THE NATURE OF PEOPLE'S ATTACHMENT TO OBJECTS – HOW EMOTIONAL TIES CAN HELP INFORM THE DESIGN OF ELECTRONIC DEVICES

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ZUSAMMENFASSUNG

Ziel dieser Studie ist es, ein besseres Verständnis über die emotionale Verbundenheit von Menschen zu unterschiedlichen Gegenständen zu erlangen, um einen Einblick darüber zu erhalten, wie elektronische Geräte nachhaltiger gestaltet werden können. Hierfür wurden Interviews durchgeführt, welche sich auf Gegenstände in den Haushalten der Teilnehmer sowie deren Einstellung in Hinblick auf diese konzentrierten. Die in der Studie gesammelten Daten wurden analysiert, um Kriterien zu erstellen, die als Maßgabe für die Gestaltung der Geräte verwendet werden können, so dass eine stärke Bindung zwischen Objekt und Besitzer entsteht. Diese Kriterien wurden vorläufig getestet, indem sie von einem Industriedesignstudenten bei der Erstellung von Entwürfen für elektronische Gegenstände berücksichtigt wurden.

ABSTRACT

The goal of this study is to better understand how people acquire, use and dispose of interactive devices, in order to provide insights on how such devices can be made more sustainable. To achieve this, interviews were conducted concentrating on items the participants own and their attitude towards them. This was supported by exploring the participants' homes during the interviews. By initiating a conversation about objects, a better understanding of the strength of attachment to them as well as the motive for doing so was provided. The collected data was analyzed and formed into a framework, consisting of the derived attachment categories and exemplary quotes. This was preliminarily applied by providing the framework to an industrial design student to create preliminary designs for interactive devices.

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ABBREVIATIONS

CHI	Conference on Human Factors in Computing Systems
e-waste	Electronic Waste
EU	European Union
HCI	Human Computer Interaction
OECD	Organisation for Economic Co-operation and Development
SID	Sustainable Interaction Design
UN	United Nations
US	United States of America

1 INTRODUCTION

The most widely quoted definition of sustainability is by the Brundtland Commission of the United Nations (UN):

> *"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."* (United Nations Geneal Assembly, 1987)

Sustainability has become a major concern over the recent years. Our society has become more and more a throw-away society, and the need to counteract this development is apparent.

This notion of sustainability should be used as the basis to counteract the ever growing amount of waste that is produced, since the Organisation for Economic Co-operation and Development (OECD) estimates, that the European Union (EU) will be generating 45% more waste in 2020 than it did in 1995 ("Municipal Waste Generation - Outlook From OECD (Outlook 013) - Assessment Published Jun 2007 — EEA," n.d.).

Right now, the EU produces almost three billion tons of waste every year, which means a waster per capita of 512 kg in 2009 (European Commission, n.d.). The United States (US) produced as much as 718 kg per capita in the same year (United States Environmental Protection Agency, 2010). In comparison, Switzerland only produced only about half the waste with 352 kg per capita in 2008 ("BAFU - Publikationen - Abfallwirtschaftsbericht 2008," n.d.). Not only the generated waste in general is a serious issue, but also the vastly rising number of electronic waste (e-waste) is of major concern to the world. Switzerland and the EU recycled about 14 kg per capita ("BAFU - Publikationen - Abfallwirtschaftsbericht 2008," n.d.; European Commission, n.d.), compared to the US, where the recycled e-waste amounts to a total of 2.2 kg per capita, because only about 20% of all e-waste in the US is recycled (US Environmental Protection Agency, n.d.), the remainder ends up in landfills, disregarding the amount of e-waste which is stored in people's homes.

Environmental sustainability has also become an important focus of the Human Computer Interaction (HCI) community, as the vastly growing number of publications in the last couple of years demonstrates. Those works look at the environmental implications of the ubiquity and the increasing consumption of electronic devices (for example Blevis, 2007; Blevis & Stolterman, 2007) as well as a need for lengthening the lifecycles of electronic devices so the amount of electronic waste yielded would be reduced (Chetty, 2010; Huang, Yatani, Truong, Kientz, & Patel, 2009; Huh, Nam, & Sharma, 2010; Kim & Paulos, 2011).

