



## Fueling the ethnographic imagination by design

David M. Frohlich, Girish Prabhu<sup>1</sup>  
Hardcopy Technology Laboratory  
HP Laboratories Bristol  
HPL-2004-72  
April 23, 2004\*

E-mail: firstname\_lastname@hp.com

contextual  
invention,  
innovation,  
ethnographic, user  
studies, design  
research, India,  
design  
ethnography,  
anthropology,  
culture

Contextual invention is defined as the process of using ethnographic data to generate new technology and business ideas in an interdisciplinary team. Ethnographic imagination is described as the essential ingredient within this process. An ethnographic study of media use in India is used as an example of how to collect and use ethnographic findings imaginatively. Techniques used in the study include the collection of inspirational materials, the explicit discussion of new product concepts, the feedforward of new concept ideas, and the circulation of user need and concept sheets. The paper concludes with some lessons for design ethnography and its role in invention.

\* Internal Accession Date Only

Published in Prabhu G. & Frohlich D.M. (Eds) *Contextual Invention 2003*, Bangalore, India: Kestone Research PVT Ltd. ISBN 81-90187201

<sup>1</sup>User and Business Studies, HP Labs Bangalore, India

Approved for External Publication

© Copyright Hewlett-Packard Company 2004

## 1 Introduction

When young men drop out of school or college they often do so as a conscious act of rebellion against culturally accepted ways of living. By forming their own counter-culture they can be said to be exercising their ethnographic imagination about how life, behaviour and identity could be different (Willis 2003). The same kind of imagination is required by designers of new computing and communication products when examining ethnographic descriptions of lives and cultures as they work today. They must look through the present system, to future ways in which people might transform and enhance their lives with the aid of new technology. They must see possible acts of rebellion.

In this paper we consider how this kind of imagination can be deliberately nurtured, fueled and directed in the collection and use of ethnographic findings. This is a key question for the practice of what might be called design ethnography or contextual design (Salvador, Bell & Anderson 1999, Beyer & Holtzblatt 2002). The extrapolation of current to future ways of living is a central concern of these disciplines and a major challenge to their effectiveness in specifying new technology requirements (Andersen 1994, Jirotko & Wallen 2000). The further extrapolation of requirements into new designs, technologies and business proposals is another challenge which remains largely undocumented. We will argue that these two trajectories for ethnographic findings are intimately related, and that one way of building their momentum is to do ethnography in the context of a multi-disciplinary investigation and team.

Our experience is drawn from an ethnographic study of media use in India, in which we visited 24 families and 5 village chiefs. Families were chosen to represent a cross section of Indian society in metropolitan, urban and rural areas in the north and south of the country, and a wide range of media practices. The study was embedded in a broader investigation of printing and imaging opportunities in India, involving design, technology and business research conducted in parallel. This embedding led to a number of transformations to the ethnographic research process which made its findings more useful for design. With hindsight, these can be seen as techniques for fueling the ethnographic imagination as it was exercised by all members of the team. Some of these techniques will now be illustrated with examples from the study.

## 2 Five approaches to invention

Before discussing the ethnographic study, it is necessary to explain its place in the broader process of invention within Hewlett Packard. Invention is important to HP and happens to be the catchphrase of our corporate identity ('invent'). How then do we go about inventing new technologies and businesses for our current and future customers? In fact, we do what most large technology companies do by adopting four parallel approaches to invention. Our business divisions use market research projections to estimate the size and vitality of future business areas. They also employ designers to design new ways of styling and combining existing technologies to improve customer experience with our products and services. More disruptive techniques are used in our corporate research labs. Technology research is used to push the envelope of existing technology, and generate technical innovations which will enable entirely new ways of solving customer problems. User research is also employed to find uses for these innovations or discover un-solved problems that technology could help with.

When things are going well, the findings from one approach begin to 'gel' with those from another. For example, a technological breakthrough might align with a large market opportunity, with minimal design impact on the product. More typically, the findings of each approach do not align, or are not generated together, so that many good ideas in one area sit around waiting for conditions in the other areas to change. This is natural, but more problematic when trying to invent for markets whose dynamics are relatively unknown, or whose user needs and design preferences are unclear or where high technology is not yet dominant— as in the emerging markets. The trajectory of western

technology and products may simply not be appropriate to the east, so the user and business conditions for them may never materialise. Hence the importance of design ethnography in describing the cultural context for technology, in a way which is useful for new designs (Salvador et al 1999).

Perhaps because of the challenge of inventing for the emerging markets, or because of our own and other's success in combining elements of the four approaches in the past (e.g. Frohlich, Dray & Silverman 2001, Hofmeester & de Charon de Saint Germain 2001), we decided to explore a new research paradigm in which each approach is represented equally. This can be seen as a fifth, hybrid, approach to invention which we call contextual invention. We put together a multidisciplinary team representing the disciplines of ethnography, design, business and technical research, and set about planning an early investigation of printing and imaging opportunities in India. The team was based in HP Labs Bangalore, and included local consultants as well as HP staff (see acknowledgements list).

