

Probing the Probes: Domestic Probes and the Design Process

**Terry Hemmings, Andy Crabtree,
and Tom Rodden**

The School of Computer Science and IT
Jubilee Campus
The University of Nottingham
Jubilee Campus
Nottingham NG1 8BB, UK,
Tel. (+44) 0115 84 66512
Email. {tah; axc; tar}@cs.nott.ac.uk

Karen Clarke and Mark Rouncefield

Computing Department
SECAMS Building
Lancaster University
Lancaster,
LA1 4YR, UK.
Tel. (+44) 01524 5 93097
Email. {k.m.clarke; m.rouncefield}@lancaster.ac.uk

ABSTRACT

The domestic environment is the centre of a great deal of attention in contemporary design communities, yet it is poorly understood. This paper is concerned to elaborate how research approaches may be combined for the practical purposes of making available such settings to the design process. We present the work of members of the two design groups, the RCA and CSEG, and consider how the two groups used probes and ethnographic insights to inform their understanding of context sensitive design.

Keywords

Interaction challenge, understanding context, design methods, ethnography, cultural probes.

INTRODUCTION

In October 2000 the UK's Engineering and Physical Sciences Research Council (EPSRC) launched the Equator IRC (Equator IRC #1). The six-year programme brings designers, social scientists and artists together to develop new technologies that bridge the divide between the physical and digital worlds. One of the primary challenges facing the programme is to devise methods for *understanding interaction* for purposes of design (Equator IRC #2). The interaction challenge is being pursued through a number of concrete experience projects. In this paper we consider the Domestic Environments project, which seeks to respond to the challenge by combining an ethnographic approach with cultural probes (Equator IRC #3).

We explore the practical relationship between ethnography and cultural probes by referencing two 'perspicuous settings' (Garfinkel and Wieder 1992). That is to say, we examine the work of two discrete workgroups involved in the Domestic Environments

'experience' project. Firstly, we discuss the work of the members of the Computer Related Design (CRD) studio at the Royal College of Art, led by Bill Gaver who pioneered the development of Cultural Probes (Gaver et al. 1999). Secondly, we discuss the work of members of the Cooperative Systems Engineering Group (CSEG) at Lancaster University, who have pioneered the use of ethnography in design (Hughes et al. 1994). This group employs a multidisciplinary research team to facilitate the development of enabling technologies. Whilst specific users might have different needs, the settings for care and support is always the home. The (CSEG) Digital Care Project is concerned with improving the quality of everyday domestic life by developing supporting technologies based on a comprehensive understanding of user needs. The CSEG group has an eclectic approach to methods and is presently utilising a number of cultural probe techniques.

In considering the work of these two workgroups we are particularly concerned to elaborate the rationale underpinning the use of probes in both contexts of work, the work involved in the construction of probes, and the different ways in which probes are employed to inform design by both workgroups. We reflect upon the similarities and differences between the two approaches in order to elaborate one possible way in which they may be combined for the practical purposes of design.

UNDERSTANDING CONTEXT

Developing a concrete understanding of naturally occurring culturally constituted domestic activities is of central importance as design moves out of the workplace and into the home. Until recently, the predominant force for application of ICT has been the workplace. Indeed the field of cognitive ergonomics and human factors has long been interested in the study of work, in areas including air traffic control, insurance companies and information technology industries.

Although cognitive science has considered a wide range of work environments, which has resulted in a broader

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understanding of the distributed nature of work practices (Hutchins and Klausen, 1996. Halverson, 1995. Flor and Hutchins, 1992. Rodgers, 1992 and 1993.), the shift from the workplace to the home is not a straightforward one. Consequently, it has been recognised that analytical techniques devised to study the workplace are not readily transferable to the domestic. Consequently, alternative analytical concepts and methods are required that are sensitive to the lived realities of the life in the home.

Compounding the problem is the heterogeneous character of the home. There are as many different types of domestic settings as there are workplace, for brief example – family homes, homes where people live alone, cohabitate or share accommodation, and sheltered residential homes for the aged, physically disabled and mentally frail. Studying the home is every bit as challenging as studying work and will therefore need to incorporate concepts and methods applicable to a wide variety of settings.

