What Do People Want from the Technology in Their Homes: Work at the Centre for Usable Home Technology (CUHTec)

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Abstract. Two studies are described that illustrate how one may gain an understanding of the needs of people with very different home circumstances to one's own. The first concerns families separated by long distances, the emotions that they experience and what it would mean to re-connect them with communication technologies. The second is a study of a nunnery and the ways that a technology can be designed for people with very particular values who are living communally. The contribution of the paper is to illustrate the value of thinking more broadly about the roles of technology in the home and to indicate some ways in which this may be done.

Keywords. home technology, connectedness, field studies, probe studies, participatory design.

1. Introduction

It is a truism in Human-computer Interaction (HCI) that too many technologies are developed without considering the actual needs of users. This is particularly so for many of the failed technologies marketed for use in the home. Rather than expecting new technologies to somehow inspire new user needs, CUHTec research seeks to provide a thorough understanding of users and to utilise this understanding to inspire new products and services.

HCI methods for understanding user needs were originally developed for use at work and have had to be extended and modified for use in the home [9] where creating a good user experience is of primary importance [1, 7].

This paper illustrates an approach we have evolved at the University of York and with colleagues at Culture Lab at Newcastle University [6] and Goldsmiths College London. The method is designed to result in practical suggestions for new technologies and services in a rapid iterative process. It starts with field studies to understand current practices and values then progresses to participatory design around prototypes.

The approach will be illustrated, with two studies where the context will be strange to many of the readers of this paper. The first concerns families separated because some members are in South Korea and some in the UK, and the emotions that they experience due to this separation. The second is a study of a nunnery and asks questions about how technology might support a life of prayer. Our intention is to illustrate how the approach taken can overcome, or even capitalise on, the strangeness of these contexts and provide insights that lead to interesting new uses for technology.

2. Connecting children, parents and grandparents, when some of them live abroad

Many families are separated by great distances, husbands or wives may be working abroad, grandparents may be in a different country to their grandchildren. One approach to this problem has been to provide awareness systems to facilitate connectedness e.g., [10]. This example of the research at CUHTec applies this approach to Korean families where at least one member is living abroad. It seeks to understand the emotions they feel when communicating at a distance and how the technologies they use help or hinder them in their aim to stay connected.

2.1 Method "emotional probes"

Getting people to tell you how they do things is relatively easy, getting them to tell you how they feel when they are doing them is much harder. CUHTec research commonly uses so-called 'probes' [4] to get people to talk about their emotions. The participants in the study were interviewed twice. In the first interview they were left with some small creative tasks to do.
These are our "emotional probes" and were presented as a "box of things to do". Participants could choose to carry out one or more of the activities. The box is pictured Figure 1. In the second interview participants talked about what they had done with the emotional probes. The method used is described in more detail in [5].

Nine participants were interviewed. All had a partner, child or grandchild living abroad. There were four mothers and one father living in the UK and also the son of one of these mothers. Two mothers and one grandmother were interviewed in South Korea.

2.1.1 Interview 1

Participants were first asked about their day-to-day contact with their family. A family map was drawn identifying family members and how they typically communicate. Next, to sensitise them to the types of technology we are interested in, they were shown pictures of four prototype communication devices from the HCI literature.

2.1.2 The "emotional probes"

**Spirit of oracle card**: These cards were intended to stimulate emotional reflection. Each card has its own name and image on the front such as, ‘intention’, ‘regret,’ ‘angel over me’, ‘soul mate’. Participants were asked to choose a few of them that elicit thoughts or feelings about their family, and write or draw on the back of the card.

**A digital camera**: Eleven prompts were listed for photographs the participant might take. Examples of these were: 'something about you that you like', 'something you like to share with your son/daughter', 'an element of family life', 'objects that are precious to you'. Figure 2 shows two of the photographs taken. The children's book (top panel) was one a mother read to her son almost every night. The iPod (bottom panel) was used to listen to specific American radio programs together.

![Figure 1. The box of things to do.](image)

![Figure 2. Photos, 'something to share with your son'; 'something to share with your husband'.](image)

**Diaries**: Two diary cards were provided to write about communications that were particularly happy or particularly unsuccessful.

