

Growing older digitally: designing technology for older people

**Guy Dewsbury, Karen Clarke, John Hughes, Mark Rouncefield
and Ian Sommerville**

Departments of Computing and Sociology, Lancaster University, UK
g.dewsbury@lancaster.ac.uk

Keywords

Cultural probes; design; ethnography and assistive technology.

Abstract

This paper documents work from the EPSRC 'EQUATOR' and 'Dependability' Interdisciplinary Research Collaborations, concerned with the appropriate design of assistive technology to enable older people maintain a quality of life within their own homes. The focus of this paper is methodological since methods for identifying user needs and system requirements in home and care settings are relatively under-developed and present a very complex set of challenges for inclusive design. We report on our experiences of using observational studies and adapting 'cultural probes' to foster an ongoing dialogue with the members of our user groups, to gain insights into their needs and generate design relevant information and inspiration.

Introduction: understanding user requirements

In recent years there has been a 'turn to the social' in system design. The emphasis on 'the social' and understanding the detail of social settings was intended to develop more appropriate methods of analysing activities and their settings as a means of informing design and thereby making end-use a much more prominent feature of system development. With the advent of ubiquitous computing and the growing presence of computer systems in everyday domestic environments, the home has become a growing focus for research. However, it may be that we require significant shifts in our investigative techniques to consider how technology relates to such different settings and users. Uncovering the detailed nature of the social organisation of domestic life is essential.

Before designers can solve a design problem they need to understand some basics – such as what they are designing, what it should do and who should use it. There is consequently a renewed emphasis on the user, and a new kind of end-user, namely, a living, breathing person who carries on their daily life within a 'real time, real world'. As designers increasingly turn towards research methods that bring them closer to people's aspirations and their lives as really lived, so user-orientated qualitative

investigative techniques have increasingly been deployed.

This paper reports on the methods adopted in a recently initiated interdisciplinary research project interested in developing enabling technologies to assist in care for user groups with different support needs. The general aim is to examine how digital technology can be used to provide various kinds of support in care settings. One objective of the project is to improve the quality of everyday life by building and adapting technologies for a range of user groups and application domains. Meeting this objective requires us to address fundamental and long-term research challenges in how computing technologies and concepts relate to a range of everyday domestic environments, including those that might be characterised as ‘care’ settings.

Our user groups include a number of elderly and disabled people living at home. Methods for eliciting needs in such complex settings are relatively under-developed. Of course, gaining an adequate understanding of user needs and perceptions has long been a general problem of researching the elderly and the disabled. As Gearing and Dant (1990) document, historically studies of the elderly have been based on concepts of need derived from available service provision and rarely on the needs of the elderly as articulated by them.

The extent to which established sociological methods can simply be transposed to care settings is doubtful, representing a complex set of design and methodological challenges. Research in these contexts is often regarded as not merely difficult but often inappropriate and intrusive. The deeply personal, perhaps tragic, nature of the setting limits what can be investigated, as well as how it can be investigated. Our methodological responses have taken a number of forms, including experimenting with combinations of ethnographic study, user-centred workshops and, the focus of this paper, the use of ‘cultural probes’.

The ‘turn to the social sciences’ is not without problems. As Bertaux and Bertaux-Wiame (1981) warn “.. thousands of students in many countries came to sociology because they wanted to find out how people live and what social life is like concretely. But instead of finding what they are hoping for, they found academic sociology”. In such research any claims to special insight tend to be based on categories and concepts that are often in direct contradiction to those used by people engaged in the course of their ordinary actions. Our solution to this is, of course to let people speak for themselves, to document their own experience, to tell their own stories and it is for this reason we have come to use variations and combinations of ethnographic methods and cultural probes. We seek “to treat practical activities, practical circumstances, and practical ... reasoning as topics of empirical study, ... to learn about them as phenomena in their own right.” (Garfinkel, 1984). We suggest that when it comes to mundane technological intervention in everyday lives what is needed is attentiveness to members’ perspectives. In so doing we highlight some of the moral and ethical components of the design enterprise. As Gitlin (1995) suggests technology can present dramatic compromises in social activities, role definition, and identity. Consequently, the challenge for the project is to provide support for individuals, rather than create new, technological, forms of dependence. Embodying a philosophy of care into design requires an ethical awareness and recognition of the various ways that technology can impinge on individual care pathways and a sensitivity towards the social implications of any technological intervention.