CULTURAL PROBES AND THE DOMESTIC

The initial impetus for this paper arose from a methodological interest in ‘Cultural Probes’ (CP) (Gaver et al. 1999), particularly the ways in which non-scientific art and design methods might lend themselves to design studies of socially sensitive settings. We were curious to understand (a) the relationship between CP and the more conventional approaches to design research procedures such as ethnography, (b) how practitioners from different disciplines go about the practical work of operationalising CP’s non-scientific approach to design and (c) the possible ways hybrid methods might provide for opening up novel design spaces.

Essentially, CP’s are objects or artefacts that are purposefully designed to provoke, reveal and capture the motivational forces that shape individual and his or her home life. Designers draw upon the responses to probe objects (which may consist of narratives in the form of written accounts, photographs, and audio recordings) as “inspirational data”.

‘Cultural Probes’ have been deployed in a number of innovative design projects, for example, the Presence Project (Gaver et al 1999). More recently, design projects have been using 'domestic probes' to explore people's home lives. Again, packs of specially designed objects are used to elicit inspiring responses from people. In this instance, CP procedures have been specifically developed for the home environment, hence the name ‘Domestic Probes’. Here the goal is not simply to learn about people's home lives but rather provide inspirational data for speculative design. CP’s “act as a design intervention that elicit... inspirational material while avoiding the understood social roles of researchers and researched” (Gaver 2001).

This experimental approach has two main concerns, on the one hand is the issue of understanding the existing use of technology and on the other, the specific role new technologies might play in supporting domestic ‘values’. (Gaver 2001). The issue of value is not abstract but is concerned with motive:

*There is a danger that as technology moves from the office into our homes, it will bring along with it workplace values such as **efficiency** and **productivity** at the expense of other possibilities.* (Gaver 2001) [emphasis added]

These ‘other possibilities’ are characterised as ‘ludic pursuits’: a notion which is intended to convey and provide an orientation to the ‘playful’ character of domestic life- not necessarily in the sense of entertainment but rather, in the sense that people ‘explore, wonder, love, worship, and waste time’ and in other ways engage in activities that are ‘meaningful and valuable’.

The approach seeks to engage potential users in an ‘inspirational’ exercise, elaborating various motivations underpinning life in the home and in so doing articulate candidate areas and applications for design. It is particularly concerned to articulate the potential role of new technologies through the construction of ‘value fictions’, developing prototypes on the bases of ‘unusual’ or extraordinary motivations in order to question contemporary attitudes to design. In this respect the approach seeks to challenge taken for granted views (of design communities rather than wider society) in a bid to bring about changes in attitudes and perspectives and consequently the design of the domestic.

INSPIRATION OR INFORMATION?

It is important to point out that each workgroup adopted CP’s for different reasons. The theoretical and methodological concerns manifested in the CP approach developed by Gaver et al (1999) is located in the philosophical tradition of the artist-designer. Given the CRD group’s pedigree it is not surprisingly that Cultural Probes play a central role in the CRD approach to design. Alternatively, the CSEG group has a Computer Supported Cooperative Work (CSCW) background and concentrates on bringing ethnographic findings to bear upon design matters. In the Digital Care project, however, the group’s ethnographer has made a pragmatic adaptation of the CP approach in order to be sensitive to the context of the research setting. Introducing a probe package has provided CSEG designers with ways of collecting contextual ethnographic information unobtrusively from a socially sensitive setting

Domestic Probes

Having recruited 20 households from the greater London area, the CRD group visited each for preliminary conversations and left behind 'probe packs'

containing provocative tasks for the volunteers. The packs included cameras, household rules packs, a pinhole camera, a family and friends map, photogram paper, a domestic routine diary and camera, a listening glass, a pad for drawing floor plans, a dream recorder, a bathroom pad, a visitor's log and a telephone pad.

The hundreds of returned items, both text and images, serve as a rich resource providing a myriad of fragmentary glimpses into peoples' domestic lives and aspirations. Gaver reports:

In February 2001, we placed advertisements for volunteers in a variety of London publications -- Loot magazine, the Evening Standard, Time Out, and Country Life. We visited the first 20 volunteers and gave them Probe packs. The returns offer fragmentary glimpses into the rich texture of people's home lives. They allow us to build semi-factual narratives, from which design proposals emerge like props for a film.

