DOMESTICATION AS DESIGN INTERVENTION.

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The paper reports a study in which design prototypes where domesticated in different households in order to collect responses to them. These responses were then compared to the intentions that were articulated by the designers in a previous study, and embedded in the design of the design prototypes. The results indicate that some of the intentions were found whereas others were not. For example, the scenarios for use presented by the designers were not realized in actual use. Nevertheless, the more abstract intentions articulated for these prototypes were found. On the one hand, the results suggest that design prototypes act as domestication probes that provoke users and help them reflect upon their values, experiences and attitudes in a way not easily accessed by other means. On the other hand, the study illuminates the practices and procedures that people use in order to tame, i.e. make understandable, a material newcomer in a material environment. The results point out some of these folk methods. For example, 1) they understand a newcomer through creating links to historical and existing artifacts, 2) a newcomer may succeed because it makes sense socially, and 3) it may succeed because it finds a slot in the (eco)system of the household. On a more general level the paper discusses the ways in which domestication may be used as a design intervention.

INTRODUCTION

What we think of a product at first sight and how we respond to it in use may be two different stories. In design process, there is a need to predict/understand how a first experience of a product may succeed in upcoming use; *i.e.* whether a product that seems amiable at first encounter will succeed in later use, or whether a product that makes an indifferent first appearance may redeem itself in actual use. These facts give rise to design inquiries through domestication.

The paper reports a study in which two design prototypes where domesticated in different households in order to collect responses to them. More specifically, the prototypes were designed with particular intentions that were embedded in the artifacts through form giving. The paper will ask whether and how these intentions were found in the use, and what these kinds of field experiments might enrich inquiries into design.

BACKGROUND

The investigation builds on a project named Static! conducted and led by the Interactive Institute in Sweden (see Backlund *et al.* 2006). It was a project that took interaction and product design as a means for rising people's awareness of energy use in everyday life. The underlying assumption guiding the initial project was that design might affect people's awareness and choices. On the basis of this assumption, the project aimed at exploring the power of design in enabling and disabling forms of behavior. These aims were linked to the objective to create a more in-depth view on how energy might be used as material for desing. These goals were approached through creating a series of examples that

would identify design opportunities. (*Ibid.*) The ideas then were realized in concrete designs (*ibid.*), two of which came to be the objects to be domesticated in the current study.

The prototypes that came to be domesticated were originally designed without a prospect of a domestication study to come. Rather, the idea of conducting the study reported here was born as a result of a conference presentation (Ernevi et al. 2005) and through networking. The head of a domestication project, Prof Koskinen, proposed for collaboration, and two of the Static! prototypes immigrated to Finland. The paper reports this process. Following questions guided the investigation:
- How will the users receive the prototypes?
- Do they interpret them in accordance to the design intentions embedded in them, *i.e.* do they increase energy awareness?
- Will the prorotypes find a slot in the material and social system of a home?

DOMESTICATION PROTOTYPE DESCRIPTION

The two prototypes to be domesticated were the 'Energy curtain' and the 'Erratic radio'. The Energy curtain looks like a Roman blind but as a Static! appliance it is an augmented version of the standard version. Having solar panels, LED lights and optical fibres interwoven in it, the curtain is able to save sun light for later use. (Backlund et al. 2006.) The Erratic radio, on the other hand, is an interactive device that communicates with the household with reference to the overall use of electricity. The radio can be listened as a normal radio but in addition to that, the radio itself 'listens' to its surroundings. When it detects other electric appliances being used in its environment, it loses the tune and starts to make disturbing noises. (Ernevi et al. 2005; Backlund et al. 2006.)

THEORETICAL BACKGROUND

The inquiry is rooted in domestication approach that was founded by Roger Silverstone and colleagues during the 1980s. The domestication approach (Silverstone & Hirsch 1992) addresses questions such as how households with similar socio-economic backgrounds still do, buy and enjoy different things (Silverstone 1994, 44). This framework of research emerged in the current of growing interest directed towards consumption and everyday lives (Haddon 2004, 3). Researchers of consumption began to find their way through the closed doors of private homes in order to understand the processes involved in people taming artifacts (cf. Miller 2001, 1-5; Haddon 2004, 4). In other words, the domestication/taming metaphor refers to the active meaning construction in which the end users are engaged both mentally and in real time actions when they make sense and use of their material environment. Newcomer artifacts represent a challenge for the context in this framework. During the domestication process, a new product finds an "ecological" slot in the material and social system of a

household (*cf.* Nieminen-Sundell & Pantzar 2003). All in all, domestication is a qualitative approach to understand consumption and the forms it may take in individual households, in its time, age- and gender-bound activities (Silverstone, Hirsch & Morley 1992; Berker *et al.* 2006, 3-4; Haddon 2004, 4). The framework is most sensitive to moral issues such as what is conceived as appropriate or inappropriate for a given household, how the practices and choices manifest values.