Our philosophy was to lead with an ethnographic study that would serve as a source of inspiration and insight for the other three disciplines. A working model of the research process is shown in Figure 1. All members of the team were involved from the start and helped to formulate and conduct the ethnography up front. The topic of the ethnography was media use as described below. From the initial data set of ethnographic materials we generated provisional observations about media-related behaviours and a list of unmet user needs. These were then used to generate point product and service concepts with a view to identifying promising clusters of ideas. We expected these clusters to indicate business opportunity spaces which could be explored more thoroughly by other methods, including showing the concepts back to the original participants in our fieldwork.

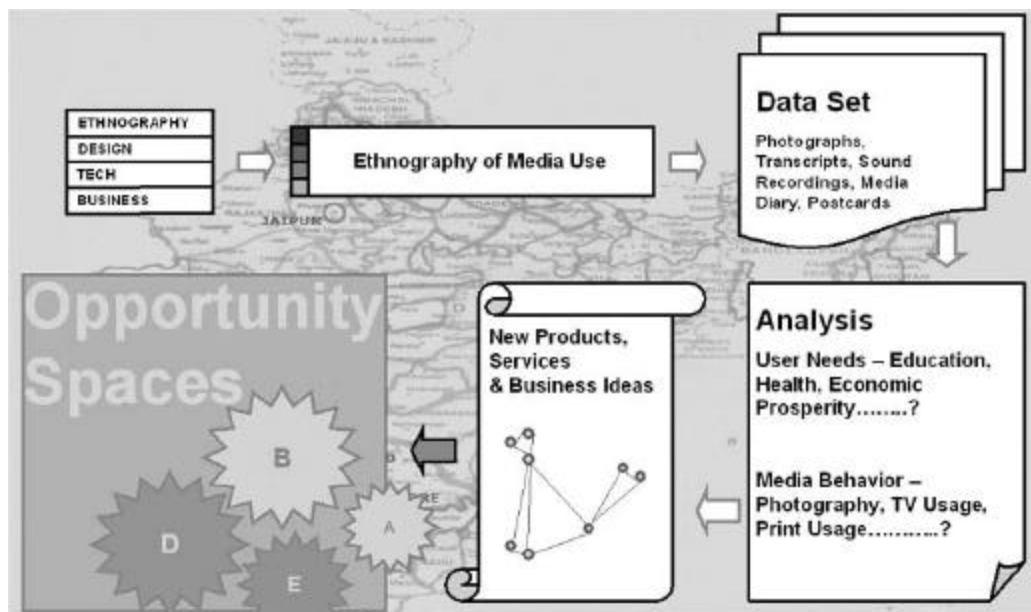


Figure 1. Contextual invention research process

Although this process appears quite linear and rational in character, with one stage following another in sequence, it was actually more iterative than this. Each individual investigation was influenced by the multi-disciplinary context, through the presence and participation of experts from other disciplines. Those people were also carrying out their own reading and research in parallel with the fieldwork and brainstorming, which itself affected the way that they thought about media. This personal influence was particularly strong on the ethnography, since all members of the team took

part in the fieldwork and contributed to the analysis in different ways. They were also motivated to ensure that the results of the ethnography were useful to their subsequent investigations. Since those investigations concerned the design of new technologies, products, services and business models, it was necessary to make the ethnography as forward looking as possible, and to use its findings imaginatively.

### **3 Framing the ethnography**

Choosing a suitable topic of study which would be fertile for design turned out to be surprisingly difficult. The topic had to relate to the technologies we were trying to impact within HP; namely printing and imaging technologies for this study. However, we could not simply examine the use of printers, scanners, cameras and so on within India, since many of these product categories have low penetration and meaning for the larger Indian society. In addition, we were hoping to generate ideas for products or services lying outside these traditional categories. So the topic had to relate to an underlying technical competence in the handling of image and other media, but in a way which participants could understand and discuss as part of their everyday lives. In the end we chose to examine 'media use' in India, defined very broadly as the use of multiple channels of communication. Our sphere of interest therefore encompassed mass media such as TV, newspapers, cinema and radio, and more intimate personal media such as the telephone, face-to-face conversations, letters, music and even handicrafts. As we got closer to defining these more precisely and formulating research and interview questions about them, we found it useful to draw on existing business and design definitions of media. This was a first step in ensuring a common language for what we were studying across the team.

