DESIGN 2002

ENVISIONING DESIGN @ HOME

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1. Introduction

With advances in Information Communication Technologies (ICT), the proliferation and growing complexity of domestic technologies and more flexible work patterns, there is an evident blurring of boundaries between work and home. The bulk of Human-Computer Interaction (HCI) research has focussed on work-based systems. A key message arising from that research is that successful design must be user-centred, but if we examine the extent of end-user involvement in published HCI studies in the home, examples of full 'partnership in design' are extremely hard to find. For example, some studies have concentrated on observing the introduction of new technologies which the intended users have not contributed to e.g. [O'Brien., Rodden, Rouncefield and Hughes, 2000], while others have investigated the use of a technology that is already present in the home e.g. [Venkatesh, 1996]. Another mode of involvement, albeit at arms length, is exemplified by [Gaver, Dunne, and Pacenti, 1999], who asked people to provide information about their lives, when the designer wasn't present and did not plan to involve them in the subsequent creative part of the design process. [Eggen,. Hollemans, and Van de Sluis, 2002] did involve families in the design process, but only to the extent that they were asked to generate concepts from questions that the interviewers had posed, they were not asked to invent or materialise their own design ideas.

One senses from these studies a reluctance from the HCI community to extend design opportunities to end-users: user involvement is limited to parts of the design cycle (typically preliminary requirements generation or post-production usability analysis). We also note a dearth of studies involving whole families.

We felt, therefore, that we needed to developed a new technique which would aid us to: (i) explore the use of technologies in the home and (ii) invite participants to conceptualise in the form of a paper prototype their ideas for a home device. Accordingly it was felt that a series of design workshops was appropriate. Researchers in the past have used design workshops as a way of establishing creative and collaborative settings for design [Buur, & Bødker 2000; Bødker, et al. 2000; Jungk and Mullert 1987].

2. The Study

Five households in central Scotland agreed to take part in a series of home-based workshop sessions. Three workshop sessions of approximately 90 minutes duration were conducted in each home with approximately three weeks in between each session. The researcher took with her to the workshop sessions a video-camera, note pad, audio-tape recorder, scenarios, pictures of future devices, and a tool box containing stationery e.g. glue, paint, pencils, pens, post-its (in various colours), paper, rulers etc.

2.1 The Households

The five households which volunteered for the study, ranged from a family with two young children to a single senior citizen. They were obtained through informal contacts of the first author. All the volunteers continued without problems to the end of the workshop. Despite the households self-

selecting to take part we were fortunate to attract in this small sample, a good cross-section of society, with some of the participants living in affluent areas while others occupied modest public sector accommodation. The age of the participants ranged from seven to eighty-four and educational attainment was varied with some still at school, some having left school at fourteen and some with a higher degree. A summary of the participants and their circumstances is given in Table 1. To preserve anonymity, pseudonyms have been used.

Table 1. Households in the study

Identifier	Who (name, age, occupation)	House	Technology
Cook	Robert (father, 52, Lecturer Sue (mother, 51, Housewife) Dianne (daughter, 10) Tarquin (son, 7)	Victorian, 4 bedrooms, dining room, drawing room, lounge kitchen, two bathrooms, cellar.	A mixture of old and new, games consoles, computers, Television.
Smith	Mike (father, 46, Carpenter) Barbara (mother, 44, catering assistant) Simon (son, 15)	Public sector apartment, two bedrooms, lounge, kitchen, bathroom	High tech, lots of new technologies e.g. digital TV, PC, Mobile phones etc
Sutton	Peter, 72 (Semi-retired builder (own business) Emily, 70 (retired school teacher)	Victorian, large house, converted for their lifestyle e.g. converted two bedrooms into one large room for entertaining.	Mix of low tech and High Tech, standard technologies: TV, Sound system, etc.
Petric and Naysmith	Gordon, (29, partner, administrative assistant) Catherine (25, recruitment consultant)	Semi-detached, newly acquired, two bedrooms, lounge, kitchen, bathroom	Mainly new technologies, games console, mobile phones, etc
Reilly	Agnes, (84, retired cook)	Public Sector house , two bedrooms, lounge, kitchen, bathroom	Low tech, portable TV, small sound system.

2.2 The Home Workshop

The overall study consisted of: one preparatory stage and three sessions. Table two shows the focus and the methods for each of the workshop sessions. A fuller explanation of each method and the results are given in [Baillie, et al 2002]. In this paper we are focusing on session two.

Table 2. The methods and focus for each of the sessions

	Preparatory Stage	Session 1	Inter session activities	Session 2	Session 3
Focus	Planning and collecting families	Investigate Current Problems and Future Possibilities	Collection of data in-between sessions	Envisioning Design	Critique and re-design
Methods	Telephoning families, gathering equipment: stationary, video camera, tapes.	1. "Technology Tour" 2. Representations of emerging technologies 3. Scenarios	Post-it notes	1. Informal interview 2. Materializing ideas for future technologies.	1. Sharing ideas across families 2. Modifying and elaborate designs.