**A journey with my family where I was very happy**: An A3 sized paper sheet was provided for describing a happy journey the participant had with members of their family. The instructions say ‘Write something next to “Start” and “Destination”. Add drawing, stickers, words or sentences along the given line between “Start” and “Destination” that tell the story of what happened on that journey’.

2.1.3 Interview 2

The probe responses were the stimulus for conversation in the second interview. Participants were asked to talk about what they had done with the probes, focusing on how and why, rather than what and who, in order to get more emotional context. Some probe activities were carried out during the second interview. The interview was designed to be natural and non-intrusive. If any signs of distress in the participants were recognized, the conversation was steered to another topic.

With 8 hours of recorded conversation for Interview 2 and 7 hours for Interview 1 (English and Korean), 134 pages of transcript were generated.
2.2 Results

The transcrips were subjected to a 3 step process of analysis the final stage of which was to enumerate 37 themes. A few of these themes are presented below (T2-32).

T2-Sharing the moment, kid's laughter with happiness:
“"This picture is of Harry playing football with his friends. I want to show this picture to my husband, hopefully with Harry's shouts at his friends." [Emma, Int 2. Photos] Q3
“"My husband said he wants to hear the children's laughter every day." [Lucy, Int.2, Diary probe] Q4

T14-Keeping a record to feel comfort from the media:
"I keep answer machine messages. ... I saved it for a year ... when I felt lonely, I just pressed the button. I can hear people say hi, Betty, it's me ... It's truly nice. I used to keep. I've got a friend in Australia. She's left me an answering message and I just used to keep it. I just want her voice." [Betty, Int.1] Q34

T17-Talking to men/father/grandfather:
"When my husband came here, I needed to talk about all things over the night. I had to talk. But my husband was just happy to see me and Benjamin and that's all. I said he didn't need to come if he just wanted to see me, and not to talk. Well, we are just compromising for us all. We are trying to do the best for each other." [Helen Int.1] Q44

T31-Little room and little time to give comfort to one another: “One day, my husband looked a bit depressed with some stress. His tone with the voice was so low. I asked what happened and he said the work was not easy, under his control. I just wanted to give a gentle hug to him but it was impossible. Even though I was talking on the phone, there was a limit of time and the way of expressing my feeling. He was talking on the way home but I was in my office. It's very inconvenient to talk. I wanted to say that I was thinking of him very much but sometimes it's not easy." [Helen, Int.2, Diary probe] Q77

T32-No time to deal with photos: “When I was studying in Australia, my husband often put photos of Benjamin on Cyworld for me to look at. But now I couldn't do that. I feel very annoyed. I know it is not so difficult to do that but I am always busy working and looking after Benjamin. I don't want to spend the time putting the photos on.” [Helen, Int.1] Q81

2.3 Participatory design around prototypes

The next stage in this work will be to generate some prototype devices. We are not going to replace their major communication media such as the telephone or video conferencing via Skype but we think we can provide ways of supplementing and facilitating the conversations that they have using those media.

Participants felt happy when they shared activities or special events (T2) and so we are thinking of mobile devices that could allow them to share sound or video clips in the from of "media gifts". They might want to demonstrate their affection through the creative act of choosing and creating the gift. However, a busy mother or a working father will not want to spend what little time they have struggling with the technology (T31 and T32). These gifts could be a topic to stimulate conversation (T17) and a long lasting keepsake for reflection (T14).

Three pairs of mobile devices will be deployed, each pair being used to communicate between England and South Korea. We will observe the ways that the participants in this new study find to use these devices, e.g., the media gifts that they create, and interview them about the value that they get from them (positive and negative). We will also get them to help us design the next iteration of the device.

3. The Nunnery

Much work in HCI is concerned with older people living independently. This project began as a study of older people living communally in a care home. The involvement of nuns in the study was not initially planned. The field worker mentioned it to a friend who said – *if you’re interested in older people living in communities you should talk to my sister, she’s a nun, and they’re all in their eighties*. The suggestion was taken up enthusiastically by the research team who immediately recognized that older people should not be considered as a homogenous group [3]. The nunnery was also of interest because there is a small but growing body of work which has begun to consider spirituality in HCI, e.g., [13].