A specific business influence at this stage was on the recruitment of participants in the study. Having decided to take families as our unit of analysis and conduct interviews in and around their homes, there was much discussion of what sample of families to involve. The ethnographic requirement was to cover a spread of lifestyles which reflected the diversity of media practice in India. We also wanted families who would be willing and able to host us, to engage honestly with our questions and follow our instructions. The business requirement was to track how representative these families were of the Indian population, and to skew the sample in favour of the most promising consumer segment for media products and services. Our research partners at Probe Qualitative Research helped us reconcile these different views by carrying out a new market segmentation of Indian households by socio-cultural region (SCR) and media exposure.

An existing classification of SCRs sharing a common language and culture was clustered by the level of penetration of mass media devices and content streams. This segmentation also happened to correlate with socio-economic class. We then selected families from two contrasting levels in the middle and top of the spectrum ('media light' and 'media heavy' respectively), avoiding families at the bottom of the spectrum who might not be in a position to benefit from new media services because of a lack of infrastructure or money. Families could then be selected from particular regions with some confidence in the type and size of the population they were representing from a market perspective.

Further social factors were introduced later to balance the sample for location (north and south India) and lifestyle (metro, urban & rural). We also administered a screener questionnaire to identify the spread of media practices in individual households, and ultimately recruit both high and low media families. Practical factors such as how far away the fieldwork locations were from potential hotel bases, the time and working patterns of families, and their willingness to take part were all considered in the final selection. This was only possible because of the good local relationship already established between Probe Qualitative Research and a cross-India panel of families they maintain for research purposes. A figure of 24 families was arrived at out of a compromise between a much larger number that could have been interviewed, advocated by the business staff on the project, and a much smaller number, preferred by the ethnographers.

Design and technology considerations came into play when planning the fieldwork methodology and interview questions. To maximise the usefulness of the study for technologists we attempted to cover the use of as many domestic media technologies as possible, including the TV, telephone, radio, PC

and internet. Some discussion arose as to the feasibility of covering shared community media technologies such as telephone booths, cinemas and religious festivals. This led us to discuss these latter forms in the context of the home visits, around a 'media map', showing where media were consumed in relation to the home. An example of such a map is shown in Figure 2. We also made efforts to tour village and urban locations in order to take photographs of media centres, and interviewed village elders or chiefs about the provision of media services at the village level.

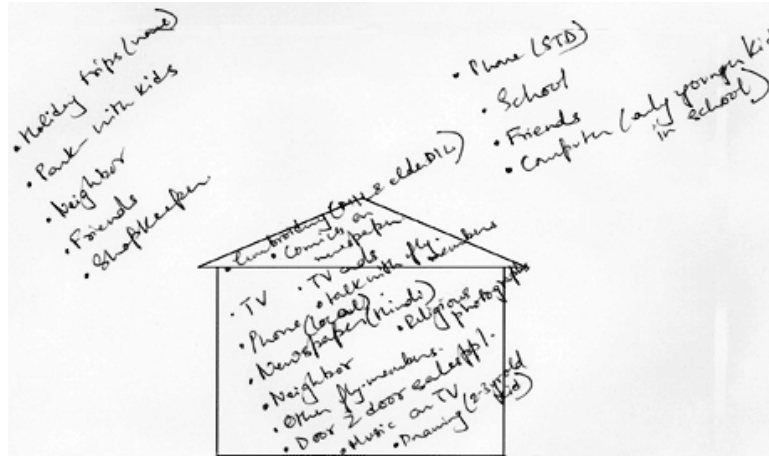


Figure 2. An example media map for one family showing the location of media consumption, in and out of the home

The designers' requirement from the ethnography was less about capturing a picture of technology use or even media practice in India, and more about absorbing the lifestyle and mindset of Indian people. To this end we built in a lifestyle section into the opening of the interviews and developed a number of techniques for recording aspects of life before and after our visits. These techniques can be seen as cultural probes, as defined by Gaver, Dunne & Pacenti (1999). They included a camera probe, a media diary and what we called psychic postcards (see Figure 3).



Figure 3 Cultural probes used in the study (camera, media postbox, and psychic postcards).

Hence, analogue cameras with a 36 exposure film were given out to families ahead of our visit with the instruction 'Show us how you live'. The resulting photographs were shown to families at the opening of the interviews, and families were asked to talk through about 10 images selected by us. This allowed us to collect more spontaneous and intimate photographs of family life than could otherwise have been recorded on our visits, and also elicited a range of explanations of family rituals and behaviours that would have been missed by focussed questioning. A media diary was developed in the form of a postbox and a set of media activity cards. Family members were asked to fill in a card corresponding to particular media activities such as watching television or reading a

book, every time they performed that activity during the week following our visit. The card recorded what the content of the activity was (e.g. TV programme), who performed it, and when and where it was performed. Cards could be completed with the help of local representatives, and were posted into the locked box for collection at the end of the week. In addition, self-addressed postcards were left with families for anyone to fill in and post back to us at will. These contained somewhat provocative questions about the way people behave or think. For example, one question asked 'What do you do when you feel lonely?' while in another, respondents were instructed to 'Describe something that is a mystery to you'. In general, these were designed to uncover emotional states that might give designers a clue to the respondent's personality or mindset.