2.3 Session 2: Envisioning Design

The second session focused on envisaging design. Participants were provided with materials (pen, paper, glue, etc.) to create paper prototypes. The final outcome of session two was for the participant to envision and design their own device for their home, in the form of a paper prototype. By doing this, it was anticipated that more would be learned about what people want, or do not want from home technologies,. It was also hoped that this would encourage the participants to think of their own solutions to current problems and envisage some novel ideas for designs of home technologies as McKim said 'visual thinking is not the exclusive reserve of artists' [McKim, 1972, p8] therefore we should be open to visualisations of home designs from families. The researcher set no limits on their design. She further emphasised that they did not have to worry about what was possible at the present time. The only stipulation was that it had to be something they could use in their own home.

MULTIDISCIPLINARY ASPECTS OF DESIGN

3. Design

In this section four designs designed by the participants will be discussed. One of the older participants was hesitant about drawing their own device, therefore, in one instance the researcher drew the device as it was dictated to them by one of the participants, all the other participants managed to draw their own devices. The participants drew thirteen designs in total.

3.1 Universal Remote

The idea for a new device emerged when Catherine was trying to think of an idea for her design, she was sitting in her livingroom, her gaze fell upon one of her remotes (television) and she picked it up, she then looked around the room and focused for a few seconds on each of her remotes (she has remotes for the: video, sound system and television), her glance also fell on her mobile phone which was sitting nearby. Being in her own living room and seeing the remotes and phone in context seemed to help Catherine find the idea for the universal remote concept. Catherine briefly explains her design:

> *Catherine: It is a remote control that does everything switches on your lights, fire, central heating, hot water, television, video, stereo...(Excerpt from transcript: P&N2).*

The remote control (see Figure 1 below) has a small screen and a tracker ball (Catherine did not draw the tracker ball on her paper prototype, as her design had spots on it, which would mean that the tracker ball would not be obvious in her drawing) for ease of use. She said that it was important that people were able to choose their own colours and graphic.
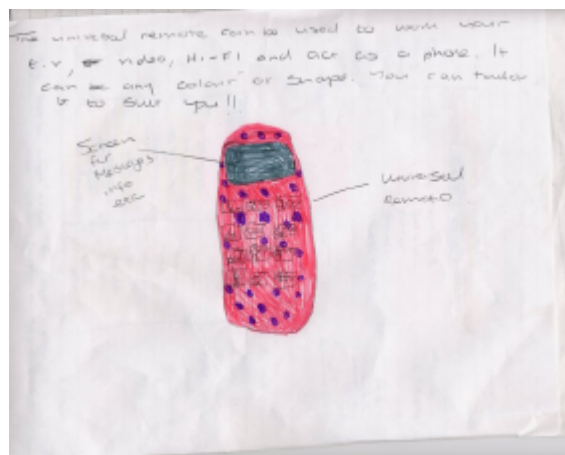

Figure 1. C. Naysmith Universal Remote (WRS2:P&N1)

The idea was born out of a genuine frustration with the current situation i.e. that each device comes with it's own remote control. Since the technologies in families homes generally come from different manufacturers it is difficult to see how a device such as this could be implemented, at the present time without co-operation between manufacturers.

3.2 Recipe Device

Gordon was trying to think of a device which would help him in the kitchen:

> *Gordon: A lot of people enjoy the preparation of the food (cooking). It is all the different things that I have a problem with. If you are cooking something quite complex it's knowing about getting all the timings and different stages all kind of synchronized in so that things are ready at the same time. It can be quite a juggling act if you are not that competent. Something that would help you plan step by step. Like get those potatoes on now. Something that would direct you and keep you right, maybe with some kind of audio sound, or flashing: now add sauce, or timing it for you   (Excerpt from transcript: P&N2).*

This is Gordon describing his design:

> *Gordon: The screen detaches from the base unit the base unit can be used to charge the screen, so that when you are ready to come to actually prepare the meal, you can just pop the screen out and its got little legs that flip out at the back so that you can just stand it on the worktop and the screen just takes you through the recipe step by step. It eh basically it just scrolls the instructions for you telling you (Excerpt from transcript: P&N2)*
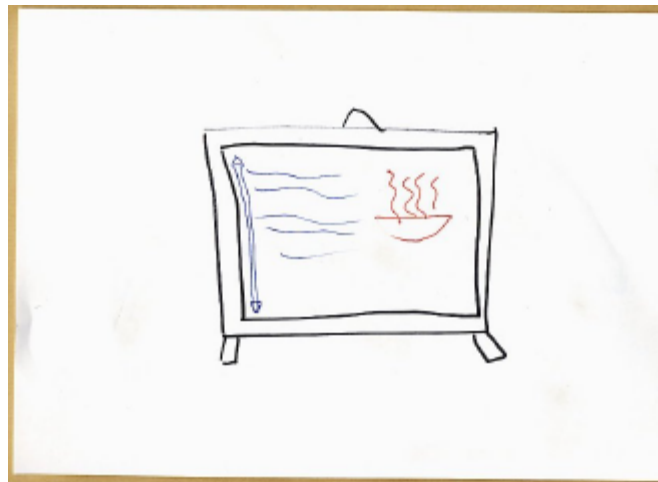

