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# Methods for Studying Technology in the Home

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## Abstract

Technology is becoming ever more integral to our home lives, and visions such as ubiquitous computing, smart technologies and the Internet of Things represent a further stage of this development. However studying interactions and experiences in the home, and drawing understanding from this to inform design, is a substantial challenge. A significant strand of research on technology in home life has developed in the CHI community and beyond, with a range of methods being created, adapted and used in combination. This workshop brings together a diverse group of researchers to develop a coherent understanding of this methodological space, and to identify connections and gaps, where further development of methods can occur to overcome issues specific to studying the home.

## Author Keywords

Home, Methods, Design, Family, Multi-disciplinary

## ACM Classification Keywords

H.5.2. User Interfaces: Theory and Methods

## General Terms

Human Factors, Design.

## **Introduction**

Homes are sensory and material environments in which we create and participate in rich individual and social worlds [14]. Technologies in the home become domesticated over time, intertwining with household relationships [2]. Due to this, rich qualitative approaches have proved essential to understanding home life and the influence of technology on it. In the CHI community, this has included the study of early adopters [5], but also further research as technologies become 'unremarkable', leading to important changes (e.g. in the case of home networking [6]). These studies have also built important understanding of the appropriation of home spaces [9], and the ways that technologies have altered the connections between home environments and the outside world [8].

We are also seeing a growth in technologies that monitor various kinds of activity in and around the home, and can collect quantitative data over long periods with little intrusion by researchers. This augments a design space for the development of technologies that recognise our behaviours around the home, e.g. in the kitchen [17]. So far, the potential for using these types of data for research is underexplored.

Approaches to creating, evaluating and iterating envisaged designs are also essential. In this case, challenges include the ability to test a wide range of designs with broad audiences, and at the same time, to build rich understanding of their domestication and individual and social use in the wild. As such, a combination of multiple approaches appears necessary: long-term field trials of innovative designs are a common approach (e.g. [3, 18]); on the other hand, approaches using narrative and scenarios are useful to

develop early understanding of the potential effects of design (e.g. [4, 13]). In these studies there is a need to represent social aspects of home life effectively, and also challenges in gathering holistic data about the impact of the technology without unacceptable intrusion into home spaces. There are also common values expressed in these designs, such as individual behaviour change [17], social persuasion [18], or keeping connected with those away from the home [3]. It is therefore important to be able to effectively reflect on the nature of these values and evaluate impact.

Previous CHI workshops have explored topics that overlap with this area, such as technology for families [7], entertainment media in the home [1], longitudinal research [10] and personal informatics [11]. Here we focus specifically on the methods used for studying technology in homes in cross-disciplinary contexts. This topic is timely as there are on-going methodological developments and integrations prompted by the challenges of informing design, and understanding the impact of these. The workshop responds to the need for increased rigour and reflection in this context, specifically as regards the knowledge(s) gained through a combination of theories and methods, the ethics of exploring technology in the home, and the general role of the researcher in domestic settings.

## **Topics of Interest**

The backgrounds of the organisers cross social science, psychology, cultural studies, technology and design disciplines. We wish to broaden this with contributions from those involved in diverse projects using multiple methods, including but not restricted to:

- Ethnographic or observational studies in homes, including dormitories and shared buildings
- Approaches to exploring design through narratives, e.g. scenarios or user enactments
- Prototype design and evaluation studies using field trials in homes, lab studies and smart home demonstrators built for research purposes
- Living Lab and action research approaches to innovation related to the home
- Automated approaches to capturing or analysing quantitative data about activities in the home

We are particularly interested in discussing novel methods, and refinements of methods, developed for this problem space. Processes for multi-disciplinary and inter-disciplinary research are particularly needed. Areas where challenges can be identified in response to new forms of technology will be used as reference points for discussion.

### **Examples of Issues to be Addressed**

*Combining Disciplines:* The Low Effort Energy Demand Reduction (LEEDR) project, based at Loughborough, brings together engineers, computer scientists, designers and social scientists to understand energy consumption and digital media use in the home, with a view to designing demand-reducing technological interventions. The project combines longitudinal energy monitoring with creative design methodologies and in-depth video ethnographies of the home and domestic practices. The sensory-ethnographic methodology employed in its social science strand [15, 16] is informed by phenomenological anthropology and geography, and uses concepts of place, perception and movement to frame fieldwork and analysis. It places researcher and researched in a collaborative encounter, and works in conjunction with the designers' user-

centred methodology, which also emphasises situated meaning-making in domestic practices.

*The Politics of Looking:* Video observation is one method to capture naturalistic data about technology use in the home environment, but it raises issues around privacy and 'politics of looking' [12]. There is social unease about surveillance technology like CCTV, but also great cultural interest in people's everyday lives (Reality TV, for example). Recording may confer significance on mundane actions, but research participants might feel they should perform for the camera. An issue explored in the 'Understanding the Multi-Screen Household' project at Nottingham is the value of observational data for people who provide it, in conjunction with the industries that could use it.

*Uses of Narrative:* The use of narrative is underpinning a spectrum of novel methods, which elicit early insights into how envisaged technologies integrate with home contexts. At one end, we are developing scenario-based surveys tailored to respondents' homes. Contrastingly, we are also utilising methods combining scripted and improvised interactions with prototypes, located in the rich context of participants' homes. These novel approaches tackle the need to appreciate the rich variation in our homes and the relationships within them. Validity issues arise in understanding the phenomenological differences along this spectrum of envisaged and situated activity. Practical challenges are raised in delivering narratives and prototypes into the home that are responsive and open to appropriation.

### **Outcomes & Future Directions**

The workshop will be used to define the space of existing approaches, and the connections, tensions and

gaps in these. After creating a representation of this, we will identify areas where the creation of new approaches, refinements, and the effective combination of methods can clarify and validate understanding. This will be documented online, for reference and sharing. This workshop builds on two prior events: the first hosted by Horizon in April 2012, and another held at Digital Futures 2012 (<http://www.de2012.org/>). Through these we are developing a community and building links with related streams of research. The cross-fertilisation of diverse approaches is necessary in addressing issues such as those described in the previous section. The workshop will aim to add to these and provoke new collaborations and outputs that respond to identified challenges and opportunities.

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