To further expand the range of materials collected from the fieldwork we planned a home tour in which we documented media artefacts and home architecture in photographs. Taken together, these design considerations led us to collect a wider range of ethnographic materials than we would ordinarily have recorded in the course of studying media-related behaviours. We also came to appreciate that the materials themselves were being collected as design resources in their own right, rather than as a means of producing an overarching 'analysis'.

A final modification of the fieldwork for design was probably the most significant of all. We allocated the last hour of each three-hour home visit to a forward-looking discussion of lifestyle futures. This began with a number of general questions asking about personal and family aspirations for the future, and went on to invite families to speculate on the role of technology in meeting such aspirations. We felt it was important to give people the chance to say directly what new technologies they would like, if they had a view. This became a chance for them to exercise their own ethnographic imaginations, unprompted by our own ideas, and to air their views on technology in general. We then went on to prompt for reactions to our own imaginings, based first on what we had been told in the current visit and then in previous visits. This was an 'empty' slot in the interview schedule that relied on us thinking up technology ideas on the fly. For the current family we would try to connect what we had learned about their media use and interests to new, or simply missing, media technologies they might like. Once those ideas ran out, or ran aground, we would introduce ideas accumulated from other visits, about the kinds of technologies other families liked. In this way, design ideas could surface within a single visit and be followed up in subsequent visits in the series. We call this technique concept feedforward, and see it as a way of applying ethnographic imagination within the interviewing process itself.

## **4 Design-oriented analysis**

Given the aim of our study and its place in the wider design process, it was important to sustain its design orientation in the analysis of findings (see again Figure 1). Furthermore, because the designers, business analysts and technologists were continuously engaged on the project, there was an urgency for them to begin working on design concepts as soon as possible after the fieldwork, without waiting several months for the 'results'. This led us to adopt an aggressive target for the first half of the analysis, and a design-oriented attitude for the rest. Our target was to have "50% of the analysis done by the end of the fieldwork", and then to conduct a more careful examination of the data with an eye to its implications for design. We can best illustrate how each of these two phases of analysis worked with some examples.

### **4.1 Phase 1 analysis**

This analysis was done mainly during the fieldwork period. It was based on live observations in the fieldwork itself and debrief meetings we held after each visit. In fact the debrief meetings were an opportunity for pairs of interviewers to reflect on their impressions of the day, and to document their conclusions. They recorded the results of feedback on any concepts presented to families, together with about three key observations on media use and three new product ideas for the family itself.

This was therefore a second occasion for interviewers to exercise their ethnographic imaginations, this time in the more relaxed circumstances of a hotel bar.

The results of one of these meetings are shown in Table 1. These observations and insights relate to the Chandigarh family whose media map is shown in Figure 3. Taken together, they give a quick impression of some of the media characteristics of the family, and serve as reminders for what the family told us. Although we sometimes found it difficult to separate observations from design ideas, as in the second two design insights in the table, the distinction was useful in forcing us to try. This same sort of distinction was preserved in a final technique used to summarise design lessons across the interviews. At the end of the exercise, we generated separate worksheets for individual user needs and design concepts to emerge from the fieldwork.

An example user need sheet is shown in Table 2. This describes a personal or family need arising out of an ethnographic observation. The need applies to a particular activity performed by a certain user group. The example shown picks up on insight 2 in Table 1 which actually describes a problem of phone sharing. Telephone owners, such as those in the Chandigarh household represented in Table 1, told us that they found it difficult to pay their phone bills because so many friends and relatives came into their house to 'borrow' the phone. This also led to irritation in having to answer incoming calls for borrowers and relay messages to them. The need represented in Table 2 describes the cost part of this problem and refers to the concept of a call monitoring device as a possible solution. Other solutions are also possible, even though they are not listed here. For example, a borrower could use a personal phone card to have calls billed directly to his or her account. Hence it is useful to distinguish between the core need and a variety of solutions that might be designed to address it. Viewed the other way around, a new product or service concept might satisfy multiple needs, which may or may not have been observed in the data.