One major concern is the constantly shortening life cycles of electronic devices, which are often even replaced before their economic life-time is up. Since most of those studies are conducted in the US, whose per capita general waste production is twice as high than that in Switzerland ("BAFU - Publikationen - Abfallwirtschaftsbericht 2008," n.d.; United States Environmental Protection Agency, 2010), the need for examining other countries behaviors is becoming apparent.

This work seeks to understand what kind of objects people regard as important as well as the nature of their attachments to these objects in a systematic fashion. In the course of achieving this, a study was conducted in 17 Swiss households based on the Personal

Inventories method by Blevis and Stolterman (2007). The findings should help better understand the person-object relationship of people in Switzerland compared to those of the participants in the US, in order to make interactive devices such as mobile phones, computers, or cameras more sustainable for example by better comprehending how to extend their product life, thereby reducing incurring e-waste.

2 PROJECT DESCRIPTION

The goal of this study is to provide a better understanding about how people acquire, use and dispose of interactive devices such as mobile phones, computers or digital cameras, in order to provide insight on how the sustainability of those devices can be improved. To achieve this goal, interviews were conducted to create Personal Inventories for each participant, consisting of items they own as well as their attitude towards them. During the interview, participants' homes were explored, making it possible to point out and look at things, which they might otherwise not remember and therefore mention at all. By initiating a conversation about those objects, a better understanding of the strength of attachment to objects as well as the motive for doing so was provided.

The data collected in this study should help to better understand how people in Switzerland acquire, use and dispose of items, and consider differences that might arise compared to the participants in the US. Consequently, better insights about how to make electronic products more sustainable, for example by better comprehending how to extend their product life, should be generated.

The data collected was analyzed and formed into a framework, using the derived attachment categories and supporting quotes, which should help inform the design of electronic devices. In order to preliminarily apply these results, the framework was provided to an industrial design student, who used it to develop design drafts of electronic devices.

3 RELATED WORK

This chapter will provide an overview of work related to this research as well as introduce the work on which this study is build upon.

3.1 BACKGROUND INFORMATION SUSTAINABLE HCI

The concept of Sustainable Interaction Design (SID) was introduced by Blevis in 2007. It encompasses the issue of whether or not it is possible to design interactive technologies in a way that they might at some point attain heirloom status, motivating people to preserve items and pass them on to further generations. Blevis proposes the need for better comprehending the material effects by considering the use, reuse and disposal of objects, as well as a number of principles of design, which should help guide SID. (Blevis, 2007)

Building upon Blevis's concept of SID (Blevis, 2007), Hanks et al. (2008) performed a survey with undergraduate students, concentrating on the attitudes of this generation towards sustainability. Deriving from their results, they propose a number of design principles, which should help in the development of designs that elicit more sustainable behaviors.

Subsequent work looks at how people replace and dispose of mobile phones, which argues for design that encourages longer usage and therefore ownership of mobile phones. (Huang & Truong, 2008) This study was followed-up by Huang et al. (Huang, et al., 2009), who extended the work by investigating the transferral of ownership of mobile phones and the barriers attached to this practice. In a similar notion, Huh et al. (2010) look at the motivations behind their participants' practices of adopting used PDAs rather than buying new devices.

By concentrating on the lifecycle of products, Wooley (2003) looks at the pleasure and dissatisfaction products provide over time. For example, the great pleasure a new object provides, which decreases over time until an object is not used at all anymore. Their primary purpose is to reduce the effects that short pleasure/dissatisfactions cycles bring on to the environment by causing the user to rapidly exchange things. They do so by proposing that *"pleasure-over-time"* should be applied in order to design products with more affective design thereby extending the life of a product. (Woolley, 2003)

Instead of looking at the extension of product lifecycles, McDonough and Braungart (2002) call for a radical change in the manufacturing of products by concentrating on a cradle to cradle approach rather than the usual cradle to grave one. Criticizing the common practice of downcycling, which is what is usually done to products that are recycled, meaning the recycled material is of lower quality than before the recycling process, they rather call for manufacturing processes, which have the goal of upcycling products, making the material be of higher quality after the recycling process.

