

Probing the Probes

'Inspiration is not the special property of an elite but can be found in everyone'

Jean Dubuffet

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

The School of Computer Science and Information
Technology
The University of Nottingham
Jubilee Campus
Nottingham NG1 8BB,
UK
+ 44(0) 1158466512
tah,axc, tom@cs.nott.ac.uk

Karen Clarke and Mark Rouncefield

Computing Department
SECAMS Building
Lancaster University
Lancaster
LA1 4YR
UK.
k.m.clarke, m.rouncefield@lancaster.ac.uk

ABSTRACT Ethnographic studies of technology have focused on trying to understand the socially organised, naturally occurring uses of technological artifacts in socio-technical systems. This paper describes the design work of two separate research groups utilising 'cultural probes' as a mode of participatory design for domestic settings. The first group created specially designed probes to analyse the motivations that shape home life, to inspire future designs. The second group used a cultural probe derivative as an adjunct to an ethnographic study of a sensitive 'home' setting – a sheltered housing complex – and used them for 'information' rather than 'inspiration'. The paper outlines an innovative evaluation of the production, use and methods that inform the use of probes for a participatory design and explore the ways in which cultural probes and probes hybrids might present alternative strategies for exploring 'sensitive' settings.

Keywords

Methodology, participatory design, cultural probes, domestic probes, ethnography, art and design, design practice, home, workplace.

ISBN 0-9667818-2-1.

In *PDC 02 Proceedings of the Participatory Design Conference*, T.Binder, J.Gregory, I.Wagner (Eds.) Malmö, Sweden, 23-25 June 2002. CPSR, P.O. Box 717, Palo Alto, CA 94302 cpsr@cpsr.org
ISBN 0-9667818-2-1.

INTRODUCTION

In October 2000, the UK Engineering and Physical Sciences Research Council (EPSRC) launched the Equator IRC (Equator #1). The six-year programme is a collaborative venture spanning eight research partners¹ and multiple disciplines including computer science, electronics, social science, psychology, art, design and architecture.

Equator research groups are creating devices and software platforms to interweave the physical and the digital in new ways. Research groups are developing innovative methods for designing and evaluating these technologies. From the outset, the Equator programme has been committed to combining these technologies and methods in a series of large-scale 'collaborative' projects that directly engage users in the design process. In practice, this grounded approach has resulted in a series of practical evaluations that directly involve the participation of users through collaborations with museums, performance groups, community support groups, care organizations, schools and other user collectivities.

One of the fundamental challenges facing the Equator programme is to devise methods for *understanding interaction* for the purposes of design. In this paper, we discuss how two design groups responded to the challenge, through an exploration of their work.

Both these design-oriented workgroups are involved in separate but related *experience projects*. First, we discuss the design and interpretation work of the Computer

Related Design Studio (CRD) group based at the Royal College of Art, UK. They are led by Bill Gaver, who pioneered the development of Cultural Probes [6]. This group of designers is involved in Domestic Environments Project that is developing innovative applications of technologies in the home. This is followed by an introduction to the work of members of the Cooperative Systems Engineering Group (CSEG) in the Department of Computing at Lancaster University, who have pioneered the use of ethnography in design [4]. This group employs a multidisciplinary research team to facilitate the development of enabling technologies to assist care for specific user groups with different support needs. The Digital Care Project is concerned with improving the quality of everyday 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 utilizing a number of cultural probe techniques.

Our investigation of the work of these two groups is not solely concerned with evaluating the methodological rationale that underpins the use of the cultural probes approach. The aim is to promote an understanding of the ways in which methods and procedures, strategically combined, produce beneficial outcomes for collaborative design work.

THE CULTURAL PROBES 'APPROACH'

The initial impetus for this paper arose from a methodological interest in 'Cultural Probes'. 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 the relationship between (a) the Cultural Probes and the more conventional collaborative approaches to design research procedures such as ethnography, and (b), how practitioners from different disciplines go about the practical work of operationalizing Cultural Probes' novel non-scientific approach to design.

The Cultural Probes approach [7] has recently gained some prominence as means of 'inspiring' interactive design. We employ the notion of a 'Cultural Probes' as a generic term that glosses a distinct methodological approach, and so incorporates technology probes, domestic probes and the like. Within a domestic context, the approach is concerned to address both what role technology might play in the home of the future and, specifically, how it can support existing domestic values. The Cultural Probes approach, Gaver argues, "*act[s] as a design intervention that elicits inspirational material while avoiding the understood social roles of researchers and researched*" [6]. For Gaver, the 'inspirational' approach, utilized by the CRD team, brings the user closer

to the design space in a way that is seemingly different from conventional ethnographic methods. In particular the variety widely used in domains such as Computer-Supported Cooperative Work (CSCW) to uncover, elicit or validate 'requirements' for technologies.