Key observations on media practice and values	Description
1	No radio stereo system in the house (any only audio media). TV was compensating for the lack of it-any music channel would be switched on only if need be.
2	TV, phones were the dominant media used in the house by everyone. Very little use of any other media. No magazines, not much newspaper.
3	Busy schedules of children- they did not have too much time for themselves except for couple of hours in the evening, when they could go out and play (indoor games not too exciting concept of videogames was interesting to them though)
4	Aspiration of family members that the children get educated on computers.
Key design insights (requirement and solution ideas)	
1	Inexpensive, low cost way of learning the computer – for children, would help enhance their future.
2	Phone in the house used by community-neighbours, acquaintances etc. for incoming and outgoing calls. Caused irritation, cost and some tension. Some better way of sharing the phone, and conveying to others that they had a call without having to go and call
3	Their community all households in that lane, and beyond- was very much a part of their everyday life, like extended family. Any device that catered to the entire community, that could be of use to all, the cost of which could be shared, seemed to have potential

Table 1 Observations and insights for one family recorded on a debrief sheet



Need Name:	<b>Telephone cost monitoring</b>
Date:	15.7.03
Target User:	Phone owners
Target Activity:	Monitoring the cost of use of a telephone
Ethnographic Observation:	We found several telephone owning households who had disconnected the telephone. This was because the cost of using it had grown too high. When we explored this, it turned out that the sharing of the phone with extended family, friends and neighbours had inflated their own costs of using it.
Need:	A technical method of accurately monitoring call durations and costs for the telephone would help families adjust the use of the device. A publically visible display of the cost at the end of the call might encourage non-family members to leave a donation. In fact we found one household who had installed such a monitor on their phone (JRH?). This need might apply to other shared devices or services that incur time-based use costs, such as internet connection.
Possible Concept solutions:	Call monitor device for the telephone
Originator(s):	David
Contributor(s):	

Table 2 An example User Need Sheet for telephone cost monitoring

An example concept sheet is shown in Table 3. The telephone monitoring device suggested in Table 2 is described in further detail, and points to the possible benefits and technology involved. Although not spelled out in the description, this device might also be used to record incoming messages for borrowers. In this case it could incorporate an answering machine to allow messages to be recorded automatically from numbers that are not known to the family. This idea could be documented separately or incorporated into the current concept. Broader design insights are also evident here. These include the idea of designing personal technology for shared use, since families live in extended groups and communities in India where personal property is freely shared.

Name of Concept:	<b>Telephone Monitoring Device</b>
Date:	July 25 <sup>th</sup> 2003
Corresponding Need:	Phone cost monitoring
Description of Solution:	A device which plugs into a conventional telephone line and telephone and is able to record the duration and cumulative cost of outgoing calls. Cost rates would be adjusted in accordance with the service provider tariffs to different outgoing number regions. The figure for the moment-by-moment cost of a call would be displayed on a large LCD display on the device.
Benefits:	The cost of calls would be made visible to both the owner and the borrower of a telephone, encouraging borrowers to make a donation covering costs. This would allow owners to monitor and control telephone operating costs and keep their phone connected.
Possible technology:	STD booth software ?
Originator:	David
Contributors:	

Table 3 An example concept sheet for a telephone monitoring device

Although these are crude representations of requirements and concepts by any standard, they proved useful in accelerating the usual analysis process and its culmination in recommendations for design. As an indication of this, we were able to hold a team design meeting 7 working days after the last fieldwork visit to review 30 user needs and 62 design concepts. The advantage of this strategy was that it put a large number of design ideas into circulation within the project. These could then form the basis of further work and thinking. The disadvantage was that we had no way of telling which were the stronger requirements or ideas at this stage, since the careful work of calibrating individual insights against the weight of comments in the interview corpus had not yet started. Nor had the work of understanding media use and Indian life at a level beyond our first impressions in the interviews themselves. It is to this analysis that we now turn.

## **4.2 Phase 2 analysis**

In this phase of analysis we returned to data collected within each part of our home visits relating to lifestyle, media use and future technology ideas. The user needs and concepts generated in the first phase served as hypotheses to test in the second. In addition, the detailed analysis served to provide a better platform of description from which new needs and concepts could be generated. These two aspects of the analysis proceeded in parallel.

For example, lifestyles across the sample were summarised in individual family profiles. These described family situations and routines, drawing on the extensive set of photographs taken by them and us. Profiles could be browsed by some of the recruitment criteria such as North and South India, or Metro, Urban and Rural settings. Media maps and debrief comments were included in these profiles so that behaviours and insights could be compared across categories. In this way, a finding about telephone sharing in one interview could be compared with similar findings from other interviews. Just by reading across the profiles, it was possible to get a sense of how often a particular observation made in Phase 1 was repeated, and what different forms it took. Over and above these comparisons, the family profiles could be read simply for design inspiration. Thus we found that particular details of the lifestyle descriptions would capture our imaginations in different ways. For example, it was mentioned by some families that men in the villages tend to congregate in groups in the evening to discuss local issues and global politics. These seemed to us to be places where technology might be applied somehow to record decisions or provide background information. The need for such support would then become an analytic question, while the method and kind of support would become a design question.