In the field of design inquiry, domestication approach has been utilized as a means for design interventions. The Interliving project developed a set of semi-functional prototypes that were called technology probes. Basically the project aimed at collecting information on three levels by domesticating these probes in households (Hutchinson ym. 2003). For one, the sociological objective was to collect material on the ways in which technologies are used in real world domestic settings. For two, the probes enabled the developers to test novel technologies in the natural context. For three the idea was to inspire both designers and users to think of design opportunities and to think differently about everyday routines and the ways in which they could be conducted. These three types of information guarantee rich data. These data were then interpreted and utilized for scenarios that were based on everyday practices and participants' experiences. Both the scenarios and the experiences were further iterated in user-centered design workshops. According to the philosophy of Interliving project, the technology probes were functional in some respects to feed imagination but they were not yet new solutions. Rather, they were design proposals for probing new opportunities by putting some existing technologies together and trusting on users' imagination. It was crucial that they encouraged households to playful interactions, recordings and communications. For example, one of the probes was a webcam that took pictures voluntarily and sent them over to another family member.

Urban probes by Paulos and Jenkins (2005) is another instantiation of domestication probes, although in this project, the domain of domestication is not a household but urban in-between spaces, that is, spaces in which people emerge when they want to get from office or school to home and hobbies.[1] The urban probes aimed at collecting Urban Atmospheres through 4 sub-themes: place, community, infrastructure and traversal (paths and routes). From these angles, Paulos and Jenkins wanted to address some of the ambivalences of in-between spaces – crowded but lonely, comforting and frightening, public and private, shared but exclusive. Beyond the cases they describe, the importance of Paulos and Jenkins' (*ibid.)* article is in the specification of a domestication probe. A technological domestication probe is a semi-functional artifact that is introduced to an environment in which it provokes the usual way of life. This specification means that the probes are not paper prototypes but employ some functionality. However, they are not produced to solve a

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[1] In a sense this view of urban city does not resonate with ideas of urban space as a public living room.

particular problem or improve a task. In this end they are loose or open ended. Actually, they conclude that even unpractical artifacts may function well as domestication probes. If the artifact is able to draw attention to the environment and human conduct in that environment, it can be regarded as advantageous.

The History Tablecloth reported by Gaver, Bowers, Boucher et al. (2006) is an example of an artifact that is *not designed for a purpose*. Instead, it is designed for a homo ludens, the playful human being, to explore, reflect and share in a temporal reality. The point of History Tablecloth was to make history visible. That was afforded by an embedded technology. If an object was placed on the surface of the cloth it caused a halo effect to form under and around the object. Moreover, when the object was later removed, the halo effect would remain and only gradually fade. This function made the history of objects perceptually salient. This way it communicated how objects moved in the household. Because the History Tablecloth was not understandable in terms of purpose, it instigated the household members to domestication through interpretations. However, the prototype was not a product of a completed design project but more like a draft to be tested. Therefore, it did not always function as intended. Especially the unexpected traits in its functions (sometimes the halo effect did not fade, sometimes it did not occur) put the test persons' minds in work when they tried to make sense of its functions. The explanations created new sensitivity for material context. In addition, the tablecloth brought meaningfulness to everyday domestic activities like setting the table for dinner. Socially, it promoted discussions and new guessing games.

Previous inquiries indicate clearly that introducing semi-functional, unfamiliar objects into a familiar everyday context, and leaving them there for while, is an effective way to provoke. An unidentified object helps people to reflect upon their experiences, desires and values. For designers such information is a source of inspiration.

METHODS

Based on the domestication approach in general and the design interventions described above, the objective in this study was to domesticate two prototypes. The prototypes were given form bearing on energy. The investigation was conducted as a set of field experiments. In them, a Static! prototype was left in a household for up to six weeks. This was called the domestication period, and it was both the basis and a trigger for information gathering. Information was gathered through interviews, e-mail communication, user diaries, photographs and video recording. All the households who agreed to domesticate the energy curtain were double or single parent families with 2-3 children between 5-16 years. Two of the households who agreed to try and tame the erratic radio consisted of a couple with or without pet animals. Two of the radio households were families with three children.

