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Artefacts for understanding

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Abstract

This paper discusses two aspects of artefacts in the design process. The first is how artefacts can be used to inform researchers about people's context, desires, concerns, needs and constraints. The second is how artefacts can facilitate the construction of shared knowledge that is needed during multidisciplinary research projects.

These two ways of looking at artefacts will be discussed mainly through the empirical material of the interLiving project, a 3-year multidisciplinary cooperative design technology development project and also through several cooperative design workshops conducted at CID, Centre for User Oriented IT Design.

Introduction

Artefacts

Different disciplines look upon artefacts in different ways according to what the discipline requires. Many researchers have the material culture, the artifacts, as their empirical material, perhaps the only material they can acquire, like archaeologists for example. The artefacts are the physical remains of human activity, the starting point for understanding of a culture (Appadurai, 1986, Tilley, 1990).

Artefact derives from latin *arte factum*, which means artificial. In general, that implies an object made by the

human hand, an artificial object. Artefacts are manmade for a specific purpose with an intention of fulfilling that purpose. Sometimes they also fulfill unspoken purposes. This paper addresses some aspects of the intentionally made artefacts and their way through the cooperative design process and how they will be attached to new meanings on the way.

interLiving and cooperative design

interLiving, Designing Interactive, Intergenerational Interfaces for Living Together, is funded by EU's program IST FET "Disappearing Computer" and the partners are CID (Centre for User Oriented IT-Design) at the Royal Institute of Technology in Stockholm, INRIA (Institut Nationale de Recherche en Informatique et Automatique) and LRI (Laboratoire de Recherche en Informatique Université de Paris-Sud) in Paris.

At the start of the project there was no explicit need, desire or problem that was to be addressed. Nor was there any specific technology that was preferred.

Our approach was to:

- engage with several real families for a longitudinal cooperative design process,
- have a multidisciplinary team of researchers from ethnology, psychology, graphic design, industrial design, interaction design and computer science and art.
- use a collection of diverse cooperative design and other methods.



Figure 1. The kit of cultural probes given to the families.

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One aim of the interLiving project was to investigate and develop new methods to work in close collaboration with the users through out the whole project. Our experiences from interLiving have been fed into other work performed at CID. We have conducted several workshops with different user groups, mostly with people that have different disabilities.

Cooperative design derives from a Scandinavian tradition of working closely with the users throughout the whole design process (Bødker, et al., 1987, Greenbaum and Kyng 1991). The users in interLiving are three families in Sweden and three in France. Each family contains of several, typically three, households. The participants' ages vary from one year to 73. The user group is the family and therefore not homogenous at all. Their skills and capabilities differ massively. Over the three years of the project, as the participants grew older they changed their individual skills and capabilities.

Multi-disciplinary work

The multi-disciplinary teams contained researchers from ethnology, psychology, graphic design, industrial design and computer science. To understand as many aspects of an individual's needs, goals, wishes and desires, and to give input to the design, we have chosen a multi-disciplinary approach that draws from social sciences and design and engineering fields. This approach, called triangulation (Mackay & Fayard, 1997) assumes that we will learn more if we experiment with multiple methods to investigate the same aspect or question. Each science has it own well-trying methods, which work well in its own context. When working in a multi disciplinary team, as in interLiving, we had to tear down barriers of firm and

grounded knowledge of how you do research and find new ways of working together, to blend the different methods and perspectives into joint multi-disciplinary research work.

This means that the collected and generated data, which is normally used in one discipline, will be used by researchers with other backgrounds. The log files, for example, that a computer scientist normally use to control that the software is working properly, can also be used by an ethnographer to get a better understanding of the users context and strategies.

Methods

To understand users needs and desires we are using a variety of research and development methods from cooperative design, CSCW (computer supported cooperative work), industrial design and ethnography. Some of the methods used are cultural probes (Gaver, B. & Pacenti, E. 1999), workshops (Westerlund et al, 2003), technology probes (Hutchinson, H. et al, 2002), observation and interviews.

The *cultural probe* method is an open-ended self-documentation activity that in our case involved taking photos and video as well as writing diaries. These would hopefully reveal more of the individuals' preferences, desires, context and needs. This would be done much with the users' own categorizations.

Technology probes were invented to collect information of how users would use, to them a not known shared communication artefact. The technology probes are based on well-known technology, they should be easy to use and open-ended. Technology probes combines the social science goal of collecting data about the



technology use in a real-world setting, the engineering goal of field-testing technology and the design goal of inspiring users and designers.

The *workshops* themselves included several methods, like brainstorming, building scenarios, video-prototyping, low-tech prototyping, etc (interLiving, 2003). Instead of general descriptions that are reduced and without detail, we focus on actual descriptions of real situations that make sense to the family members. These descriptions should cover the whole context of the situation. We encouraged the group to think of communication situations that would have been problematic. From that they made scenarios, both written and drawn, but most importantly stage it and videotape it. Through videotaped scenario iterations they refined their design ideas.