Assembling Probes

Generating ideas and constructing innovative and effective probes involves a range of skills, experience and working knowledge of cutting edge design matters. It also requires an understanding of graphic design, craft skills such as model making, and skills in the use and deployment of computer based design packages. An appreciation of the putative aesthesis and sensitivities of the then unknown volunteer adjunct researchers/participants, also demonstrates the skills required in constructing CP's. These skills are combined with a range of more mundane contingent matters including a working knowledge of material costs and availability.

During the early period of their work, members of the group regularly discussed their proposed project at length. Our arrival occurred just after the start, when planning consisted of designers talking through the ways they envisaged their work could be organised. In this way, they began the process of organising the ways in which the work could be distributed amongst the group. Talking provided a way of elaborating and sharing their knowledge of design and established a sense of just who had practiced skills and experience, and in which particular area of design work. Conceptual matters were also a design issue and featured at this stage in designer's talk.

Over this period, the group arrived at a tacit agreement about the rules that govern the form, functions and aesthetic properties of a CP. The design requirements or brief (although it was never expressed in such a way) for any probe object or artefact was that it should be capable of probing and recording participant's feelings about their life and their home, eliciting some kind of emotional response, ideally invoking a different form of response that fits within a category of acceptable emotional responses e.g. playfulness, anger, sadness etc. It is clear that design work here was very much a case of anticipating known in common experiences.

The practical work of designing, constructing and assembling the Domestic Probes Pack started at the very beginning of the project and had continued throughout the planning, recruitment and selection phases. The group had come to an agreement that they would include a *probe camera* - a repackaged disposable camera. Using the camera, volunteers were instructed to photograph the spaces, objects, scenes and people in their domestic environment. Printed on the back of the camera were questions that included: "*who lives in your home*", "*your most private object*" and "*a photo at 8pm on a Sunday*".

The camera itself is not an unusual object. What is unusual, however, are the recommendations for its use. The design 'problem' was to contrive to make the functional use of the camera an aesthetic experience. The theory here was that using *this* camera could afford participants with an exceptional experience. 'Strangifying' or distorting the appearance of an ordinary object would, it was argued "encourage from respondents a slightly detached attitude to our requests" (Gaver 2001). To achieve this, a disposable camera was repackaged by a member of the CRD team. Materially, the cameras packaging was transformed into something that had the look and feel of an 'aesthetically crafted' object rather than a commercially manufactured consumable. The objective here was to attempt to "reduce the distance between the designers and the participants through the probe packages" (Gaver, 2001).

RESIDENTIAL PROBES

In contrast to the 'inspiration' approach as utilized by the CRD group, the Digital Care ethnography used the probes for 'information'. This is a response to the particular problems of using ethnographic techniques in sensitive, care-oriented settings. Ethnographic studies claim to provide a 'sensitising' to the 'real world', 'real time' character and context of everyday life and the facilitation of what Anderson (1994) calls 'the play of possibilities for design', in this case the socially organized, naturally occurring uses of technology in domestic interaction in a care setting.

Over the past three decades or so ethnography-oriented techniques have emerged that have promoted an understanding of the nature of organisations and the different forms of interaction that underpin organisational life (Baillie and Benyon, 2001). Ethnographic approaches to field studies continue to produce valuable insights into existing and emerging work practices of use (Hutchins 1995). However, the use of ethnography-oriented techniques for studying social settings such as the home is relatively immature and under evaluated by comparison. This is partly because it is a relatively new area of study but also, and of at least equal importance, because the ethnographic techniques themselves are constantly adapting to the setting or domain being studied.