Both the radio and the curtain had in one household a domesticator who had design education.

Two interviews were conducted in each household: one in the beginning of the test period when the prototype was brought to the domestic setting, another in the end of the domestication period when the prototype was collected. The opening interviews were semi-structured with the help of an interview sheet to encourage the household members to describe themselves loosely in terms of household composition, education and interests (see picture 1 below).
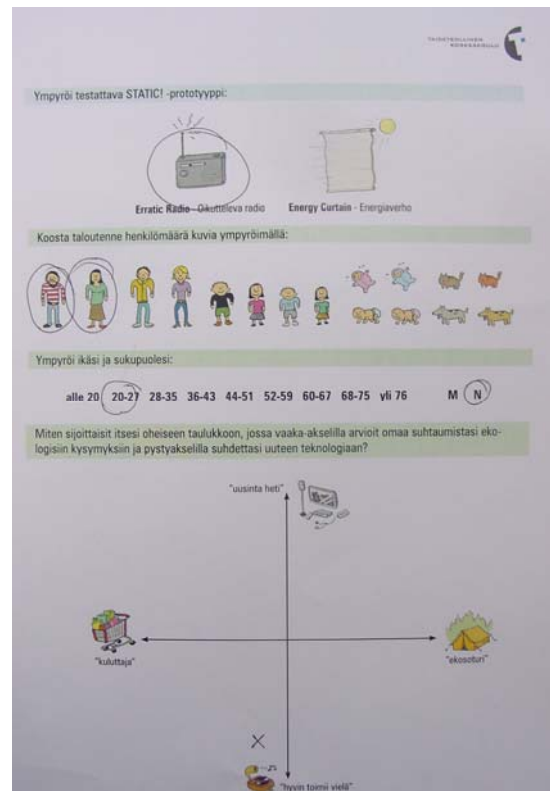
Picture 1. Background information was elicited with the help of a visualized information sheet.

Since the prototypes were designed to increase energy awareness and address issues of sustainability, it seemed necessary to find out about family member's attitudes towards this issue. However, energy awareness is a rather abstract notion, and therefore it was translated into issues of energy consumption and, what seemed the most down to earth sustainability issue, recycling. In addition, energy awareness is not a matter of either-or opposition but a gradable one. A person's energy awareness may rise or fall during a time period; different persons can be compared as being more or less aware of energy. Therefore, the interviewees were asked to place themselves on a continuum between an eco warrior and a serious shopper (the horizontal axis in picture 1). In addition, as the prototypes were also novel technological devices the users could not be familiar with, they were also asked to position themselves on an attitudinal

continuum between the poles of trusting the old technologies or being eager to buy the latest ones (the vertical axis in picture 1). The sheet was realized by a BA level design student Tatu Piispanen who also conducted approximately half of the interviews, the rest of the interviews were conducted by the author. During the first interview, the prototype to be domesticated was introduced. The families were told that they were designed by a Swedish design studio in a project that focused on energy. It was told that the energy curtain was supposed to collect day light and glow it in the evening. The researcher(s) volunteered in helping with the installation, and the domesticator was recommended to keep daylight and points of compass in mind. The final decision on what window the curtain should be placed was naturally left up to the domesticator. The erratic radio was introduced more mysteriously. The families were told that it was a radio but not a usual one because from time to time it was erratic. The test persons then were encouraged to find out if its twists could be explainable.

For the domestication period, the households were also provided with a diary to take notes on their experiences with the devices. The diaries were sent to the researcher approximately a week before the prototype was collected and a final interview was made. In the final interview the test families were asked how different family members had understood the prototype, how it might have come up in social occasions when somebody was visiting the home, whether the users had come to think about how that device might be used in another context or developed to meet the users needs and desires more accurately. The domestication interventions were conducted during the winter 200 –2006 from November to April.

RESULTS
The interviews indicate that the test participants were more likely to place themselves closer to the eco warrior than the serious shopper end of the vertical axis in the trigger sheet. Yet, when asked to justify their placement through examples of their ecological behavior, there was wide variance. In this sense, the absolute value of self assessment did not correlate with the reports on behavior in which the users manifest their ecological attitude. Thus the answers indicate that being an ecological person is a disposition people want to confirm. This attitudinal climate can be interpreted as an opportunity for ecological design.

