Probing Designs: Designing Probes

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ABSTRACT
This position paper reflects on the use of cultural probes in design. In detailing our use of probes we analyse their contribution to design. Using probes data from the study of a climbing club we reflect on how probes might 'work' for design.

Categories and Subject Descriptors
H.5.3 [**Information Interfaces and Presentation**]: Group and Organisation Interfaces – *evaluation/methodology*.

General Terms
Design, Human Factors

Keywords
Cultural probes, ethnography, design.

1. INTRODUCTION
This position paper documents and reflects on the use of cultural probes in design work. In detailing our use of probes we want to consider and analyse what they bring to the design enterprise. In this process we also want to consider, to reflect on how they 'work' so that we may think more clearly about any future use or deployment. Our use of probes in various technology design projects – and, indeed, our employment of social scientists - can reasonably be attributed to the 'turn to the social' in design. It is a commonplace observation that systems design - faced with numerous and costly failures generally consequent on a failure to consider the social circumstances of use - has experienced a 'turn to the social', exemplified in the widespread referencing of Suchman's *Plans and Situated Actions* [17] (though often without fully understanding it). As Dertouzos [6] notes, systems are not being designed in a human-centric fashion. *"The important quest for the balance of this century is to make our information systems human-centered. We should raise them from their lowly mechanistic levels to where they can serve us by carrying out what we need done-be easily understood by them, offload our work on them, get the information we want when we want it, and work with others effectively across space and time."* Dertouzos (2001)

Of course we are all in favour of this – and who wouldn't be?. However, we also observe that often the 'turn to the social' has meant a turn to theory, sociological theory, psychological theory, cultural theory, and the consequence appears to have been endless disappointment. In contrast we believe that the turn to the social should involve the careful employment of social science methods (though not necessarily social scientists) for uncovering design relevant details from the domain.

We are interested in designing technologies that will assist people in their work, their activities, in a range of mundane, if often sensitive, settings: the home, a hostel, a hospital and, the focus of this position paper, a club or community. Of course all complex social interactions are 'sensitive' and even within mundane settings it often transpires that certain details of how people organise themselves may prove 'sensitive'; at least in the sense of often not being readily amenable to conventional techniques such as questionnaire or interview. To do design work we need to know something, some mundane, yet often sensitive, details about how particular groups of people, members of the climbing club in this case, lead their lives: what they do, moment by moment; what notable regularities there might be; and the availability and mundane use of technology. For us the design issue is, and always has been, to pay heed to grossly observable, stable and compelling routines, and to ground our designs in the everyday realities of the setting and thereby minimise the likelihood of producing the kind of stupid mistakes that litter design.

While we have long been advocates of ethnographic methods, we readily acknowledge that these methods can be intrusive, disruptive and inappropriate in certain settings. Consequently we have endeavoured to supplement observational work with a range of other approaches, the most notable of which is the use of 'probes', technology probes and cultural probes. Our use of probes to supplement ethnographic, observational techniques with 'cultural probes' was inspired by Gaver et al's [10] description of their deployment in the Presence project to investigate the lives, hopes and fears of the elderly in three European countries. They used postcards, photos etc as 'inspirations' for the design of technologies. Our aim has always been much more modest and mundane. We simply wanted to know more. We wanted information about people's everyday lives and experiences in the belief that these would provide a range of sensitivities essential to design. Of course, any 'inspiration' would be an added bonus. And of course, the probes approach, using, postcards, diaries, photos etc. is hardly new in social research [e.g. 15]. Above all, we wanted to use the probes as a way of opening a dialogue, of probing sensitivities, of getting people to trust us, to see us as essentially, mostly, harmless, as nothing like any authority figures who might normally enquire into their lives. We conceived probes as a way to enable us to keep going back and talking to people as the design progressed and as an essential aspect of the 'co-realisation' [12] or 'co-production' of the design. We anticipated and discovered the enforced reflexivity of the probes; compelling people to think about, write about and take pictures of aspects of their daily lives they normally took for granted. Such

reflection, even if only resulting in 'fragmentary glimpses', pointed to some of the sensitivities that we needed to bear in mind as we went about the process of the co-realisation [12] of design.