The 'Digital Care' project employs a multidisciplinary research team to facilitate the development of enabling technologies to assist care in the community for particular user groups with different support needs. The general aim is to examine how technology can be used to provide various kinds of support to sheltered housing residents and their staff. The setting for the project is a hostel and nearby and associated semi-independent living accommodation, managed by a charitable trust, for former psychiatric patients. The hostel is the initial home for former psychiatric patients leaving the psychiatric wards of the local hospital that are themselves in the process of being closed down as part of a more general move towards 'community care'. In the hostel, residents are provided with a room and are monitored and helped to develop independent living skills by a number of qualified staff. Residents then move on to another, semi-independent living site, which is sheltered housing consisting of a number of flats and bed-sits, prior to eventually moving out to flats in the local area, or, if they are deemed to need further and continuing support, back to the hostel. Emphasis is on the learning of daily living routine and skills and consequently any technology introduced should contribute to this goal.

One objective of the 'Digital Care' project is to improve the quality of everyday life by building and adapting technologies for a range of user groups and application domains. Consequently, it is very much concerned with developing supporting technologies based on a comprehensive understanding of user needs. A technology that merely completes a task for residents does little in producing independence but merely shifts reliance onto the technology. Thus, the emphasis here is on assistive or enabling technology.

Within the 'Digital Care' project, the methodological response to the issues raised by our focus on context and user-led design has taken a number of forms and remains under active consideration and revision. CSEG are exploring and modifying various forms of observational and ethnographic study, user-centred design and evaluation and the use of 'residential probes'. The specific focus is on technological intervention to support everyday life. Observational studies have been supplemented with relatively informal interviews and, what some might call 'technological tours' (Blau 1964). The interest is in how residents organize 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.

'Cultural probes' have been adapted in the Digital Care project as a way of uncovering information from a group that is notoriously difficult to research. In this particular case, the residents involved in the study have medical conditions, e.g. paranoia, which would make conventional observation techniques at least inappropriate and potentially damaging. They are also a

way of prompting responses to areas that are equally difficult to uncover - users emotional, aesthetic, and social values and habits. 'Residential Probes' - in this case consisting of various Polaroid and disposable cameras, diaries, maps, Dictaphones, photo-albums, and postcards etc) - were a method of supplementing ethnographic investigations, and as an engaging and effective way to open a dialogue with users. The aim here is to elicit new and different information through using the probes, anticipating that they could be used to provide more substance to design ideas that had surfaced in the course of the interviews or observational periods. Although this project is in only its early stages, it has already resulted in prototypes for a self-medication device and communication devices for staff

DISCUSSION

Our analysis of the studies carried out by the CRD group at the RCA and CSEG group at Lancaster University provides one of the first evaluations of the interdisciplinary approach which has led to the adaptation of methods across disciplines in the use of participatory approaches to design oriented practice studies.

The techniques developed to study the workplace may, on the face of things appear inappropriate when applied to the differently organised institutional social settings such as the home, whatever form that takes e.g. care. Technology design approaches that have emerged from the workplace have, quite rightly, been situated within the core rationalities of production, efficiency and the organization of labour. However, it is debatable whether these post-Fordist principles could be applied to small but complex social environment glossed as the 'household'. The utilisation of Cultural Probes is a way of addressing the methodological challenge posed by the 'home' setting. We are aware that there are many relevant issues concerned with the purported differences in the study of home and work settings and the blurring of the boundaries between the two. One consequence of the shift in emphasis from the workplace to the home is that it has provoked a reassessment of approaches for (a), analysing and representing domestic life then (b), conveying the 'findings' to designers

For those engaged in formative design studies of social settings, the creation of future technologies for domestic environments offers a number of interesting challenges. Gaining a comprehensive understanding of needs or an insight on user requirements in such domains is central to this. Predominant in designing for future domestic environments is the key research issue of understanding the everyday character of the existing social and physical arrangements within the home; how people live (and sometimes work) together in the home, what they do when they are at home, and the existing and potential role of technologies within the milieu of domestic activities. Consequently, understanding the relevance of context specific behaviors and the situated use of

technologies are elements that should have relevance in the design space, along side fundamental cognitive notions such as tasks of tools (Hutchins 1995).

Clearly, both groups are using Probes type devices as part of an ongoing design process. The trajectory followed by the CRD group over the first two years starts with design-driven methods for understanding people. This phase will be followed by concept proposals and technology explorations, and tests of novel configurations of technologies in participants' homes. It is important to note that members of the Home Technologies design group were not coming to the project as complete novices. Each member had practical, practitioner-based experience in the design community and so fully understood the user-centred, design-driven process. In addition, each member of the group has had either direct experience¹ or was familiar with the Cultural Probes approach.