The extensive discussions of media use were used to generate descriptions of media practices across the sample, and also to understand proposed user needs in more detail. This can be illustrated with respect to telephone use. Thus we found that the telephone was valued very highly, even by families who did not actually own one. This seemed to be related to the strength of the family as an institution in India, and the patterns of mobility for family members when they get married or look for work. Traditionally, daughters leave home to live with their husband's family when they get married, while sons stay at home. This results in extended joint families containing parents, sons, sons' wives and children, and any daughters who have not yet left home. Significantly these families all have ties to their distant daughters who may live many miles away. A further factor in the separation of family groups is the availability of work, which may drive sons or daughters to live away from home for

extended period of time. Some may even emigrate to take up new opportunities abroad. So there are often distant family members, who can only be contacted by telephone or letter. Furthermore, the telephone was by far the preferred medium for keeping in touch, as indicated in the following quote:

“I prefer to use the phone.. it’s expensive but you get the reply there and then. A letter will take 3 days to reach and then the answer will take another 3 days to come, whereas in a telephone you can talk there and then in 5 minutes”.

Even in places where traditional joint families didn’t exist, we found that the telephone was used to maintain links with distant children who had moved to set-up nuclear families, or to coordinate relationships and meetings with extended family and friends in a more local area. Mobile phones appeared to suit this latter context particularly well. A final use of the phone was for emergency calls. Even though these might not be made very often, the phone offered the security of knowing that emergency services could be called at short notice if required. Thus the value of the phone was perceived to be very high. So much so that one participant likened its removal to a bereavement:

Interviewer: “If we take the phone then how will you all feel?”

Respondent: “If it gets spoilt then it becomes like there is a funeral. If it is OK, there is happiness.”

Given this drive to talk over the telephone, it appeared to be a matter of convenience and cost where the activity was performed. Public long distance call booths offer one option, but do not allow the caller to receive incoming calls at home. People preferred to have their own telephone but often could not afford it. Sharing a neighbour’s phone turned out to be a good intermediate option, because it might be closer than a public call box and could also be used to receive calls, given the willingness of the neighbour to take messages. It was this dynamic that led to the problem of phone sharing reported by various telephone owners in our sample (see again Table 2). This problem was made worse for some owners by the fact that it was not socially acceptable to ask for money for calls made by others. In fact, there was a less formal exchange system in place, whereby favours were returned in kind - leaving a shortfall in money:

“No we don’t take money, in this village there is no rule like that.. They come here to make a phone call and tomorrow we may have some other work with them”

All these findings begin to address the reasons behind phone sharing as a phenomenon, and their implications for design. In the process of chasing down these reasons, new insights and design ideas emerge alongside the initial ideas generated in the fieldwork period (see again Table 3). For example, receiving incoming calls appears to be a big motivation for phone borrowers, and this may create an additional problem for phone lenders. This highlights the value of message notification and recording on shared telephones. By conducting the ethnographic ‘analysis’ in the context of a design project, such considerations become part and parcel of the analysis itself. So in this case, message taking would become a media behaviour we might look at more closely because of our design interests.

Just occasionally in this process we would discover a family or individual using a technology solution we had predicted would be useful before our encounter with them. This then became an intensive focus of discussion in the interview, and a case study for later analysis. This happened in the case of

the telephone monitoring device proposed in Table 3. One family in a village outside Jaipur had installed such a device on their home telephone line (see Figure 4).



Figure 4 A telephone monitoring device discovered in a village home. The device is mounted on the wall above the telephone.

The elder brother of the household was working away from the village in a town, and had brought back something which he felt would help his family manage the use of their phone. Although we couldn't speak to the missing brother, his younger brother and mother explained the functionality to us, and some of the benefits as they saw them. We have included it here in some detail to show how certain discoveries in the interviews can illuminate more general design issues for the larger population. In fact, this discussion validates the concept of cost monitoring, and flags a problem of taking messages for unknown people in the village.

Brother: "The phone is locked. Children keep fiddling that is why we lock it"

Interviewer: "So what is this thing?" (display)

Brother: "This is for the calls which come from outside. The number it gets displayed" (caller ID)

Interviewer: "Why did he (older brother) get this thing? How did he get the idea?"

Brother: "People who call up, trouble... They call and say call this one, and when we don't know them, how can we call them? They just trouble us"

Interviewer: "And what is this?"

Brother: "The earlier calls they all get recorded in this. Before this the call had come from this number. They come till about 2-3 days earlier" (incoming number record).

Interviewer: "If with this you got something by which you could come to know how much money you have spent then –"

Mother: "It comes!"

