a few days but he remotely checks the home fax and his home voice mail for messages, while web-cams and the intelligent security system reassure him that all is well at home.

The connected home in this technophilic picture of contemporary/near-future life is redolent of old-fashioned stereotypes and new-fashion imagery that some will find attractive and others depressing, but is none-the-less coming closer to the lived experience of affluent Australians with each new product release. It is a picture of the appropriation and domestication of technology – of the way affordances are exploited, neglected, and shaped in contexts of use, not just on the designer's screen. To render the appropriation of technology in the connected home tractable to PD research, it may be viewed in terms of ICT functions that interpolate it as a place of leisure, a command and control centre, a place for production, and a place for consumption.

As a *place of leisure*, domesticated ICTs promise us context and content. In terms of leisure context we are promised more time for ourselves – to be delivered through on-line, automated and labour-saving services; creature comfort – to be delivered through automated, "smart home" technologies; and a sense of security – to be delivered through intelligent surveillance devices. In terms of leisure content, the connected home contains a bewildering array of integrated, interactive home entertainment devices. The materiality of broadband, digital TV, home theatres and the like, manifests a broad cultural shift that relocates public entertainment and public spectacle from shared spaces such as football grounds and cinemas to private spaces – first the home lounge room, now in further dispersal to bedrooms. As a *command and control centre* these domesticated ICTs promise us access to detailed, real-time information about our finances, our consumption patterns, our commitments and priorities, and about one another, with a concomitant potential for increased command, control, coordination, discipline, commensurability and regulation As a *centre of contemporary production*, the home accumulates, produces, and transmits information in vast quantities. Firstly, the home is a data-mine of considerable value. Secondly, the home is used as a communications and publishing centre by members of the household. Thirdly, as the boundaries that confine work to defined places and times have weakened and disappeared, and the home returns to its role in the market economy, it takes its place as a data processing centre. Fourthly, to shift registers, the connected home also produces the subjects in the home. ICTs inscribe representations of users in their design, and by attributing

and delegating a variety of responsibilities, competencies, needs and desires [18], these technologies interpolate users of various kinds [19]. But alongside production, the contemporary connected home is also significant as a *centre of ICT consumption*. Historically, ICTs migrated from their place of origin – the workplace – to the domestic environment. But in addition to transferral, we also see that the home itself is often the first and primary target for ICT innovation and marketing [20].

And so, the home may now take its place as a fully integrated and articulated node in the digital space of flows. The contemporary home is truly a machine for living, and a research collaboration that attends to ICT appropriation in terms of the effective uses of domestic ICTs, and the emotive responses to this use, may be a necessary strategy.

1.1 Effects and Affects

To understand the effects (functional values) of the appropriation of these technologies we look at the work they perform to provide for leisure, command and control functions, production and consumption. We therefore attend to the instrumental coordination of family members, social interaction, "phatic" communication, security and safety functions, paid work activity, consumption, access to informational resources, and providing a modes of self expression.

To understand the affective (emotive) implications of the technology researchers and designers must rely even more closely on the collaboration of the people in the homes in question, which poses considerable methodological difficulties. We want access to routine home-life – problematic in itself. We want access to technologically permeated homes, which implies homeowners that are well to do – not the usual target for the social researcher's gaze. We want somehow to elicit subject's emotive responses, not the prosaic stuff of quantitative market research. Above all we want to hear the voices of the household. The method outlined below makes a stab at overcoming these difficulties.

2. Collaborative Research

The aim of such a method is to inform design by collaborating with householders to gain a better understanding of the effects and affects of contemporary machines for living, through examining the appropriation technologies in use, in situ. But of course the home is a quintessentially private space, and its peculiar and important character flows from this. Test-labs and prototypes don't interrogate the routine. Direct observation is not always possible or desirable in private settings. Participant observation for example, is a reliable and justifiably well-regarded ethnographic method for application in the work place, but is intrusive and problematic to apply to peoples' routine home life. In any event, the presence of a field observer in a private environment such as a home, necessarily alters the environment to something less than private, with a concomitant effect on the social performances that take place within, and on the veracity of the study.