In "*Designing for Sustainability: A Philosophy for Ecologically Intentional Design"*, Stegall explores different aspects of product design for sustainability. In his opinion, right now *"design for the environment"* focuses only on the physical attributes of a product, which is not sufficient. According to him, the impact a product has on the environment depends not only on the technology and processes involved in the fabrication of the product but also on its use. The designers are directly responsible for the influence their products have and should encourage widespread sustainable behavior. (Stegall, 2006)

In order to provide an overview of where the field of sustainable HCI currently stands, DiSalvo et al. (2010) give in "*Mapping the landscape of sustainable HCI"* a summary over the published work on sustainable HCI up to this point. They analyze how the field of sustainable HCI is defining itself and point out *"(1) established genres in the area, (2) key unrecognized intellectual differences, and (3) emerging issues".*

Building upon this sustainable HCI work, a study was conducted using the Personal Inventories method by Blevis and Stolterman (2007). The underlying literature to this method will be considered next.

3.2 Personal Inventories Method

The Personal Inventories method was first introduced by Blevis and Stolterman (2007). Based on the notion of SID, they started conducting an elicitation study, with the intent to build Personal Inventories for their participants. This study was further conducted and presented in Odom (2008), Odom et al. (2008), Odom and Pierce (Odom & Pierce, 2009) and Odom et al. (2009).

Blevis and Stolterman (2007) base their work upon Nelson and Stolterman's (2002) concept of *"ensoulment"* in a combination Blevis's notion of *"promoting quality and equality"* (Blevis, 2007) as well as Cooper (2002, 2004) and Walker's (2006) perception of "current approaches to product durability". They also consider Csikszentmihalyi and Rochberg-Halton's *"The Meaning of Things"* (1981) as the fundamental work within psychological research on peoples relationship to everyday objects and Norman's "Emotional Design: Why We Love (Or Hate) Everyday Things" (2005) on the same topic within cognitive science. They consider Verbeek's (2005) *"What Things Do"* as inspiration.

In order to gain a better understanding of the nature of people's attachment to objects, Blevis and Stolterman (2007) and Odom et al. (2009) conducted contextual interviews, building a personal inventory for each participant. From the collected data, Odom et al. (2009) derived a framework, which is build around the three design perspectives that affect durability by Verbeek (2005): function, symbolism and material qualities. They provide categories, which integrate each of those perspectives and present design principles, which should help designers to create objects with a high strength of attachment.

The Personal Inventories method was also applied in a study by Jung et al. (2011) were *deep narratives* are collected, concentrating on one particular object rather than on different kinds of objects in the participant's home.

The method itself as well as the adoption for this research is further described in Chapter 4.

3.3 Further Attachment Literature

Besides the Personal Inventories method, other literature also looks at people's attachment to objects.

For example, Wallendorf and Arnould (1988) investigate the nature of people's relationships to favorite objects in two different cultures by interviewing people in the US and Niger. They look at the different forms of attachment as well as the influence of gender, age and culture on the type of attachment.

In a different work, Glenn and Hayes look in *"Taking Things Seriously: 75 Objects With Unexpected Signficance"* at objects which are of surprising significance to their owners. Those owners explain on a single page why that specific object has special meaning to them. The objects are mostly out-of-use but are retained, because they are too special to be thrown out. They range from a common children's toy with special meaning to more uncommon items like a collection of toenails and a turtle's tail. (Glenn & Hayes, 2007)

However, most of the attachment work concentrates on few favorite items in people's homes or a special kind of item the study focuses on. Previous works do not look at the different kinds of items in one person's home, nor do they investigate the different types of relationships those people have to those items.

3.4 Out-Of-Use Electronic Devices

Part of this research concentrates on out-of-use electronic devices and the reasons why people retain those. Recently, two works have looked in some depth into why people keep old and/or out-of-use electronic devices.