Before the substantive work of designing domestic technologies could begin however, the CRD group was faced with a preliminary 'design challenge'- how could familiar objects and artefacts be reconfigured in such a way that, not only were they capable of triggering emotional reactions in a respondent but that they were able capture the context in which those responses were occasioned. In short, the function of all domestic CP objects is to capture for analysis the motivations that shape home life (Gaver 2001).

Unsurprisingly, each of the five members of the group appeared to share a common disciplinary approach to computer related design. It was, however, apparent from their talk that each oriented to probe design issues in different ways. As individuals, they were hired for the particular skills and knowledge they could contribute to the project. All acknowledged that as a 'team' their fundamental problem was a practical one- how to design probe object that would be perceived and function in the way in which it was intended. There was much talk about the 'appropriate' use of a Domestic Probe object. There was also a concern that the normative understanding of the use of everyday objects would prohibit an interpretive response. Using Probe objects required participants to be creative, to think about what they take for granted and report upon that which is intimate, private often deeply personal. The group worked together to compose a form of words that would provide clear instructions on how to use the object i.e. guidance on how to get objects such as a camera or a tape recorder to function correctly. Embedded in these instructions were also cryptic clues on when and where they should be used. As Gaver makes clear:

".. we were after "inspirational data" with the probes, to stimulate our imaginations rather than define a set of problems. We weren't trying to reach an objective view of ... needs through the probes, but instead a more impressionistic account of their beliefs and desires, their aesthetic preferences and cultural concerns".

We are not aware of the existence of a document that formally recorded the group's plan or laid down a schedule of proposed work to be done but that is not to say that a plan did not exist. The 'plan' for the work of designing and producing the probe, and the design work that resumed as probes returned, was regularly invoked throughout the time of our study in and through the talk of the members of the group. As the daily work proceeded there would inevitably be situations or events that called for variations in the plan. The plan was flexible, revisable and ultimately contingent on indefinite variables.

As we have remarked this group, like many other groups of knowledge workers, spend a great deal of their time talking. This talk enabled them to know what is relevant. Talking about designs involved the use and development of their specialist vocabulary. This ongoing knowledge, together with personal experience, acquired skills and an understanding of the history of previous Cultural Probes studies provides both the contextual framework for their expectations and the resource for design work.

This 'talking' about the work continued throughout our visits and appeared to be just as integral to the creative process as the work of computer-based design skills. Understanding and using a range of professional CAD applications was a skill each member regularly employed in their work.

The Lancaster group's probe pack consisted of a camera, an event diary, maps, an audio tape recorder and postcards. These objects provided a way of eliciting and recording information from a group that would be difficult to study by other ethical means, and as a way of prompting responses to users emotional, aesthetic and social values and habits. Incidentally, handing over and collecting the probes proved to be appropriate opportunities for unstructured interviews with users. Apart from some colour coordination and their appearance as 'presents' the general approach has been to make the probes stimulating and fun (though, as it turned out, they could be 'too much fun' and in one instance resulted in 'rude' photos of various residents). To give some examples of the probes - residents were supplied with Polaroid and disposable cameras and asked to take photos of their rooms, things that were important to them and were asked to put the Polaroid photos in the photo album supplied with the probe pack and "write what you like about them, why you took them, any thoughts...." and were provided with 'post-it' notes to attach any comments. The provision of disposable cameras provided the researchers with a useful opportunity to open up a friendly dialogue with residents based around the return of the developed pictures. Another probe was a map of the local area and various colored pens and 'post-it' notes to enable residents to indicate favorite places, areas where they felt safe or threatened and so on. In this way the probes

clearly had an 'informational' focus as opposed to Gaver's emphasis on 'inspirational' use.

Participatory design has, necessarily always been sensitive to the political context of design. In the case of 'Digital Care', the project, and any associated technical development, takes place within a particular political and moral framework. The challenge for design in these settings therefore, is not just to recognize this dilemma but to steer a careful path through this moral minefield. Embodying a philosophy of care into design necessitates considering issues of empowerment and dependence and then thinking how these might usefully become incorporated into design guidelines.