In this particular case, investigating the design and deployment of a situated display for the university climbing club, the probe pack consisted of: cameras (Polaroid and disposable); a USB pencam that enabled them both to record random thoughts and to take short video clips; a blog facility where they could upload any of the materials they had collected; a diary which was a booklet that outlined both the rationale behind the project and some suggestions for the kinds of activities we were interested in hearing about. The booklet attempted to steer their thoughts towards what we considered might be some of the important issues surrounding the design of situated displays: the where, what, when, who, how questions. Where should the display be positioned? Where on the interface might particular items be? What should be included or be provided for through the display? What might the interface look like? When should messages etc. be displayed and for how long? How might people access the display or post messages or images?

Inside the probe pack there were some instructions for use:

"Your mission, should you choose to accept it, is twofold. First, we would like you to document the various activities you participate in as part of your association with the climbing club. Secondly, we are interested in how you think situated displays, as well as other technologies, could be used to support climbing club activities and the general sense of community amongst climbing club members."

Participants were provided with and asked to keep a journal, a daily diary, and advised as to the kinds of things that might be worth recording.

Activities we are interested in (but not limited to)

- *Organizing climbing trips. Including organizing the trip, arranging resources (bus, gear, ropes etc) and accommodation. Advertising the trip etc.*

- *Organizing group social events: including organizing the event, arranging resources (ropes for pub-crawl together etc.), finding venue, advertising the event etc*

- *Attracting new members. This could include advertising, organizing events, updating notice board, showing club recruitment video/DVD etc.*

- *Activities at the climbing wall, such as climbing problems, setting new problems, rating problems (good, bad, fun, indifferent etc) and grading problems (eg 4A, 6C etc); technical tips for problems.*

Other activities:

Sometime over the next two weeks you may wish to engage in some, all or none of the following playful activities. These are designed to help us get a sense of the less serious aspects associated with climbing and being a member of the climbing club. They are intended as examples of things that might be posted.

- *Take a photo of the smelliest boot in the climbing club*

- *Take a photo from the top of a climb and describe your feelings using the sound recording function on the USB camera.*

- *Show us some video of cool moves on the climbing wall.*

- *Record anything else you'd wish to share with other climbing club members if it was possible to do so easily with devices such as those in this study.*

The daily diary was divided into two parts. Firstly participants were asked; *Please write and/or paste in below stories, pictures, descriptions, jokes, sounds and video (for blog) relating to your experiences with any climbing club activities you have been involved in today.*

Secondly, participants were also asked to provide us with their opinions and thoughts about technologies that might support climbing club activities:

"We're interested in both really obvious ways it might be useful as well as flippant, creative and/or fanciful ways this or other technologies could be used. Please be as imaginative or serious as you wish."

Below is one example of a diary entry:

"Organised to go out with X and Y to Jack Scout. Saw Z at lunch, he was keen so had to rearrange pick-up times.. got a bit confusing.. problems of organising gear and transport.. it would be cool if we could have online access to all local crags..type in specifications eg, close to sea, within grade range, people, local weather info etc.. have access via phones or at the displays.."

Though our probe pack clearly incorporates some of the ludic elements that Gaver [11] places so much store by in the design process, obviously, the materials were not as well designed, or indeed quite as thought provoking. Our interest was information not provocation, though we remain unconvinced that, at least as far as design is concerned, any such dichotomies are necessary or important distinctions. What emerged from our ethnographic work and the cultural probes were some of the various rhythms and routines and mundane activities of everyday life and the identification of a number of 'abiding concerns' [4] for members of the climbing club. We think identifying and knowing about such activities, rhythms and concerns is important; knowing where people and things are; what comes next; when things will happen etc – information that is important not just for members but also for designers.

2. PROBING ACTIVITIES, PROBING COMMUNITIES

What kind of purchase do probes give us on understanding aspects of a community for the express purpose of design? What particular sensitivities do they develop or foster? As an initial cut through the mass of data we collected, we suggest the probes provided us with some insights into two important areas; the climbing club as a set of organised activities and actions and the climbing club as a community. Firstly then the climbing club is an organisation, its activities and its membership need to be planned and coordinated. Of course we don't need probes (and we certainly don't need sociological theory) to tell us this, it's hardly a staggering insight. What the probes do begin to provide is the necessary detail: the who, what, when, why etc. of organising activities as they get done. Harvey Sacks [16] in a famous phrase talks about technology being made "at home in the world that already has whatever organisation it has," and getting some kind of purchase on this organised character of activities was facilitated by the probes. In the probes and the design workshop that

followed a number of interesting design issues emerged concerning the climbing club as a community, as an organisation and as a club – engaged in all sorts of 'planful' and 'coordinated' activities – the precise details of which, their complexities and idiosyncracies, were revealed through the probes and the workshop. Given that the technology, a situated display, had already been decided issues that design centred around concerned content, location, administration and timing: the where, what, when, who and how questions.