With reference to the question regarding technology acquisition, the placements on the given continuum were more heterogeneous. In this sense, there seemed to be more freedom for individual choice in the acquisition of technologies, although none of the test persons located themselves in the poles of the given continuum. In this sense, also these answers add to a picture of a moderate and reasonable consumer.
EXPERIENCES WITH ENERGY CURTAIN
The first contact with the energy curtain involved installing. In two families the curtain was later reinstalled on different windows during the test period

in order to find a better window. In these reinstallations the family acted for the benefit of the curtain, eager to see it lit. However, these households had to admit that the curtain did not live up to expectations. This is how one of the domesticators, a woman in her late thirties, describes the first encounter with the curtain in an e-mail:

> "I was left alone with the curtain after dark. I went to bedroom and pulled the curtain down. Well, I did not succeed immediately: I had to put the electric lights on and pull the strings before the curtain came down.
>
> Then I turned off the light, I even closed the door and sat on the bed expecting that the curtain would glow. I watched and watched and was imagining seeing something but it was probably only an illusion. The curtain was dark and I was pretty disappointed."

Picture 2. One family decided to cheat in order to make the curtain glow. They used a bright light appliance to charge the solar

In three out of four households the curtain did not function as intended. In the fourth family it finally started to enlighten as expected. That depended on two contextual factors: the domestication period took place in the late March and beginning of April, which means in our latitudes that there was daylight available; in addition, the curtain was installed on a huge window facing to south.

Had the test period focused on usability, the conclusion must have been that the curtain failed. As it is, the curtain was intended to act as a technology probe that provokes households during a period of domestication. Gaver et al. (2006) report with reference to the History Tablecloth intervention how, paradoxically, the insecurity of a domestication probe encouraged the users in an active interpretation and reflective work. Exactly the same phenomenon occurred with the curtain. The designers had sketched that energy awareness will increase when the users have to decide whether to a) take the sunlight during the day or b) spare it for the night (Backlund et al. 2006). In addition to that scenario, one of the families articulated a more serious one: The curtain must be pulled down in front of the window all the time, otherwise it will not glow at all. But if the curtain is pulled down, the family must use electricity for

lighting. This observation made them realize the difficulty of reducing energy consumption. In addition, all the rest of the families reported how the curtain helped them realize how dark it is during winter up in the North Europe. These reflections point to the point that indeed the curtain did increase the users' energy awareness.

The energy curtain proved to offer a subject in social encounters. The families report that visitors were fascinated with the idea of it. They also received suggestions about companies that should be contacted in developing the idea and the technologies. This links to the inspirational aspects of the energy curtain. All the families came to think of alternative solutions with led lights and solar cells. Would it be nicer to have the functions in Venetian blinds? Should the solar cells and the illumination be separated locally? What if the light would appear in an installation on the wall? Could we recharge our mobile phones with solar power if we would have solar cells in our back bags, hats or bicycles?

EXPERIENCES WITH ERRATIC RADIO
According to the test persons, the erratic radio was easy to understand in the first place: it was recognized that there were only three knobs. The users did not experience a need for a manual although the mother in one family made an inquiry whether a manual was enclosed.

Because the erratic radio was relatively small and not heavy, the families did not situate it in one place and leave it there but the radio turned out to travel in every household. In one family the radio was first taken into the kitchen because it was the place in which the family normally listened to the radio while reading the morning paper and having breakfast. Soon the family members found out that it ruined their mornings and they started to relocate it. Same happened in another family where the radio started on the sofa table in the living room but was soon moved to other rooms one after another. In these two families the radio was soon abandoned.

The other two households consisting both of a couple took a different approach. They started an investigation in order to understand the appliance and its twists. One of the couples concluded that wherever they take the radio, it becomes erratic after 10 minutes. In other words, they tried to make sense of it on the basis of duration. The other of the couples adopted a detective approach. They took photos and video recorded the use in different places, even on the washing machine in the bathroom. The overall result was that the families did not find enough consistency in their interactions with the radio.

Picture 3. TO be inserted: Radio travelled to a bathroom.

At some point of the domestication period the households were informed by the researchers that the radio was designed to be erratic when many electronic devices nearby were in use. The designer scenario had been to force the user to make choices between different appliances (Ernevi et al. 2005). One of the couples happened to reflect upon this idea in detail:

> It did not function as intended…sometimes we had nothing on but we only got the buzz…I mean should we go and call the neighbours and tell them to shut down their appliances?...I don't know but how many people just listen to the radio? should I sit in the dark and listen to the radio?…usually I listen to the radio when I'm on the computer, like who only listens to the radio, the function could better be embedded in a TV set.