The first one, Chetty's workshop position paper presented at CHI 2010 (Chetty, 2010), focuses on the remaking of technologies, in particular at home networking equipment like computers and modems. In her qualitative study, the intention to remake technologies, transferral of ownership, and concerns about data security were mentioned as the main reasons why people kept old networking devices.

The other one, by Kim and Paulos (Kim & Paulos, 2011) focuses on the reuse of technology for creative purposes. This includes a survey on out-of-use technologies, which was conducted using Amazon Mechanical Turk. There, the main reason for retaining out-of-use technology was the possibility of future use. Less frequent reasons were sentimental value and the lack of knowledge or resources for disposal.

Their suggestion, that people maintain an inventory of out-of-use electronic devices has also been addressed by the above mentioned studies on people's practices with mobile phones (Huang & Truong, 2008; Huang et al., 2009) and PDA's (Huh et al., 2010).

Even though there are some reasons uncovered by those works about why people retain unused technology, those are generally secondary findings and not the primary focus of their studies.

The following chapter will give an introduction to the study method as well as further describe how the study was conducted and who the participants were.

4 STUDY METHOD

This work builds upon the previous studies by Blevis and Stolterman (2007) and Odom et al. (2009) as well as existing knowledge acquired through in-home qualitative studies concerning people's attachment to all different kind of objects, for example by Wallendorf and Arnould (1988) and Glenn and Hayes (2007).

The study was conducted using an adapted version of Blevis's and Stolterman's Personal Inventories method (2007) which was also used by (Odom, 2008; Odom & Pierce, 2009; Odom et al., 2008, 2009). In this chapter, the Personal Inventories method and the changes made to it are described, as well as how the study was conducted and who the participants were.

4.1 PERSONAL INVENTORIES DESCRIPTION

The Personal Inventories method entails visiting participants' homes and conducting contextual interviews. This is done using a protocol, which inquires about all sorts of items in their homes as well as their attitude towards them. It also includes tours of the participants' homes to probe for further items, which the participants might otherwise not remember and therefore will not bring up in a conversation. If the participants do not feel comfortable being interviewed in their homes, the interview can be held at a place of their convenience. However, this limits the conversation to items the participants can remember. The questions asked included:

> *"What things do you have that you love?*
>
> *What things do you have that you thought you would love but don't?*
>
> *What things do you have that you didn't expect to love but do?*
>
> *What things do you have more than one of?*
>
> *What are the oldest things you have?*
>
> *That you still use?*
>
> *That you no longer use but would not discard?*
>
> *What are the newest things you have?*
>
> *What do you acquire most frequently?"*

The authors conducted the study using American participants from two US cities. (Blevis & Stolterman, 2007; Odom, 2008; Odom & Pierce, 2009; Odom et al., 2008, 2009).

The study conducted for this thesis used a slightly modified version of the Personal Inventories method, employing a more structured protocol with some additional questions to generate more in-depth results. The method was adapted by adding a few additional questions, such as:

> *What would you only buy new?*
>
> *What would you only buy used?*

Why do you buy used things?

Does it matter whether or not you get something used from someone you know?

(see Appendix E Interview Protocol - English Version / Appendix F Interview Protocol – German Version).

The additional questions were applied to gain even better insights on the nature of people's attachment to objects and allow a more in-depth conversation about different kinds of objects, which the participants otherwise might consider as not important enough to bring up. For every mentioned item, the answer to why it fits to the question was also investigated. In contrast to the original Personal Inventories studies, this study was conducted using Swiss or longtime (a minimum of five years of residency) Swiss residents as participants.

Interviewing the participants in their own homes offered them the possibility to walk around and pick up items which they might not have remembered had the interview taken place at a different location. A home tour was part of the interviews, which consisted if possible of a tour of the whole apartment or house. During that tour, interviewees often remembered important items, which they subsequently talked about, allowing building a more comprehensive Personal Inventory for this person.

As in the original deployments of the method, the interviews were not focused on any particular type of object, allowing the participants to bring up items they wanted to discuss, no matter whether those were electronic devices or not.