The field worker happened to live next door to the monastery and could therefore be introduced both as a family friend to one of the sisters and also as a neighbor. After an informal
A presentation about the project and the research team’s previous work, the Mother Abbess discussed it with the other sisters and they agreed to take part. The study of nuns has a long history in gerontology and has resulted in classic studies such as “Aging with Grace” [11]. Epidemiologists have long been interested in cloistered nuns because they have similar lifestyles to one another and so many factors can be controlled for in studies of conditions such as Alzheimer’s. This study was in no sense controlled but the history of work with nuns helped to frame the focus.

Poor Clares is Franciscan order. At the beginning of the thirteenth century Francis of Assisi founded an order of friars who would live simple lives of poverty. Saint Clare, inspired by his teaching, founded a similar order for women. At the time it was unthinkable for nuns to wander as the friars did and so the orders were set up as enclosures where women could devote their lives to prayer, poverty and manual labour.

The convent in this study was founded in 1865 when a local aristocratic Catholic Lady invited eight Poor Clares to travel from Bruges to the North of England to set up a monastery. Since it was established the number of sisters has gone up and down reaching as many as forty in the nineteen fifties. When this study began there were fourteen sisters, the majority of whom were in their eighties; there are now eleven.

For the past hundred and forty five years the life of the nuns has followed, more or less, the same routine.

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
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<tbody>
<tr>
<td>05.30</td>
<td>Rise</td>
</tr>
<tr>
<td>06.25</td>
<td>Prayer</td>
</tr>
<tr>
<td>07.45</td>
<td>Breakfast</td>
</tr>
<tr>
<td>08.00</td>
<td>Work Time</td>
</tr>
<tr>
<td>12.00</td>
<td>Mass</td>
</tr>
<tr>
<td>12.45</td>
<td>Prayer</td>
</tr>
<tr>
<td>13.15</td>
<td>Lunch</td>
</tr>
<tr>
<td>14.00</td>
<td>Work Time</td>
</tr>
<tr>
<td>15.00</td>
<td>Free Time (reading, hobbies)</td>
</tr>
<tr>
<td>17.30</td>
<td>Prayer</td>
</tr>
<tr>
<td>18.00</td>
<td>Dinner</td>
</tr>
<tr>
<td>18.30</td>
<td>Free time</td>
</tr>
<tr>
<td>19.15</td>
<td>Prayer</td>
</tr>
<tr>
<td>19.45</td>
<td>Community recreation</td>
</tr>
<tr>
<td>20.15</td>
<td>Prayer</td>
</tr>
<tr>
<td></td>
<td>Bed</td>
</tr>
</tbody>
</table>

The Divine Office (readings of formal prayers and psalms) said five times a day and announced by bell ringing. For the most part mass is said daily at noon although this varies depending on the time of year. Work includes the chores necessary to maintain the community such as making habits, gardening, preparing food, doing the laundry and so on. But they also package and distribute wafers for mass. Although the average age of the nuns is eighty most are able to carry out these duties.

During the course of the study three of the sisters died. The nuns did not view the deaths as tragic, indeed, when a nun dies the others celebrate with a biscuit at breakfast (a very rare luxury). Though they will miss the departed sister they are confident that she has gone on to her reward for a life devoted to poverty, chastity and obedience.

A problem early in the research was how to address the needs of people who consciously deny themselves all material comforts.

3.1 Method: field study and biography

Because Poor Clares is an enclosed order, in depth observational study was clearly never going to be possible. However, Sister Peter, the Mother Abbess and the Mother Vicarress were extremely generous with their time and took part in a series of in depth interviews over a two year period. They also conducted tours around the house and grounds and took part in group discussions with other sisters.

Sister Peter, is the “Extern” sister, she is not a fully enclosed nun and her role involves being the main point of contact between the enclosed sisters and the outside world. Sister Peter is a garrulous and highly articulate person and she acted as a key informant for the study. It is not unusual in ethnographic studies, particularly of communities that are hard to reach, for a particular informant to be key to the understanding of the community as a whole [12]. Sister Peter’s in depth and patient explanations of the sisters’ life of prayer were particularly important in the development of the study. The interviews were semi-structured but attempted to gain a better understanding of prayer in the context of each informant’s biography. The following questions formed the basis of the discussion but were not adhered to rigidly:
Prayer Biography Questions
How did you become a nun?
What are your duties here?
How has your life here changed as you’ve gotten older?
How did you learn to pray?
When do you pray?
Why do you pray?
Who do you pray for?
What have you been praying about recently?
Which intentions are you praying for now?
When was the last time a prayer was answered?