The relevance of plans to human action has been famously outlined by Suchman [17] who presents a powerful critique of the user modeling and planning-based approaches to design, suggesting that: "*plans are resources for situated action but do not in any strong sense determine its course.*" A plan is an abstract construction that needs to be to be applied in specific circumstances. Following the plan' will consequently always involve more than can be specified within it. Looking at the climbing clubs returns of the probes pack we can see, unsurprisingly, how planning (and coordination) is central, is vital to many of their activities and that the successful accomplishment of a 'plan' is dependent on the practical understandings about what the plan specifies in *these* circumstances, using *these* resources, *these* people, and so on - the 'just what' it takes to realise them is a practical matter of 'making the plan work' through all the various and inevitable contingencies that can arise.

Our interest, and our participants' interest, in coordination, reflects a concern with the various ways in which the coordination of people and tasks is routinely accomplished. An important, if commonplace feature of all settings is the ways in which tasks, activities and, persons are embedded within an organised ensemble. Both the activities and the people who perform them are interconnected, and have to be treated not as isolated activities and persons but as part of some *organisation* of activities and persons. Thus many aspects of work in the climbing club, are explicitly concerned with coordinating interdependencies of various kinds in order to get the 'work', the trip to the crags, the club social etc., done. In the design workshop that followed the probess the following comments were written up about coordination:

" ..*trips – Tuesday meetings in Furness (lunchtime) : official*

- *message board – web-based 'unofficial' – popular with 'core' group*

..*board – non-core will almost never see the board*

- *core-group messages from climbs*

- *board – threads – some people leave loads of messages but frustrating*

..*groups – social, word of mouth*

..*gear – 4 people with keys..*

- *all gear checked in Tuesdays at meeting*

- *book in advance..*"

Given the central role of coordination, identifying features that promote coordination, including the ability to monitor the activities of others and access to shared and readily available information, is clearly important. Such coordination can be, and often is, a feature of specifically designed or evolved artifacts: documents, message boards, and displays. Displaying

organisational activities can be characterised by the following social features that we need to consider designing into and building into any situated displays:

- displays are integral to socially organised patterns of activity
- displays are representations of organisational objects and actions
- displays are sedimentations of an organisation's activities
- displays are shared
- displays access is normatively regulated
- displays have a procedural implicativeness
- displays tend to be part of a collection
- the sense and import of displays relies upon local organisational knowledge
- displays are matters of inquiry

Undoubtedly the notion of community has a long, complicated and disputed history in social science and it is a commonplace observation that social and economic changes have altered the nature, importance and influence of 'community' [19]. New communications technologies allowing for the use and maintenance of a dispersed social network and 'community' may have little to do with the individual's geographical location, as an intriguing aspect of what has been termed 'time-space distantiation' [18]. In this view community is an achieved social construct of mutual ties, orientations and obligations. Thus, while the spatial and temporal character of community may differ and change, small-scale social groupings of various kinds remain crucial to social life in various ways. These social groupings have always been produced in the face of shifting and interconnected social, geographical and technical relations and remain a crucial instantiation of community.