CONCLUSION

One of the objectives for this paper was to explicate the practical, real world nature of creative and imaginative design work. However, readers will no doubt be aware that there is a variety of discipline-led approaches to design research (psychology, cognitive science, sociology, engineering etc). The existence (or co-existence) of this range of approaches is not in itself an issue here. That said, what is problematical is that a discipline's philosophical attachment to certain theoretical matters drives an attachment to particular methodological procedures. This preoccupation with methodology often masks what is really required, 'a more adequate- often more detailed- rendering of the domain being designed for' (Sharrock & Hughes 2002). We demonstrate how two seemingly discrete disciplines deal with this apparent problem.

This paper provides an initial evaluation of both these user-centred approaches to design studies and asks whether current approaches to the design of new technologies are appropriate in such intimate and sensitive settings. Both groups have begun to explore some of the methodological options opened up by the use of 'cultural probes' and a combination of a derivation of cultural probe and ethnographic study (Kember et al 2002)

For the authors, providing an ethnographically oriented view of just what 'doing' design studies consists required that we attempt to relay our understandings that have been 'appropriated' (Sharrock & Hughes 2002) during our field study. It also illustrated the way in which the ethnographic approach is in itself an intrinsically collaborative affair, particularly the participant observation techniques.

This notion of collaboration extends to the work we observed in the CRD studio - it could be characterized as an intra-collaborative achievement. Design work here is plainly a social activity that involves and is organised around the sharing and exchange of ideas. We observed that, in and through their talk, members of the group exchanged personal information and continually repaired their understanding about each other. These

ongoing biographical exchanges provide each member with context for their own, the group and participants behaviour. Seen this way, contextual knowledge provides a way sensitising and accommodating each other's actions and ideas in an appropriate manner.

A key issue brought out through our evaluation of the work of the CRD team indicates that much of the apparent gathering of 'inspiration' rests on ethnographic 'information' gathering techniques. It is clear that, in the course of the visits to the homes of volunteers, designers were implicitly involved in eliciting ethnographically-oriented data. This in turn provided a contextual sensitivity to the individual settings. We would argue that it would be a mistake to try to separate the mutually constitutive activities of designing and deploying Cultural Probes and the gathering of information about volunteers' home lives. From our evaluation, the apparent methodological dichotomy that results from an attachment to theory is dissolved in practice.

The probes deployed in the Digital Care project were certainly less well or less obviously 'designed' than those produced in the CRD studio. Despite this fundamental difference of focus, there are also some similarities in the way cultural probes have been used. Like Gaver the CSEG group envisaged probes having a provocative in eliciting informative responses;

"we anticipate that the probes, the feedback on them as well as the periods of observation has enabled us to overcome some of the 'distance' between us and the residents and staff at the hostel" (Kember et al 2002). In this sense we would concur with Gaver's statement that: "The cultural probes were successful for us in trying to familiarize ourselves with the sites in a way that would be appropriate for our approach... They provided us with a rich and varied set of materials that both inspired our designs and let us ground them in the detailed textures of the local cultures" (Gaver 2001)

No doubt, the art and design philosophy underpins the probes approach, and the anti-scientific stance that many might find novel and appealing. Probes, however, are primarily concerned with understanding people *in situ*, uniquely, not abstractly *en masse*. The results of the probe exercise, in both cases, demonstrate, as one might expect, the highly individual (emotive, idiosyncratic) nature of participants' home lives.

To sum up, we would argue much of the design work in the domain of the 'home' has been technology rather than 'needs' led - perhaps because gaining a comprehensive understanding of needs or a perspicuous view on user requirements in this domain poses a number of interesting and difficult methodological challenges. It is not just that many of the important ethical and deployment issues concerning the development and evaluation of real systems remain unexplored, but that methods for understanding and

incorporating specific context in such a complex setting are relatively under-developed. The extent to which the relatively well developed methods used to understand work environments can simply be transposed to investigation of domestic environments is doubtful, and 'care' settings in particular represent a very different set of design and methodological challenges. Preliminary research of the Equator projects suggests that new conceptual models, theories and guidelines are needed, but that variations on the idea of a cultural probe may suggest a way forward.

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