Cultural probes and the domestic

The settings for our project include a hostel for former psychiatric patients; a stroke

victim and her family and a number of elderly people living at home. The kinds of the research questions we are concerned with include general questions about the organisation and coordination of domestic space as well as more specific issues to do with the availability and use of technologies and their affordances. We have been interested in how users organise their day, the kinds of things they do and how they go about doing them, their use of technology, the organisation of their personal space and so on. One way in which we have attempted to increase the repertoire of available techniques is through the employment and adaptation of ‘cultural probes’. ‘Cultural Probes’ (Gaver et al., 1999), originated in the traditions of artist–designers and have been deployed in a number of innovative design projects (e.g. the Presence project) largely to provide ‘inspiration’ for design activity. We use ‘cultural probes’ as a way of uncovering mundane information from a group that is difficult to research by other means and as a way of prompting responses to users emotional, aesthetic, and social values and habits. The probes furthermore provide an engaging and effective way to open an interesting dialogue with users. The probes have been provocative in eliciting some informative responses; enabling us to overcome some of the ‘distance’ between researchers and users, presenting us with a rich set of materials that grounds our designs in the detailed textures of everyday life. Cultural probes are thereby one way in which we can attempt to meet what Edwards and Grinter regard as the challenge for designers: “... to pay heed to the stable and compelling routines of the home, rather than external factors, including the abilities of the technology itself. These routines are subtle, complex, and ill-articulated, if they are articulated at all... Only by grounding our designs in such realities of the home will we have a better chance to minimize, or at least predict, the effects of our technologies”. (Edwards and Grinter, 2001)

In contrast to standard observational approaches where as Adler and Adler (1998) suggest, “observers neither stimulate nor manipulate their subjects. ...they do not ask the questions research questions, pose tasks for them, or deliberately create new provocations,” with cultural probes the conceptual arts are drawn upon to inform the development of probe artefacts that provoke and so hopefully reveal the motivational forces that shape an individual’s home life. Probes are about understanding people in situ, uniquely not abstractly en masse, and the results of the probe exercise are highly individual, emotive, idiosyncratic and revealing of participant’s personal lives as these ‘fragmentary glimpses’ of people’s home lives are transformed into ‘semi-factual narratives’ informing design.

Cultural probes: inspiration and information

Sensitivity to the feelings of the participants who agreed to be part of our study necessarily involved the choice a range of ‘sympathetic’ data gathering techniques. Some agreed to keep personal diaries of their daily activities. All were also supplied with cameras and voice activated tape Dictaphone type devices in a ‘cultural probe’ pack. The cultural probes pack consisted of polaroid and disposable cameras and photo album, dictaphone, visitors book and scrapbook, post-it notes, pens, pencils and crayons, a set of postcards addressed to the researcher and a map. These were handed out, much like a birthday or Christmas present, and the use of the probes was explained. The probe packs also contained a set of instructions or, in the case of the elderly, a booklet to be completed. The booklet included reference to what rooms were used most often, favourite activities and activities they would like to do or miss being able to perform; the various kinds of technology in use and so on. Further instructions included some suggestions as to how the various devices in the probe

pack might be used. “Draw on the maps, use post-it notes – indicate where you feel safe or threatened – favourite places - places you avoid” or “the diary can be used to record your daily events and actions as well as visitors that you get everyday. You can write in it whatever you like or wish to tell the team”. The stroke victim and her husband also allowed a researcher to record parts of the routine daily home life on digital video. Family histories and biographical background material was provided in the way of photograph albums and informal interviews. Copies of medical records and documents were also provided, all of which served to enrich the detail and scope of the information gathered.

Our probes, whilst consisting of many of the same items and apparently performing many of the same functions – photos, postcards, comments etc – were nevertheless very different from those of Gaver. Not only were they less obviously ‘designed’ or ‘artistic’ consisting of readily available commercial devices with relatively mundane instructions but they were intended primarily as an informational input for design. For Gaver and the Presence project, cultural probes were a device for ‘inspiring’ design. For us, while inspiration would be an added bonus, our prime concern was ‘informational’ – gaining some information on how these people lived their lives, their everyday circumstances, routines and rhythms, their concerns and everyday aesthetics and so on. The use of cultural probes to provide greater information about everyday activities and concerns became one way of identifying and ultimately addressing some of the moral and ethical components of the design enterprise. In this fashion the probes act as instruments both incorporating and facilitating other research approaches; in particular forms of ‘biographical’ research (Gearing and Dant, 1990). Here older people are encouraged to reflect on and reconstruct features of their everyday lives, so that current needs and concerns can be adequately understood – or as Terkel (1985) more elegantly puts it: “In time the sluice gates of dammed up hurts and dreams were opened.” (Terkel, 1985)

Probing aiding concerns

Our fieldwork studies and the probes have indicated some major preoccupations in our different research settings such as an understandable preoccupation with safety and security. Amongst the elderly residents concerns about safety and travel outside the home are reflected in diary entries and are manifested in reduced social contact. These unfortunate circumstances pose fascinating, if distressing, problems for the design of domestic technologies, through highlighting the importance of connections between the home environment and the outside world.