Figure 2. G. Petric Recipe Device (WRS2: P&N2)

This is an interesting device. At the moment people use paper based books in the kitchen, but are paper based books suitable for the kitchen environment? We have all read or heard about digital books and their relatively poor impact on the market. The reasons for this may be the poor quality of design or that the task of reading books, which typically takes place either at a desk or in an armchair suits paper. In the kitchen, however the recipe book is not a good tool for the job. It has to be propped up, or laid down on a counter or a work bench. It gets splashed on so pages end up getting stuck together. The cook sometimes need to change pages, just at the moment that his or her hands are covered in flour. A small digital recipe book that could be wiped clean, recognise basic voice commands, issue auditory clues, and be easily hung on a cupboard or stand on its own, would, it seems, improve the current situation.

3.3 Home warning device

This is a panel that would hang on your wall and would have a family picture, painting, or drawing displayed, when not in use (see figure 3). Peter felt very strongly that he did not want a screen taking up space and dominating the room, he wanted something pleasurable to look at and that would merge into the background of the room. Peter is explaining his device:

> *Peter: It would flash up, A light would flash if the doorbell rings, in case you can't hear it, or a light would flash if you had left the oven on to long. It would have to be somewhere in the room that it would catch your eye and then you would go up to it and see the individual light and see what has happened. I would want the light to flash and for the display to pop up, it could be in your lounge, bedroom, kitchen, it could also be in the toilet (Excerpt from transcript: Sutton2).*

Figure 3. P. Sutton Home Warning Device (WR2:.SUT2)

This idea seems to be one that would be relatively easy to implement. It is interesting that Peter only wants the device to be visible when it is required and disappear into the background when not in use. The fact that a senior citizen designed a device, which would help him as he grows more infirm was interesting. Many researchers at the moment are looking at building 'smart homes' and trying to 'guess' what senior citizens would want from this type of home. This design shows that it would be of benefit to researchers and to senior citizens, if researcher were to talk to senior citizens about what they want from a 'smart home' and involve them in the design process.

3.4 The Automatic Lawnmower

Robert Cook designed an automatic lawnmower. The lawnmower would be programmed with the layout of the lawn:

> *Robert: You just have to take it out once to let it work its way round the garden and it could learn from that in order to go and mow the lawn and in the future according to the same pattern. The lawn mower could have the ability to store more than one possible lawn layout (Excerpt from transcript: Cook2).*

The lawnmower was an interesting choice for Robert to make, one of his household tasks is to mow the lawn, this was obviously something he found boring. Therefore it seemed natural, for him, when thinking about a device for the home to think of a device which would free-up his time, so that he could do something he enjoyed instead. However, there would be many practical and technological hurdles to overcome before a design such as this could be produced.
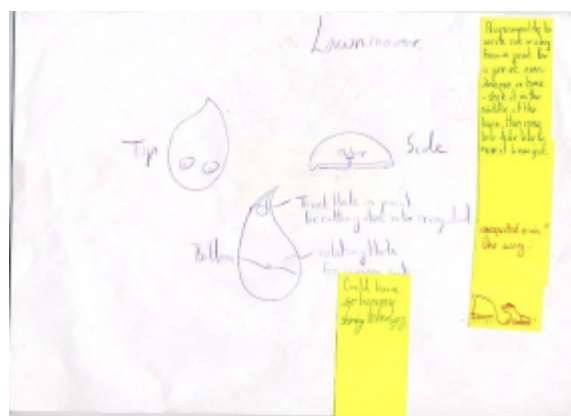

Figure 4. R. Cook Automatic Lawnmower. (WRS1:CK1)

4. Conclusions

We as researchers are sometimes guilty of feeling that people cannot articulate their ideas for the future without help from us. We can also sometimes assume that they cannot envisage novel solutions or ideas for the future. As technologies become more ubiquitous and invisible. It is essential that the people who will use these devices have an input into the design so as to improve the usability and acceptability of those devices for all.

During the course of the workshop it became clear that people, of various ages, could indeed envisage novel ideas for future homes/devices, if not practical at the present time. The devices designed by the participants were never intended to be seen as finished designs but were in fact intended to be seen as visualisations of possible future homes or devices which the participants wished they could have. The design of new technology is ultimately in the hands of the experts. This study shows one way of involving users in the design process and how this can result in experts gaining insightful glimpses into the need and wants of users.

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