Interviewer: "Show me where it comes"

Mother "In this, the amount of money which is spent also comes. He presses some buttons and then it comes. I don't know how to do it"

A final boost to the process of looking towards future ways of living was given by our technique of concept feedforward. By going back to the record of these discussions in the interviews, it was

possible to trace the origin and evolution of a new product or service idea. In connection with the telephone, we discussed a number of future enhancements with families who seemed to value the telephone highly. In general, the idea of asynchronous extensions such as fax or voicemail did not have much appeal. However, the idea of seeing live images in a synchronous call generated a number of positive responses. These were usually related to experiencing the presence of distant relatives more effectively, but sometime incorporated other reasons and ideas. In the following example, the interviewee thinks of using a videophone facility not only to see the other parties, but to show them domestic scenes, items and photographs. In addition, they imagine a called number record similar to the one supported by the device in Figure 4, but in images. This is seen to be useful for monitoring and responding to missed calls :

Respondent: “We can see our relatives in Bombay ...and show them our house”

Interviewer: “What else would you like to show?”

Respondent: “Gold jewellery and photos. Also we could know who has called. When people make blank calls you will know who it is and no need to answer the call”

One problem with these kinds of reactions and comments is that they tend to differ between respondents, and may not be based on a clear and consistent understanding of the concept in question. As a result, their importance and status is unclear. This is particularly true here, where the same concept is not presented to everyone in the same way. By definition, our technique encourages spontaneous generation of concepts by respondents and interviewers alike, and can only feedforward new ideas after they have arisen in this way. This presents another analytic problem which is more common to focus groups than to ethnography: namely the interpretation of reactions to product concepts (Nielsen 1997). The solution to this problem is not to take concept ideas and reactions at face value. Calder (1977) points out 3 ways of looking at them which are useful here. They can be seen as exploratory findings or hypotheses for further research, subjective revelations for a kind of clinical interpretation, or simply phenomenological insights into how potential customers see the world. Some of the further research and interpretation that might be applied involves comparing similar comments and looking for corroborating evidence of underlying preferences and motivations. In the case of reactions to a videophone, we found a number of respondents expressing the same interest in feeling closer to their telephone partners through seeing their faces. These sentiments also agreed with a more generic preference for face-to-face interaction over other forms, and an attraction to multimedia stimulation. For example, we found that colour televisions were generally preferred to black and white ones, even in cases where the viewer had to compromise on programme selection. This raises the intriguing possibility that the domestic videophone, at the right price, might fair better in the East than in the West, because of a better fit to the culture and psychology of its people.

In the next phase of our project, we are considering yet other ways of drawing on our existing ethnographic data for design. We would like to make it available more broadly within HP, to educate designers who may be working on products for India or other emerging markets. But we do not yet know how to do this. We have also applied a number of business and technology filters to the current pool of design ideas, in order to develop those best aligned with HP's interests. This prioritises some ideas and activities over others. For example, it happens to exclude the telephone ideas mentioned above, in favour of others more directly related to printing and imaging technologies. All this affects the relevance and focus of ethnographic analysis, and its relationship to other forms of analysis going on around it.

## 5 Conclusions

We started by promoting the use of ethnographic imagination in design ethnography, whereby researchers look for ‘possible acts of rebellion’ in the lives of their participants. To help them look, we further suggested that ethnographers should work alongside experts from other disciplines who are more skilled at developing the design implications of social research. In particular, we recommended a blend of ethnographers, designers, business researchers and technologists, and went on to describe our own experience of doing ethnography together in such a team. Our biggest lesson from this exercise is that the presence of experts from other disciplines transforms the way in which design ethnography is conducted, and can do so in a way which stimulates the ethnographic imagination of the whole team.

The ethnographers were affected by the technology, design and business issues surrounding the area of research. These encouraged them to think creatively about the implications of their findings, and about how to maximise these in the set-up and analysis of their research. We described a number of techniques for doing this, used in our own ethnographic study. Its framing was modified through the selection of an appropriate research topic, the recruitment of participants, the coverage of questions, the breadth of materials collected, and the incorporation of an explicit discussion of new product concepts. Its analysis was modified by the use of creative debrief meetings, the circulation of user need and concept sheets, and the generation and testing of design ideas. These changes all fuelled the ethnographic imagination, not only of the ethnographers themselves, but also of participants in the study and of other team members. The latter group were particularly affected by the proximity to real people and contexts. In effect, their imaginations became grounded in ethnographic observations rather than in personal speculation or statistical abstractions. Whichever way you look at it, the quality of imagination appeared to go up.

Within these effects, we can discern two components of the ethnographic imagination: one louder and more obvious than the other. These correspond to the two values of design ethnography cited by Salvador et al (1999). Let us take each of these in turn. First, they say that design ethnography can reveal user need, and therefore steer technology development towards successful products and away from unsuccessful ones:

“There are two reasons why design ethnography has something to offer to industry specifically and business practices more generally. The first is deceptively simple – designing technology that consumers want and need”.

In our terms, this contribution is in the imagination of how things might be different in the future compared with the present. It is the design part of design ethnography. It relates to all the problems and opportunities represented in our user need sheets, and to the creative solution of those needs in our concept sheets. We see this as a form of creative imagination which has the louder voice in invention. It speaks about substantive needs and opportunities, and suggests new product directions to business partners.