2.1 Domestic Probes

The intention of the "Domestic Probe" is to inform design by inviting people to tell their own story of their relationship with technology in routine domestic settings, and have fun doing so. Domestic Probes are derived from "Cultural Probes", a method

recently developed in response to the problems of user centred design [3-6, 8-12, 14]. Cultural Probes were intended to move technology design research away from strict issues of effect, function and efficiency, towards an understanding of and support for affective responses and ludic pursuits – playful activities that are meaningful and valuable to those who use technologies. Combined with more traditional ethnographic methods, Cultural Probes enable insights to be gathered from within the site in question, as technology is in use, thus maintaining "fidelity to the phenomenon"[4] without intruding on and disrupting the domestic setting.

Following Gaver, Crabtree and others, we construct the "Domestic Probe", and introduce our household collaborators to their "Domestic Probe Pack".

The pack consists of a variety of artefacts specifically designed to "probe" the connected home in action, and leave archaeological traces in its wake that stimulate reflection on the effects and affects of domesticated ICTs. The precise contents of the pack depends upon the makeup and preferences of the household in question, and is subject to consultation and negotiation with each household, but in "standard" form might comprise –

1. A set of stamped postcards addressed to the researchers. The image on each postcard is of a communications technology typically found in target homes. On the reverse are questions or statements designed to elicit comment on the technology and its use, and participants are invited to dash off a response and post it as the inspiration strikes them. The questions and statements are open-ended or oblique, and seek an affective response to particular technologies, rather than specifics of use (e.g. "I love it when….").

2. A set of small stickers, colour-coded to represent each member of the household, and stamped with simple mood-indicating image to represent the affective response to technology use. Stickers are left in handy locations around the house, and participants are asked to apply a sticker to a device each time they use it. The history that builds and becomes ever more evident is a source of reflection for participants and for researchers.

3. The loan of a digital camera to take photographs and short video clips of technology in use. Participants are invited to photograph routine use, and unusual or notable use. Participants are also invited to annotate the images with their comments – either by voice through the camera, or after uploading to a computer. Individually, the photos capture representations of fragments of the connected home in action, and together they constitute an autobiographical montage telling the story of the connected home.

4. A "Connected Home Diary" given to each member of the household, and formatted to encourage participants to record their use of connecting technologies – when, why, with what degree of satisfaction, perceptions, impressions, reflections, and anything else the participant wants to note about their experiences with technology.

5. A "random sampler", comprising an old mobile phone with an unusual ring-tone. When the phone rings (triggered by the researchers) the household takes an immediate effective and/or affective "snapshot" of its technology use at that time, using the camera, diary, or other probe device.

6. A "frustro-metre": a whimsical artefact, in the form of a foam hammer, club, or brick, used by members of the household to mete out a thrashing to badly behaved technology. A pedometer located in the device records a rough count of the blows delivered over the research period.

7. A series of maps that cover the local neighbourhood, the metropolitan area, the country, and the globe, on which participants are asked to record their communications destinations. Sticky notes or coloured pins can be placed in position on the appropriate map, to recall the name of the interlocutor, the date, and perhaps the purpose of the communication.

8. Statements of transactions and accounts due, provide traces of phone use, internet use, and perhaps other modes of connection. Duplicates of these are collected in a container in the Probe Pack and may be annotated to indicate effects and affects.

9. Sedimentary piles of newspapers, junk-mail, school notices, Neighbourhood Watch newsletters and the like, also join the Probe Pack and provide traces of inward bound connections to the home.

10. The Community Intranet routinely captures data about its use, and its users. Traces of postings, pages accessed, time of login and logout, and other data are stored and processed by the server, and are potentially available to the Domestic Probe.