Also socially the erratic radio was not as fruitful as the curtain was. One of the reasons may be that since it was smallish, it was not as easily noticed by visitors as was the energy curtain. Nor did the erratic radio inspire as many suggestions for further development. Among those articulated was a suggestion to create a mobile appliance that was easily moved from place to place. In one family it was suggested that instead of sound a visual indicator of electricity use might be less disturbing. A proposal was made that a separate appliance could be developed: Who would want to buy a radio that did not serve as a radio? Instead, somebody might be willing to buy a gadget that would interact with an existing radio or a television set. All in all, nobody claimed interest in owning the erratic radio even if they felt a bit sad when it was collected from the household.

INTERPRETATIONS

On a more general level, both the curtain and the radio were interpreted through anchoring. These anchoring practices represent folk methods of understanding on the basis of previous experiences. One family understood the energy curtain by comparing it to a traditional Finnish wall hanging, 'raanu'. By this link to the tradition and history of handicraft, the aesthetics of the prototype were connected with something the family was already familiar with. As to the radio, also it was anchored in the history of radio transmitters. One family enjoyed the radio because it was 'nostalgic'. It reminded them of the good old days on the country side with the grandparents when they used to listen to a tube radio. For another couple the aesthetics of the radio represented retro style and they were taken back to the times when they had been kids.
In creating historical links the domesticators were likely to mention people and places that were attached to certain historical periods of their lives. These personal connections seemed to add value to the users. Even if the users were not always very active in interacting with the prototypes, all the households except for one reported that they felt a loss when the prototype was collected. Creating personal links had been one of the ways to attach oneself with the artifact. With reference to social links, the curtain was more successful in affording social interactions. Visitors to the test households noticed it, and were willing to discuss it. In this sense the erratic radio had not as much initiative capital as an artifact. However, some of its domesticators had discussed it with their friends and relatives.

In one of the households that domesticated the energy

Picture 4. The users anchored the energy appliances to familiar artefacts through seeing them in a historical sequence.

curtain, the curtain enabled to find an ecological slot in the practices of the household. In that home, the family had their shared computer in the living room next to a huge window. They had been suffering from light reflections on the computer screen. Being installed next to the computer the energy curtain helped with the reflections.

CONCLUSION

Domestication as design intervention is a powerful tool for user evaluation that is able to go beyond the first impression. The ideal tool for this kind of intervention is a semi-functional interactive appliance. Semi-functional involves here that the appliance is not yet a completed product ready for launch. Instead, it lends itself to be interwoven into practices in ways that cannot be anticipated by its design. Some sort of functionality is advantageous for provoking responses. The case presented in the reported investigation consisted of a domestication intervention where two Static! prototypes, the energy curtain and the erratic radio, were domesticated each in four different households for a period up to six weeks.

The findings here as well as those by Gaver et al. (2006) implicate that the uncertainty and instability of functions in a domestication probe are especially likely to trigger interpretations and enable people to reflect upon their experiences and aspirations. In domestication the users make reference to the context of their everyday lives. The context consists of the material and social environment but also the history of artifacts and the history of people's lives are present in interpretations. . On the one hand, the results suggest that design prototypes act as domestication probes that provoke users and help them reflect upon their values,

experiences and attitudes in a way not easily accessed by other means. On the other hand, the study illuminates the practices and procedures that people use in order to tame, i.e. make understandable, a material newcomer in a material environment. The results point out some of these folk methods. For example, 1) they understand a newcomer through creating links to historical and existing artifacts, 2) a newcomer may succeed because it makes sense socially, and 3) it may succeed because it finds a slot in the (eco)system of the household.

The paper reports an investigation that builds on the project Static! As compared to the designers' intentions in Static! (see Ernevi et al. 2005; Backlund et al. 2006), the responses indicate that some of the intentions were found whereas others were not. For example, the anticipated scenarios for the energy curtain and the erratic radio were not realized in actual use. Nevertheless, the more abstract intentions on the level of energy awareness that was articulated for these prototypes were found. Domestication as design intervention addresses the issue of how the first experience of a product or an artifact changes over time and what are the critical feature in its domestication. Domestication probes intrude into practices; while doing so they provoke alternative practices or at least alternative interpretations of them. This is the perspective they have to offer for design inquiry.

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