Our initial analysis is based on an ongoing investigation of the design domain and incorporates what can best be described methodologically, as taking the ethnomethodological turn to studies of work. Following Sharrock and Hughes recommendation, our approach places an emphasis upon the extent to which our reports are joint productions- things that have been orchestrated by us and those under study [12]. Secondly, it emphasizes the "extent to which the organization of the social setting is a 'joint construction'- something that is done *between* and *together* by the participants in the setting" [their emphasis]. We would argue that it might also be analytically useful if the notions of participation and collaboration were elaborated to include inter-collaboration- with the 'subjects' of study (lay members) and intra-collaboration- between researchers (experts).

INFORMATION OR INSPIRATION?

It is important to point out that each workgroup adopted Cultural Probes for different reasons. The theoretical and methodological concerns manifested in the Cultural Probes approach developed by Gaver and Dunne [7] 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.

Cultural Probes have been deployed recently in a number of innovative design projects, for example the Presence Project [5]. In this study, the Probe pack (See figure 1), comprises a collection of materials specifically designed to elicit inspiring responses from people in domestic environments. Probes objects are viewed primarily as a way of capturing a sense of emotional forces that shape people's home lives.



Figure 1. Domestic Probe Pack

Designers draw upon Probe returns as “inspirational data” for their design work. In the CRD study probe objects include: cameras, household rules packs, a pinhole camera, a family and friends map, photogram paper, a domestic routine diary, a ‘listening’ glass, a floor plan sketch pad, a dream recorder, a bathroom pad, a visitor’s log and a telephone pad.

DESIGNING CULTURAL PROBES

We now move on to a brief overview how the work of designing and constructing Probes gets done. To begin with, we have provided a list of headings outlining a schedule¹ of probe design activities.

1. Planning
2. Recruiting Participants.
3. Selecting Volunteers.
4. Assembling Domestic Probes.
5. Deploying Domestic Probes.
6. Retrieving and Analysing Probes.
7. Speculative Design.

Having recruited 20 households from the Greater London area, the CRD group visited each household to conduct preliminary conversations and leave behind ‘Probe Packs’ containing provocative tasks for the volunteers. The returned items provided a range of text and images media that provided a myriad of fragmentary glimpses into peoples’ domestic lives and aspirations.

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 and product design, craft skills such as model making and photography, together with a range of skills including the use and deployment of a range of computer based design programmes. CRD designers regularly demonstrated a tacit appreciation of the putative aesthesis and sensitivities of the volunteer participants. Moreover, these professional skills are seamlessly combined with an ability to deal with an indeterminate variety of mundane contingent matters. For example, the types, forms and potential functional

properties of a vast range of material and mediums together with a broad working knowledge working of their costs and availability.

Essentially, Domestic Probes are purposefully designed to provoke, reveal and capture the motivational forces that shape an individual and his/her home life. CRD designers’ work regularly involved informal and impromptu discussions in the studio and other locations. During these work oriented conversations, ideas for probe objects were ‘worked up’ through a process of organising a working division of knowledge and labour. Visualisations in the form of crafted prototypes, models, sketches and/or verbal descriptions of objects were all considered candidate material for design discussions.

In short, talk was central to the design process; in that assessing ‘just what counted’ as ‘appropriate’ for a probe object, was a negotiated matter. A tacit local working agreement, on what functional and aesthetic qualities were relevant for an object to be classified as a candidate for inclusion, was arrived at and maintained in and through the talk of the designers.

In terms of the specific details, however, most of what was observed consisted of a complexity of practical sequential activities that emerged during the course of work rather than follow predetermined process. Time does not allow for a full account of each step in the process. We focus on selected stages in the designing of the probes themselves, and the ways in which the CRD team develop their ‘inspirational’ probes to inform a participatory approach.

Planning

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 organized. In this way, they began the process of organizing 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 Cultural Probe. The design requirements or brief (although it was never expressed in such a way) for any probe object or artifact was that it should be capable of probing and recording participant’s feelings about their life and their home, eliciting some kind

¹ The headings used here are for presentational purposes and do not necessarily reflect the real-time temporal ordering of the work.

of emotional response. Ideally, each probe object should be capable of 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.