The probes provide us with some notion of the mundane rhythms and coordination of everyday social life. The probes reveal what Zerubavel (1985) would view as the ‘temporal rhythms’ of social life; a notion that provides a method for us to think about activities – visiting people, going shopping, taking medication – repeating themselves over time as they get absorbed into the routine of everyday life in the domain. In the everyday life of the elderly a number of rhythms can be perceived, such as visits to the Church and the visits of friends and relatives that are documented in the diaries. The rhythms of daily activity orient people to their present and future activities and requirements and allows them to plan their activities accordingly. Current activities are crafted with an orientation towards expectations of future events - for example, knowing that a visit and talk, or a trip to the shops or the dentist etc will take place at a particular time.

Technology is required to fit into these temporal regularities or temporal rhythms in order to sustain the patterns and routines of the occupier. The rhythms change

time and design of technology should reflect such rhythms. Bedtime changes with age as do most activity patterns, yet these rhythms are central to dependable design as technology should fit into these patterns and enhance the person's life. If technology ignores the rhythms of a person's life, then it is likely to be unresponsive to the subtle changes that occur throughout the person's day.

What emerges from the probes is a confirmation of the home as a place that is tailored to the individual's needs, taste and aesthetic sensibility. What comes from the probes is orderliness as routinely, unproblematically, recognised and attended to in everyday life. From our perspective design is concerned with interventions into this orderliness – to supporting everyday activities in various ways by impacting on timeliness, reliability, dependability, safety or security. In this way a 'philosophy of care' can be integrated into the design of domestic environments and ubiquitous computing in much the same way as other philosophies have already been incorporated. Accordingly, while these are difficult challenges they should not be overestimated. Despite 'hyped-up' visions of technology as a means of completely transforming home life, successful forms of domestic interactive technologies, no matter how radical, are successful precisely because they are quite routinely, 'made at home' with the social organisation of the domestic environment. Uncovering the detailed nature of the social organisation of domestic life is consequently, essential to both design and development.

Conclusions: moving towards appropriate design

In moving towards what might be termed 'appropriate design' – for 'design with care' – there is a perceptual shift that is required in order to determine the needs of the occupant(s) and reflect these needs within the overall design (Dewsbury, 2001). In 'designing with care' inclusive design criteria are required and while viewing technology as enabling is central to the design process, it is important to recognise that inappropriate design can be debilitating and fundamentally dis-empowering. Both the overall design of the home and the embedding of 'intelligence' into a wide range of everyday appliances often appear to depend on particular, often unverified, models of the social and spatial organisation of the household and domestic activity. Understanding how technologies fit into daily routines is one aspect of design but designers also need to be aware of the broader social effects of technology. There are unforeseen and unpredictable social consequences that can arise when technology is placed into the domestic setting – and the home is perhaps an especially complex and volatile setting. When considering design for care environments, traditional technological approaches need to be supplemented by detailed investigations into everyday life and needs – and 'cultural probes' may prove a useful part of the researcher's repertoire. The turn towards new methods and other disciplines to inspire and inform design is also a product of the changing technological landscape and priorities towards ubiquitous computing, radical technologies and adventurous visions of the future. But despite this imaginative view of future technologies, getting such dreams to 'work' generally means it must, at some point, meet the 'real world' and studies, and new engagements with users to sufficiently ground the design and it is in this context that 'cultural probes' may have something to contribute.

Acknowledgements

This work is funded by the UK Engineering and Physical Sciences Research Council, EQUATOR and Dependability (DIRC) Interdisciplinary Research Collaborations.

References

- Adler P and Adler P (1998)** Observational Techniques. In Denzin and Lincoln (1998) (eds) *Collecting and Interpreting Qualitative Materials*. Thousand Oaks, CA Sage
- Bertaux D and Bertaux-Wiame I (1981)** *Biography and Society, the Life History Approach in the Social Sciences*. London. Sage
- Dewsbury G (2001)** The social and psychological aspects of smart home technology within the care sector, *New Technology in Human Services*, Vol 14 (1), 9-17
- Edwards K and Grinter R (2001)** At Home with Ubiquitous Computing: Seven Challenges in GD Abowd, B Brumitt, SAN Shafer (Eds): *Proceedings of Ubicomp 2001*, LNCS 2201, 256-272, 2001. Springer-Verlag Berlin Heidelberg 2001
- Garfinkel H (1984)** *Studies in Ethnomethodology*. Cambridge. Polity Press
- Gaver W, Dunne A and Pacenti E (1999)** Cultural probes, *Interactions*, Vol 6 (1), 21-29
- Gearing B and Dant T (1990)** Doing Biographical Research. In Peace, S.M. (1990) (ed) *Researching Social Gerontology: Concepts, Methods and Issues*. London. Sage 143-159
- Gitlin L (1995)** Why older people accept or reject assistive technology. *Generations*, Vol 19 (1), 41-46
- Terkel S (1985)** *Working*. New York. Ballantine
- Zerubavel E (1985)** *Hidden Rhythms: schedules and calendars in social life*. University of California Press