This focus on the details of participants’ particular biographies draws on previous work such as the “technology biography” [2]. This is informed by a long and rich tradition of work in social science which sees individual biographies as resources[8]. The questions were broad and, in part, deliberately naïve but the sisters answered them patiently. It became clear that their prayer life was far more nuanced and complex than the research team had initially realized [3].

3.2 Results

Visits were made over an eighteen month period for biographical interviews. Although Poor Clares are a meditative order, their meditations are not like those of Buddhists directed towards inner peace and enlightenment. Rather than focus on their own spiritual development the sisters’ meditations are more often focused on the outside world. As the Extern Sister put it, their role is to “stand in the presence of God” for those that can’t do it themselves, either because they are busy leading their own perfectly good but busy lives or because they do not believe in or know God. Although the sisters withdraw from the world their prayer life is directed towards it.

The Poor Clares have long traditions of saying prayers of intercession, anyone can request the sisters to pray for them or their loved ones. They also have access to news sources like the radio and pray whenever they learn of specific disasters or upheavals in the world.

It became clear that if technology were to enhance their lives it would not be in meeting any “unmet need” but in helping them in their role as witnesses before God for the world. The design team became fascinated by the question of what the nuns decided to pray for [3]. If radio sources were relied on could media bias interfere with their choices? Could RSS feeds and online web resources be used to inform their prayer life? [3].

3.3 Participatory design with Design Provocations

A sketchbook of provocative images illustrating various designs for a prayer companion were discussed and left with the sisters. These all related to the basic idea of conveying news feeds to the nuns in a form that would be culturally and aesthetically acceptable to them. The sources would not just be news feeds but also other resources such as “We Feel Fine” [3]. Reactions to the sketches were powerful. One deliberately provocative image featured a large display board such as those used for train announcements, prominently grafted into a photograph of the nuns recreation area. The Mother Abbess was horrified. “That’s where guests like the Bishop sit!” Such reactions gave a clear direction for the designers to follow [3].

Figure 3: The Prayer Companion

3.4 The final design: the Prayer Companion

The final design took the form of a Tao cross (Figure 3), a T shaped cross particularly associated with St Francis who noted that when a friar holds out his arms the robe makes the shape of the Tao cross, the symbol of his mission.
The nuns were delighted with the look of the device straight away and instantly recognized the Tao cross. They were immediately appreciative of the news feeds but the “I feel” statements were initially problematic. Following an adjustment both the Mother Abbess and Sister Peter were entirely enthusiastic about the device. Reactions varied across the community, some sisters preferred the in depth detail that online newspapers provided, one had no interest in current affairs at all. Acknowledging diverse taste within the community the team are regarding the design as a success. The Prayer Companion has been working in the abbey for over a year now and is currently still in use. A full account of this work can be found at [3].

4. Conclusions

When designers think of the needs of the users of their products they are, more often than not, users who are people like themselves, that is, living in similar circumstances and facing similar problems to themselves. However, the way people live can be very different. It can be argued that, because of this limited mind set, the information and communication technologies in our home address a very small part of the design space that they could do.

The two studies described here illustrate how it is possible to study home contexts very different from our own and hence to discover new possibilities for technological developments. Studying people living in special circumstances does not mean the design solutions that are inspired will not be more widely applicable. All families are occasionally separated putting strains on relationships. Many people pray for others. Focusing not only on the nuns' routines and activities but also their beliefs directed the research in quite unpredictable ways.

5. Acknowledgments

We would like to thank our colleagues at Culture Lab, Newcastle University, particularly Patrick Olivier and Jayne Wallace, and on the Landscapes project, particularly Bill Gaver, Andy Boucher, Nadine Jarvis, John Bowers and Peter Wright and for their part in this work, also the participants in these two studies who let us into their worlds.

6. References

6. Lindsay, S, Jackson, D and Olivier, P. D5.5.1 Guidelines on UCD-based user requirements extraction: OASIS Participatory Analysis Framework (OPAF), 2008.