Second, Salvador et al (1999) note that design ethnography reveals both familiar and unfamiliar voices and lifestyles to designers of new technology:

“The second reason that design ethnography is so compelling is a little bit more complicated, but worth understanding. Design ethnography interrupts the divide between work and home. We bring the voices and lives of the end-user or consumer out of the home and into the business world”.

In our terms, this contribution is in the imagination of how things are today, and also how current technology is actually used. It is the ethnography part of design ethnography, and relates to the personal influence of the fieldwork and analysis on other members of the team and organisation. In short it amounts to empathy with the customer; defined as an ability to see the world from their point of view. Although this assumes a quieter voice in the process of invention and innovation, it is invaluable in the design of successful products over the long term. While this kind of imagination will not tell you exactly where to innovate, it will whisper a sense of what will and won’t work in a range of contexts. The usefulness of this kind of empathic imagination has surprised us on our project, by turning up unexpectedly in areas we haven’t studied. For example, by living through the fieldwork and discussions on media use, we now seem to have opinions and sensibilities about Indian attitudes

to other technologies and behaviours. We began to hint at this direct effect of fieldwork materials and experience on the inspiration of designers, but want to underscore it here. It means that there is an educational value to design ethnography which can go beyond the particular subject of study, by tuning design sensibilities and thinking.

This brings us to our final point of the paper which is about representation. There is much discussion in the ethnographic literature of the need for adequate representations of activity from which to reason about design (see for example the recent panel debate by Blomberg, Robinson, Carroll, Rodden, Randall & Suchman 2002). In some cases, representations are advocated as the central output of ethnography done in a design context (Diggins & Tolmie 2003). In our own work, we have found that the most useful representations have been those relating to requirements and concepts rather than to activities themselves, and that they play only a minor role in holding onto the otherwise fleeting products of the imagination. What matters more than representation is imagination itself, for this is what makes ethnographic data fruitful for design. Furthermore, when ethnography is done in a multidisciplinary team, representation is only one of the devices that might be used to aid the expression and communication of findings within the team, and certainly should not be used to handover the responsibility of design to others.

## **Acknowledgements**

I would like to thank all members of the media literacy project for their input to this work. They include Vivek Singh and Shekhar Borgaonkar from HP Labs Bangalore; Anuradha Pandya and Preethi Gupta from Probe Qualitative Research; and Devika Ganapathy and Apala Chavan from Human Factors International. Thanks also to Warren Greving, Gita Gopal, Kris Halvosen and Huw Robson for their steering and support of this work within HP. We are also indebted to Irene McAra-McWilliam for introducing us to the concept and relevance of the ethnographic imagination, and helping us to instantiate it within the team.

## **References**

- Anderson, R.J. (1994) Representations and requirements: The value of ethnography in system design. *Human-Computer Interaction* 9 (No. 2):151-182.
- Beyer, H. & Holtzblatt, K. (2002) Contextual design: A customer-centered approach to systems design. Morgan Kaufmann.
- Blomberg, J., Robinson, R., Carroll, J., Rodden, T., Randall, D. & Suchman, L. (2002) Representations of practice in design: Reductionist or indispensable? *Proceedings of CSCW 2002, Conference Supplement*, 65-67. New York: ACM Press.
- Calder, B.J. (1977) Focus groups and the nature of qualitative marketing research. *Journal of Marketing Research* XIV: 353-364.
- Diggins, T. & Tolmie, P. (2003) The 'adequate' design of ethnographic outputs for practice: Some explorations of the characteristics of design resources. *Personal and Ubiquitous Computing* 7: 147-158.
- Frohlich, D.M., Dray S. & Silverman, A. (2001) Breaking up is hard to do: Family perspectives on the future of the home PC. *International Journal of Human-Computer Studies* 54 (5), 701-724.
- Gaver, B. , Dunne, T. & Pacenti, E. (1999) Cultural probes. *Interactions* 1 (1), 21-29.

Hofmeester, K. & de Charon de Saint Germain, E. (2001) *The presence project: New media for older people*. Amsterdam: Netherlands Design Institute.

Jirotko M. & Wallen L. (2000) *Analysing the workplace and user requirements.: Challenges for the development of methods for requirements engineering*. Chapter 12 in P. Luff, J. Hindmarsh & C. Heath (Eds.) *Workplace studies: Recovering work practice and informing system design*. Cambridge: Cambridge University Press.

Nielsen, J. (1997) *The use and misuse of focus groups*. *IEEE Software*, January 1997, pp 94-95.

Salvador, T. , Bell G. & Anderson K. (1999) *Design ethnography*. *Design Management Journal* 10 (4).

Willis, P. (2003) *The ethnographic imagination*. Polity Press.