Artefacts used by the users

The cultural probes, which in them selves are sets of designed artefacts, are used by the users. Each household in interLiving filled diaries with words, drawings, tickets etc. concerning their family communication. When looking in them, we understood that it was mostly one person from each household that had been annotating the diary. The notes were only one person's point of view. How they had written and what varied a lot.

Red family, Thursday the 17th of April

David called friend

Monica called David

Monica called Maria at work

Maths called Maria on mobile

Maths, Maria, David ate at a pizzeria

Maria & David hit on the driving range with David's new golf set.

Blue family, Thursday the 17th of April
Mother called to check how things were. Sussi called and asked how we felt after the weekend.

Green family, Thursday the 17th of April

Back at work – many messages during the day on the answering machine at the reception. Can't make it to call everyone – bring that part of work home. Calls, during the evening, some patients to book appointments. Some work e-mails were collected on the home computer.

On the way home from work I call Lennart from the car to his car, wondering who has time to do the shopping. It will be me, who has come a bit further on my way home. In the shop, Sara calls – wondering if we can baby-sit in the weekend. Give some times and activities – she is thinking and will call back.

All three examples are written by mothers, about their own and other family members communication. These three women wrote the most in the household diaries. Husbands and children wrote too, but not as much. That made us aware that what is said comes mostly from one perspective and one way of writing.

Artefacts created by the users

A more explicit task was to take photos of “places where you leave messages to others”, “things that remind you of others” and “things that look nice and ugly”. They used the probe cameras to take photos in response to the questions. They then sent the film to a photo-lab, received the photos some days later and then annotated them on the back with remarks concerning the questions. This

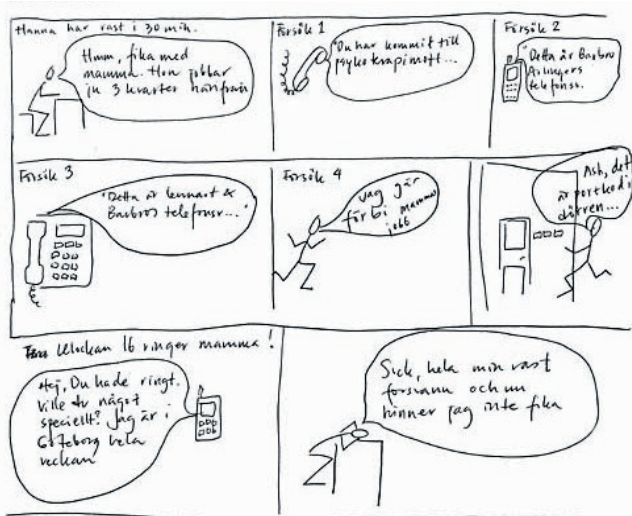


Figure 2 (left), The videoProbe is an example of a technology probe.

Figure 3 (above). A use scenario describing a communication breakdown.



Figure 4 (above). The tape dispenser here represents a recording device.

activity addressed all household members but it turned out that it was mostly one of them doing it.

It became obvious that this format, the diary where you write your experiences, works well with people who like writing. The cameras, two per household, were not enough to receive input from all members. To get everyone engaged in the task, we would need to make probes to give to all family members, and to adjust every probe for that specific individual, according to capabilities and age etc.

Perhaps the most important part of videotaping a scenario at a workshop is that the design idea must be very clear. The medium itself, with frames and sequences, sound or not sound, forces you to be very specific, or else the idea will not be understood. The video is the shared artefact that enables a team to make a shared understanding of an idea.

To visualize the design idea, you can make prototypes (artefacts) which enable you to describe the idea to yourself but also to the project group. One example from the interLiving project was the BongoFax.

The BongoFax was created by a teenage boy during a joint family workshop at CID. The idea it represented is more or less a tele-porter. The boy presented it to the whole group by telling us his scenario.

If for example the toilet in your home is occupied or something, you can just dial your granny's telephone number, jump into the machine, and them pop up at her place, use the bathroom and then dial your home number, jump into the machine again and come back home.

While he was telling the whole group this, his father looked a bit uncomfortable and tried to interrupt the presentation. He thought the idea was a bit stupid. The father instead, presented the idea to put GPSs on all his sons, so that he could keep track of them.



Figure 5. The BongoFax prototype.

Every time we need to go somewhere and I tell the kids to wait out by the car, they are all gone by the time I come out. It is the same thing every time. I never know where they are.

These prototypes were the first and perhaps the most obvious artefacts to represent the asymmetric communication pattern in the families and especially within the households that were created in interLiving.

Artefacts in the process

The artefacts became tools to think with as well as vehicles for revealing needs and desires.