2.2 Debriefing

At the conclusion of a negotiated time period (say, two weeks), the researchers will meet with the participants to collect or record the traces, and to discuss initial impressions. Participants and researchers will subsequently meet a second time for a more considered conversation, and to enable a presentation of the collated and attractively bound traces to be made to the household – as a thank-you gift, and a multimedia memento. It is hoped that the traces will guide and stimulate open-ended, semi-structured conversations, of the kind commonly employed in ethnographic research. The traces are not "evidence" as such, but act as conversation starters and stimulants for reflection. Although the researchers record, interpret and analyse probe-traces and the conversations, the probe requires the close collaboration of the participants, not just as passive data sources – as subjects of research – but as full participants in the inquiry. Not only are they responsible for the traces that build up as the probe is used, the probe's traces invite participants to reflect upon and articulate their relations with the technology as the traces accumulate. The focus of analysis is not "…. the material artefacts of the probes – the tapes, the photos, the booklets and diaries, etc. – but rather, the situated character of everyday life …. elaborated by participants' accounts of their daily rhythms, routines, and abiding concerns. Such accounts supplement and augment insights gained from direct observation and are generated through cooperative analysis of the returned probe material. Probe materials serve as triggers for analysis then, and in asking people to administer them we transform participants into active enquirers into their everyday lives, rather than passive subjects of our research".[3]

3. Conclusion

Studies of domestic ICTs as sociotechnical phenomena are clearly important to design. A study such as that suggested here can make an interesting contribution to the field for 4 reasons: a) it directly addresses a foundational controversy in our sociotechnical relations; b) it does so empirically, through an innovative method that in itself is worthy of further investigation; c) the field of study, the home, is of significant import for ICT design; and d) the focus on ICT affect as well as effect is significant. These points will be taken in turn.

a) The question that energises our concern with sociotechnical relations runs deeper than questions that go to design issues, and is usually put in binary terms… does the presence of ever more capable technologies enrich and enable our lives, or have we indeed become more engineered as our technologies have become more lively? A very long list of eminent scholars and technologists has contributed to this ongoing debate, a debate that ultimately goes to the ontology of humanity and the phenomenology of our experience of life. Heidegger, Mumford, Ellul, Borgman, Postman and others are brought forward to lead the critique of technology as a force of control, domination and exploitation, and Negreponte, Kelly, Barlow, Papert and others arguing that technologies are instrumental tools that can empower and enrich. A third position, taken by Haraway, Hayles, Latour, Callon and others, denies that there is a Cartesian subject that sits opposite technology to be either master or slave, and argues that the "ontological separation of the human and the technological no longer offers the best model for describing our relationship with, and experience of technology" [7]. This argument about our reflexive engagement with technology is clearly important for the ongoing philosophical project of working through what it is to be human in an environment shared with technologies, and is also important for the pragmatic understanding of those who design and manufacture those technologies, and for those who consume and use those technologies – which of course is all of us.

b) A study such as that suggested, seeks to contribute to this foundational controversy empirically, by collaboratively examining and reporting the experience of those who lead that life. Polemical and reflective interventions abound, and are valuable, but so too are contributions grounded in the lived experience of those in the technologically saturated space of flows. The well-grounded form of the suggested study is also notable in that the empirical work is collaborative; researchers and designers can do more than tell someone else's story, but can also provide people with resources to tell their own.

c) The choice of the home as the site for the study is also significant. The home is a social space of a particularly important kind – it is a space for intimate relations and agency, and social structure, power relations, identity, subjectivity, all work differently in the home. The way a home is constituted and the way it performs is crucially important to people, to our culture and society, and crucially important to understand as a sociotechnical environment. With the important exception of feminist scholars – for example Judy Wajcman, – studies of technologically mediated practices have been conducted in the workplace. Consequently, a plethora of important institutions, disciplines, publications and paradigms have grown up around the study of ICTs in the workplace, and workplace ICT research

exceeds home focused research by at least an order of magnitude [15].

d) A study of the affective performance and implications of ICTs is in itself innovative – systems designers and human-computer specialists being more commonly focused on effective issues of functionality and efficiency. Yet people desire as well as function. To understand the design of sociotechnical systems, and the implications of design, we need to know how desires and technologies are "imagined" [21], and how they are regarded by "homo-ludens" [8], not just by rational goal-seekers. What is our relationship with these things, with which we spend so much time? What is their character? What are they seen to be?

All of these questions go to life in the machine for living, and … "then, yes then, through all this turmoil, a question still haunts us like a spectre: What for? – Whither? – And what then?" [13]

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