Technology has always been involved in the production/maintenance etc of community. The notion of 'technosociality' developed by Bijker [3] refers to this linkage of technical and social systems and the ability of technology to reshape and redefine how people see themselves. Technology can reshape notions of space and proximity and thus notions of the 'local'; community boundaries etc. Such 'spanning technologies' [13] have led to reconceptualisations of time and space, and what it means to be local, connected, and so forth. Urry [18] also points to ways in which ideas of community are 'over-focused upon people and their interactions and ignore the role of objects.. places should be thought of as being placed in relation to sets of objects rather than being fixed through subjects and their uniquely human meanings and interactions.'. Despite both Utopian and Dystopian visions, or perhaps because of them, there is no single, or obvious, outcome of technology in terms of community; they can encourage, fragment or reinforce community. The end product is emergent in the interaction between social practices and technology. It appears to be dependent on the interaction between the combination of technologies (and their affordances) and particular communities (and their dynamics). Our project is interested in exactly how and in what ways the technology might get used and adapted – or 'innofused' and 'domesticated' [8]. That is, how it might be made "at home in the world that already

has whatever organisation it has" [16]; thinking about how technological artefacts as situated displays can mesh and integrate with other devices and prove useful in promoting or 'affording' some sense of community.

Currently the following social and communal issues appear important for our research as a focus for design and technological intervention:

Boundaries: 'Community' is based on a bounded and relatively small-scale set of relationships. However, the boundaries of community are not just spatial but also relational, social, technological, institutional etc.. This therefore incorporates some notion of 'membership', (and of awareness of membership) of inclusion and exclusion as well as ideas about apprenticeship, of 'learning the ropes to become a member (or a 'stronger' member) of the community. Within the climbing club it is interesting to observe the different boundaries that occur. For example, at one level, the 'climbing club' society has a set of paying members and technical facilities to support this community include a private bulletin board service etc. But the 'climbing' community at the University is certainly wider that the society membership and this wider community of climbers come together at various places such as the University Climbing wall and local climbing venues. Similarly, the wider community will coordinate actions, such as selling climbing gear, using, for example, the notice board situated just outside the University Climbing wall, affording what Lave and Wenger [14] might term legitimate peripheral participation.

Relationships: 'Community' is based on meaningful and multi-layered relationships that are significant and persistent for members. These relations become a mutual source of orientation and definition of appropriate and inappropriate behaviours and values. In this way the 'community' establishes expectations and responsibilities. This will include notions of reciprocity and commitment as well as shared values and practices. So, for example, communities have a strong sense of periodicity that is established through a variety of communal rhythms and patterns [20]. This in turn bounds how activity and time are recognised and made meaningful in the community, such as appropriate response times to communications. Such a characteristic allows for the perception of routine and exceptions and the development of trust. For example, for the climbing club, the 'climbing year' is effectively divided into two halves: the 'wall half' (during which the climbing wall is where most climbing takes place because it is generally too cold, wet or dark to climb outside); and the 'outside half' (when the preference is for climbing outside). Because there is a wide choice of possible outside venues many climbers will only meet each other during the 'wall' half of the year and during the ''outside' half will only climb with their 'close' climbing partners. The relationship is also interesting here in terms of trust. At the climbing wall, the climbing that takes place is not perceived as dangerous. However, when climbing outside the risks are far greater and climbers typically only climb with partners they know and trust.

We have yet to understand fully the role of the notice board at the wall. Is the notice board more important during the 'outside' half when there are fewer opportunities for unplanned face-to-face meetings, or less important because it is not visited? If, as we

suspect, it is the latter, this may be a point for technical aids, simply replicating notice board electronically via the web, or more radically perhaps using some form of 'geo-notes' so that climbers at a particular outside location can see notes left by other community members at the same location. A common problem with such systems is that too few people visit the same location to create critical mass. However, popular climbing locations are places where those with similar interests and skill levels visit and revisit but not necessarily at the same time. There are already often physical signs of past visitors, the scratching of a rock or protection left on the face, but technological approaches may be able to excite further feelings and glimpses of the 'absent presence' (Dix et al., 2004) of those who have been in the same place in the past.

Change: Communities are dynamic and are always under development – as Woody Allen comments about relationships in *Annie Hall*, like the shark they must move on or die. This might, for example, require the provision of some sense of history through an archive as well as an orientation towards development and change. This includes the ability to keep records of various interactions where text or pictures or video are preserved and made available as a resource. With the climbing community the sense of history is certainly a key factor. Climbing guidebooks used by the community include pictures of climbers on climbs often to mark/record historical events such as the route's first accent. In addition, climbers will annotate these guidebooks to reflect when they climbed one of the routes and which climber they climbed the routes with. Effectively, the affordances of the paper guidebook coupled with the values held by the climbing community enable guidebooks to become over time highly personalised and cherished artefacts.