To sum up this formative stage of the project, much of the designers work was concerned with talking through plans. They 'bounced concepts off each other', 'knocked ideas about', made suggestions, recommendations and endorsements regarding the possible properties a probe object could embody. They talked over putative responses certain 'kinds' of objects 'might' elicit and, what features functioned to provoked 'these' reactions. Together, during their 'working' day in the studio, during coffee breaks and later in the bar, they spent a lot of time arguing and joking, made up stories, made sketches, kept notes, and talked over previous and possible scenarios. In short, they worked up the detailed form and function of the Cultural Probes.

Selecting Volunteers.

The CRD group had initially carried out a mail drop as a first attempt to recruit volunteers for the project. However, the response to such unsolicited mail was poor. In February 2001, advertisements for volunteers were placed in a variety of popular London publications - *Loot*, *Evening Standard*, *Time Out*, and *Country Life*. The administrative staff at the RCA was responsible for fielding the telephone responses from candidate volunteers and sending out pre-printed acknowledgements. Information regarding the number of responses and descriptive accounts of 'interesting' telephone calls were relayed to the CRD designers. These versions of the telephone conversation provided the CRD team with verbal images of the 'type' (social type) of person the administrative staff recognized making the call.

Volunteers deemed to be suitable candidates for consideration were visited at home, usually by two members of CRD designers. These initial meetings provided an opportunity for the CRD designers to assess the candidate 'suitability' and to survey the candidate's home. The meeting also provided the opportunity for the designers to explain in more detail the context of the study and gauge the initial reaction of candidates. This first meeting provided the appropriate opportunity for the designers to enquire about the participant's personal circumstances and family history and domestic living arrangements. Invariably, they would be invited to look round the home. Participants would be later informed, usually by telephone, if they were successful. Providing firm dates for probe pack delivery was initially difficult, as

they had not at that time been completed. Post cards and envelopes incorporating initial enquiries from the project were used "to keep participants interested and involved" and provided additional background information. Arrangements were made some time later to arrange mutually convenient dates for the delivery of probe packs.

It is interesting that non-design administration staff contributed significantly to the study through their involvement in the designation of suitable volunteer candidates. The skills required to select 'appropriate' candidates were not grounded in any design philosophy, but rested upon their tacit knowledge of designers and their lived experience.

Assembling Probes

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. Almost from the very beginning of the project the group had come to an agreement that they would include a camera but one that would be used in a quite specific way. The "*PROBE CAMERA*" (see figure 2) - was a repackaged disposable camera.

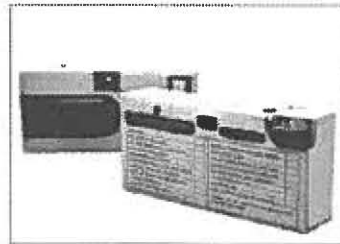


Figure 2. Probe Camera

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" [7]. To achieve this, the camera- a cheap, disposable, but nevertheless professionally designed device - was repackaged by a member of the CRD team. Materially, the cameras packaging was transformed into 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 intervention of a probe [object]” [5].

CULTURAL PROBES AND THE DIGITAL CARE PROJECT

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 [9] claim to provide a ‘sensitizing’ to the ‘real world’, ‘real time’ character and context of everyday life and the facilitation of what Anderson [1] 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 [2]. With its early focus on business systems and office automation the ICT community has, over time, incorporated a range of techniques to support design particularly for workplace environments [13]. Ethnographic approaches to field studies continue to produce valuable insights into existing and emerging work practices of use [10]. 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.

What follows is an account of the use of a CP derivative for the Digital Care project. This will then allow for a comparative analysis of the ‘inspiration’ and ‘information’ deployments of CP’s, highlighting our main themes exploring the nature of participation and design in these two approaches and the roles of the researcher and the researched.

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 location 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. At present CSEG are exploring and modifying various forms of observational and ethnographic study, user-centred design and evaluation and the use of ‘cultural 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’ [2]. 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 organization 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. ‘Cultural Probes’ - in this case consisting of various Polaroid and disposable cameras, diaries, maps, a tape

recorder, 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 [13]. A PD-oriented design workshop with the staff has also been held.

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 might take e.g. a place of care and support. 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. We deal with this particular debate elsewhere [8].

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. A notable exception here is of course the Scandinavian design school. Here, there is a long history of participatory design that has developed into a practice imbued with notions of the community and the sociality of design. For example, the cooperative/participant design research studies of domestic life of Bjerknes et al [4], Bødker et al [in 4] and, more recently, the 'interLiving' project [16].