Probe photos, were used as starting points for the interviews that followed. They became the tangible thoughts on communication surfaces in the home, as in the case with the drawer (see image 6). Through the paper print photo the team and the users could hold on, see and talk about the same specified *shared surface*, shown in a specified context. Verbal descriptions of the same context would have made the research group make their own imaginative pictures of a shared surface and of the context.

When working with small children, 2-4 years old, you need to have tangible, visible things to concentrate the activities around. Concepts and abstractions do not work very well at all. We gave the youngest interLiving children Polaroid cameras so that they could create a photo, a representation of something, right away. They could then make comments and a grown up could write it down on the very same representation. They then put them in a photo album. And afterwards the children could show us, the researchers, their album.

The children liked the cameras very much because of the obvious way of how to handle it, the robustness and the instant delivery of the photos. The Polaroid became the entrance to the cooperative work with them.



Figure 6. The top of this drawer worked as a shared information surface.]

The albums became representations of many things but most obviously that children grow and their perspectives change fast.

All the interviews were recorded on video, and cuts from the different interviews were assembled by the researchers into a summary. This summary video was used to frame the work in one of the following workshops. The sequences in the video became the shared reference about a topic that all participants could relate to. It became the starting point from which the workshop could start.

The meaning of artefacts, summarizing thoughts

Throughout the whole interLiving process we learned that artefacts have several different roles.

- For the users to inform the research group about their lives, experiences, needs and desires etc. (workshop outcome, videos, probes, etc)
- To facilitate reflection in action and interactive cognition (prototypes, workshop outcome, videos, probes, etc)
- To feed the design process with design ideas. (prototypes, videos, etc.)
- For the multidisciplinary team to construct shared understandings of the family members. (all)
- For the multidisciplinary team to construct shared intentions of the design space. (all)

The first three items in the list are rather obvious and expected. Artefacts can of course facilitate someone to communicate issues to someone else. The photo and video artefacts worked as representations in ways that words hardly could have done. This is especially important since nearly half of the participants were



Figure 7. A video cut from an interview regarding a child's photos.

children. It is also well known that artefacts help us to reflect and understand in different ways (Schön, 1983. Gedenryd 1998: 115). Although design ideas are what you hope that a design workshop will result in we found that these designs actually more contributed to deepen our understanding of the users.

Shared understandings and intentions

One very important discovery for us was that artefacts helped us to construct and understand our shared intentions. The BongoFax and the story around it became the representation of our intent of developing communication technology, and not surveillance equipment, i.e. the researchers implicit intentions. It is also one representation of the asymmetric communication, i.e. it helps to reveal the different intentions that the father and his sons have.

Another shared object on the topic of asymmetry is a video clip from an interview with one of the mothers, expressing that – *It is not everybody's right to be able to reach me all the time!*. She was referring to mobile phones and that she sometimes shut it off, just to be alone. Our intentions of making communication technology that is not intrusive became clear to us in that video clip as well as in the BongoFax example. These needs of sometimes being left alone, overlap with our intentions with the communication technology and thus gives us a clearer view of the preferred design space.

Concepts have different meaning to people with different background, i.e. from different disciplines. The artefacts provide a non-verbal representation that can be easier to understand and work together with than words. This is of course important when working with small children.

When working in multidisciplinary groups, you may speak the same national language but you seem to oppress the fact that with different disciplines comes

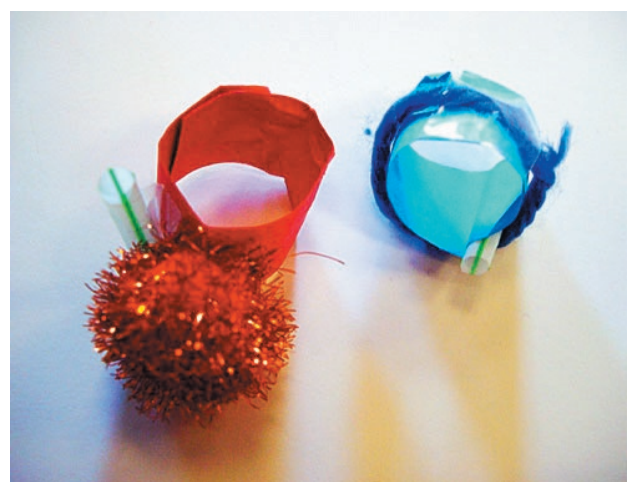


Figure 8. These prototypes revealed a couple's desire to keep in touch during work.

different meanings of the same concepts. Of course, both spoken and written language is of utter importance since it helps us to define and be explicit. But if language is a barrier, the artefact can help to open up and to make us reach a shared understanding.

All these are representation of previous work, but also as a reference to what we once did, thought and knew.

Thus hand in hand with our understanding of the family members, partly through artefacts, we gradually increased our understanding of the design space, i.e. the possible future artefacts that could fulfil some of the communication desires and needs that they had.

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