A subtle affordance of the paper guidebook is the fact that it can reflect the climber's experience. The more climbers use a guidebook the more physically damaged the guidebook is likely to become (especially given the likelihood of the guide being exposed to the elements) but this will only serve to make the guidebook more cherished and can in effect strengthen the climbers status in a community. Climbers will also use guidebooks as a kind of prop to be passed round during social activities (e.g. at the pub or cafe after a climb) enabling (often exaggerated) climbing tales to be recounted and exchanged. It will be interesting to explore the extent to which technological approaches such as 'blogs' are able to support or complement the same functions as the guidebook. Can a wall display or shared images on phones or PDAs act as props for reminiscence in the same way? It may be that electronic technologies can never have the same sense of emotional 'past' as the physical guidebook.

Our work with the University climbing club will be to try to capture the patterns with which they maintain community. To develop situated display based technologies that allow the 'new technologies' owned by many of this fairly young climbing community, such as video phones etc., to be used in a way that helps the community function, supporting fun, coordination, competitiveness and aspirations.

3. CONCLUSION: PROBES ETCETERA…

In this final section we want to reflect on our use of cultural probes. Firstly we want to consider how the probes might impact

on technology design in various ways. What *specific* aspects of the technology are important? Why might they work in developing and facilitating 'community'? This, of course, is the central research question for the CASIDE project (www.caside.lancs.ac.uk) which this paper reports on, but at present, the following appear to merit some attention:

- membership: recognisable members and membership categories, allied with recognisable boundaries

- identity and representation: how people can represent themselves and manage their 'identities'

- managing spatial relations: managing spatial relations to integrate the real and the virtual

- rhythms: the highly predictable rhythm of everyday activity sets the grounds for shared expectations and comprehension of behaviour – successful communities carry intelligible rhythms of interaction and awareness, which vary according to the community and is linked to issues of awareness and sense of place.

- community development - the community should be able to reflect and learn from experience, to develop 'robust sociality'

- history and change - the ability to develop a history through recording and archiving various interactions

Secondly we want to reflect on the probes themselves. The late Harvey Sacks is something of a hero in our own particular community, at least the social scientists in it, and when he says: "I can tell you something but you have to be careful what you make of it," we naturally agree and reiterate that we should have modest expectations of any method, including cultural probes. To some people, of course, and because the academic world is full of cynics, what we have is a collection of trivia because we have missed the 'important data' about power, gender or whatever. Furthermore, by grounding design in these mundane details of everyday life (the 'trivia' of our critics), we hope to avoid some of the more stupid mistakes that characterise design, mistakes not just about design but, perhaps, more fundamental ones about human values and capabilities. As Gaver says: *"They may seem whimsical, but it would be a mistake to dismiss them on that ground: for unless we start to respect the full range of values that make us human, the technologies we build are likely to be dull and uninteresting at best, and de-humanising at worst."*

Sacks in a famous phrase talks about technology being made "at home in the world that already has whatever organisation it has". We think the probes provide us with some commonsense understanding of the organisation of one particular community, beginning a conversation that would allow us to probe more deeply into people's lives and reassuring the 'subjects' of our research that we were ordinary, harmless, (if strange) people.

Of course there has been (considerable) dispute over the use and value of probes, largely couched in the false and unintended dichotomy between information and inspiration in arguments about their 'analytic' versus their 'ludic' use and so on. We don't wish to contribute to this exaggerated and rather silly dispute, while acknowledging that in writing this paper we are in danger of doing precisely that. We, like Plummer [15] with documents, acknowledge the importance of the inherent subjectivity of probes and the rich stories that emerge from them over dehumanized

disputes and turf wars that are too removed from the individual subject and are characterised by various confusions as to what a 'probe' might belike, how they are designed, used, collected and analysed as well as what words like 'information' and 'inspiration' actually mean. Instead we are interested in trying to understand what makes probes work? How exactly do probes work? How are they used, modified and completed as research instruments

What we are especially interested in is the role of probe materials in encouraging various forms of 'reflexivity' – both in the standard social science sense of reflection or contemplation and in the more precise, if more mundane, ethnomethodological sense of making actions accountable (as the actions they observably are). We are especially exercised by Garfinkel's [9] work on 'instructed actions' and the operation of the etcetera clause as a way of understanding what happens when people encounter probes. That despite Garfinkel's [9] avowed disassociation of ethnomethodology from any obvious practical design exercise (that it cannot be used to remedy anything), it is in documenting the working out of the etcetera clause that design relevant considerations emerge. In following the various suggestions in the probe pack participants embarked on a journey of instructed actions – where the outcomes were never entirely clear but where the onus was on the participants to make their instructed action accountable, reflexive, workable action. Action that must be seen to work by others.