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 [9].

Clearly, both groups are using Cultural Probes 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-centered, design-driven process. In addition, each member of the group has had either direct experience² or was familiar with the Cultural Probes approach [6].

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 artifacts 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 [6].

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 CP 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 sets of instructions were cryptic clues as to when, where and how 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 a range of indefinite variables.

As we have previously 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 color 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' [14]. 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 [13]. For the authors, providing an ethnographically oriented view of just what 'doing' design studies consist required that we attempt to relay our understandings that have been 'appropriated' [14] 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 organized 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 behavior. Seen this way, contextual knowledge provides a way sensitizing 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 and their 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" [13]. 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" [6].

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 eliciting needs 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.

ACKNOWLEDGEMENTS

This research was funded by Equator IRC, EPSRC. GNR/N15986/01 (www.equator.ac.uk).

We are grateful to our partners from the Royal College of Art and Lancaster University. In particular Andy Boucher, Bill Gaver, Brendan Walker, Sarah Pennington. Keith Cheverst and Stewart Kember.

REFERENCES

1. Anderson. R. (1994) 'Representations and Requirements: The value of Ethnography in Systems Design' *Human Computer Interaction*, Vol. 9 pp 151-182.
2. Baillie, L. & Benyon, D. (2001) *Investigating Ubiquitous Computing in the Home*

- in *Proceedings of the 1st Equator Workshop on Ubiquitous Computing in Domestic Environments*. <http://www.equator.ac.uk>
3. Blau, P.M. (1964) *The Dynamics of Bureaucracy: A Study of Interpersonal Relations in Two Government Agencies*, Chicago: University of Chicago Press.
 4. Bjerknes, G., Ehn, P., and Kyng, M. (1987) *Computers and Democracy: A Scandinavian Challenge* Avebury, Aldershot, UK.
 5. Gaver, W. (2001) *The Presence Project*. Computer Related Design Research Studio, RCA, London.
 6. Gaver, W. (2001) 'Cultural Probes- Probing People for Design Inspiration'. SIGCHI.DK
 7. Gaver, W., Dunne, A., and Pacenti, E. (1999) Design: Cultural Probes in '*Interactions: New Visions of Human-Computer Interaction*'. ACM Inc., Danvers, MA.
 8. Hemmings, T.A., Clarke, K.M., Crabtree, A., & Rodden, T. "Domestic Probes and the Design Process" paper accepted for ECCE 11, Catania, Sicily, September 2002.
 9. Hughes, J.A., King, V., Rodden, T., and Anderson, R. (1994) "Moving out of the control room: ethnography in systems design". *Proceedings of the 1994 ACM Conference on Computer Supported Cooperative Work*, pp429-438, Chapel Hill, North Carolina: ACM Press.
 10. Hutchins, E. (1995) *Cognition in the Wild*, Cambridge, Mass, MIT Press
 11. Hughes, J.A., King, V., Rodden, T., and Andersen, H. (1994) "Moving out of the control room: Ethnography in systems design. In *Proceedings of CSCW '94*, Chapel Hill: North Carolina.
 12. Luff, P., Hindmarsh, J. and Heath, C. (eds.) (2000) *Workshop Studies: Recovering Work Practice and Informing Systems Design*, Cambridge: Cambridge University Press.
 13. Kember, S., Cheverst K., Clarke, K., Dewsbury, G., Hemmings, T. Rodden, T. and Rouncefield, M. (2002) "*Keep Taking the Medicine: Assistive Technologies for Medication Regimes in Care Settings*" Forthcoming
 14. Sharrock, W. Hughes, J. A. (2002) '*Ethnography In The Workplace: Remarks on its theoretical bases*' in Team Ethno-online Issue 1, November 20002. <http://www.teamethno-online.org/index.html> ISSN 1475-0872
 15. Suchman, L. (1983) "Office procedures as practical actions: models of work and systems design". *ACM Transactions on Office Information Systems*. Vol. 1 (4).
 16. Westerlund, B. (ed.) (2001) '*Cooperative Design with Families*'.interLiving deliverable D1.1 CID/NADA. :KTH: Stockholm, Sweden. ISSN 1650-8009. <http://interliving.kth.se>

¹ The University of Nottingham (coordinating partner), The University of Bristol, The University of Glasgow, The University of Lancaster, The Royal College of Art, The University of Southampton, The University of Sussex, and University College London