4. ACKNOWLEDGMENTS

5. REFERENCES
[1] Agre, P. (1999) "Rethinking networks and communities in a wired society", paper presented to the American Society for Information Science, Pasadena, May 1999.

[2] Anderson, R.J., and Sharrock W.W (1993) "Can organisations Afford Knowledge" Journal of Computer Supported Cooperative Work (JCSCW) Vol 1, No. 3, 143-161.

[3] Bijker, Wiebe E., 1995. Of Bicycles, Bakelites and Bulbs. Towards a Theory of Sociotechnical Change, MIT Press, Cambridge, Massachusetts.

[4] Crabtree, A., Hemmings, T., Rodden, T., Cheverst, K., Clarke, K., Dewsbury, G., Hughes, J., Rouncefield, M., (2003). Designing With Care: Adapting Cultural Probes to Inform Design in Sensitive Settings. *In Proceedings of the 2004 Australasian Conference on Computer-Human Interaction (OZCHI2004)*, pp 4-13. Brisbane, Australia: Ergonomics Society of Australia.

[5] Cheverst, K., Fitton, D., Rouncefield, M., and Graham. C.. 'Smart Mobs' and Technology Probes: Evaluating Texting at Work. In Proceedings of ECITE 2004.

[6] Dertouzos, M (2001) The Unfinished Revolution Human-Centered Computers and What They Can Do For Us. HarperCollins, New York

[7] Dix, A. J. Sheridan, S. Lock, G. Ellis (2004). "absenT Presence". Position paper for EQUATOR Record and Reeuse workshop, UCL, London, 12-13 February 2003. http://www.hcibook.com/alan/papers/absent-presence-2004/

[8] Fleck, J. (1988) "Innofusion or diffusation? The nature of technological development in robotics", Edinburgh PICT Working Paper No 4.

[9] Garfinkel, H. (2002). Ethnomethodology's program: Working out Durkheim's aphorism. Lanham, MD: Rowman & Littlefield.

[10] Gaver, W.H., Dunne, A. and Pacenti, E. (1999) "Design: cultural probes", Interactions, Vol. 6, No. 1, pp. 21-29.

[11] Gaver, W. (2001). Designing for Ludic Aspects of Everyday Life. ERCIM News No. 47, October 2001. www.ercim.org/publication/Ercim_News/enw47/gaver.htm.

[12] Hartswood, M., Procter, R., Slack, R., Voß, A., Buscher, M., Rouncefield, M., and Rouchy, P. (2002) Co-realisation: Towards a Principled Synthesis of Ethnomethodology and Participatory Design. Scandinavian Journal of Information Systems, 14(2).

[13] Kern, S. (1983). The Culture of time and Space, 1880-1918. Cambridge, Massachusetts: Harvard University Press.

[14] Lave, J and Wenger, E. (1991) Situated Learning: Legitimate Peripheral Participation Cambridge University Press. Caabridge.

[15] Plummer, K. (1983). Documents of Life. London: George Allen & Unwin.

[16] Sacks, H. (1992) "A single instance of a phone-call opening", Lectures on Conversation (ed. Jefferson, G.), vol. II, pp. 542-553, Oxford: Blackwell.

[17] Suchman, L. A., 1987, Plans and Situated Actions: The Problem of Human-Computer Communication , Cambridge University Press, New York.

[18] Urry, J. (2000) Sociology Beyond Societies: mobilities for the twenty-first century. London. RKP.

[19] Wellman, B. (1999) "From Little Boxes to Loosely-Bounded Networks: The Privatization and Domestication of Community", In Sociology for the 21st Century: Continuities and Cutting Edges. J. Abu-Lughod ed. Chicago, IL: University of Chicago Press.

[20] Zerubavel, E (1985) Hidden Rhythms: schedules and calendars in social life. California. University of California Press.