4.2 PARTICIPANTS

The study was conducted interviewing nineteen participants in seventeen households, which were recruited using snowball sampling. This comprised word-to-mouth recruiting as well as recruiting via email and messaging vial a social network. (Appendix A Recruiting Email – English Version / Appendix B Recruiting Email – German Version) Participants were asked to sign a consent form (Appendix C Consent Form / Appendix D Einverständniserklärung) and received a compensation of 20 Swiss Francs (approximately 20 US Dollars) for participating in the study. The participants ranged in age from 18 to their early 70s with a wide variety of living situations and occupations including a doctor, an engineer, a dance instructor, an about to be retired minister, a full-time mother and graduate students. Households represented included families, couples, people living alone, and people living with roommates. (See Table 1: Participant Overview). In all, except for two cases only one member of the household participated in the study and only two participants did not feel comfortable touring the whole house but rather restricted the home tour to the common areas of the house (for example living room, kitchen).

4.3 INTERVIEW PROCEDURE

The interviews were conducted at a convenient time for the participant at the participant's home. The interviews lasted for approximately one hour and the participants were asked about items they have in their homes and their perception of them. The interviews were audio recorded and items mentioned during the interviews were subsequently photographed in their environment, if the participants agreed.

House-hold	Partici-pant	Age	Gender	Occupation	Place of Residence	Living Situation
H1	P1, P2	73 69	Male Female	Retired, Retired	Zürich	Married Couple, Adult Children
H2	P3	69	Male	Protestant Pastor	Seuzach	Married, Adult Children
H3	P4	25	Male	Student	Schlieren	Single, lives with Roommate
H4	P5	57	Female	Housewife	Wilen bei Wollerau	Married, Adult Child
H5	P6	34	Female	Full-Time Mother	Zürich	Married, Young Child (< 6 years)
H6	P7	31	Male	Self Employed	Zürich	Lives with Girlfriend
H7	P8	39	Female	Doctor	Basel	Married, Young Child (< 6 years)
H8	P9	40	Male	Hotel Manager	Lenzerheide	Married, Infant (< 1 year)
H9	P10	45	Female	Dance Instructor	Chur	Married, Adult Children
H10	P11	58	Female	Part Time Payroll Accounting	Zumikon	Married, Adult Children
H11	P12, P13	42 31	Male Female	Senior Test Automation Engineer, Doctoral Student	Zürich	Married Couple, Young Child (< 6 years)
H12	P14	27	Female	Administrative Assistant	Lenzerheide	Single
H13	P15	54	Male	Branch Manager Sports Store	Lenzerheide	Married, Adolescent Children
H14	P16	33	Female	Hotelier	Lenzerheide	Lives with Boyfriend
H15	P17	29	Male	Hotelier	Lenzerheide	Single
H16	P18	28	Female	Key Account Manager	Dietikon	Married
H17	P19	18	Female	Travel Agent	Zürich	Single, living with parents

Table 1: Participant Overview

The interviews were conducted in German or English, whichever the participant had native fluency in. 18 were conducted in German and one was conducted in English. If the participants preferred to answer in Swiss German, they were entitled to do so.

Participants were at least 18 years of age and residents of Switzerland. They have lived in Switzerland for at least 5 years. Otherwise, there were no restrictions to participating in this study.

The data collected in this study should provide a better understanding of how people in Switzerland acquire, use and dispose of items, compared to those in the US (Odom et al., 2009). This was done in order to gain insights on how to make electronic products more sustainable, for example by better comprehending how to extend their product life.

The interviews were partially transcribed and translated into English in order to be analyzed. The transcripts are not provided in the appendix due to the confidentiality agreed upon with the participants. This data was then analyzed and formed into a framework, which was given to an industrial design student in order to have a preliminary application of it.

4.4 Design Project

As a preliminary proof of concept of the derived framework, a design project was conducted. For this purpose, an advanced industrial design student was recruited. He was provided with the framework to see what ideas he comes up with, in order to better understand how designers would work using the derived categories of attachment and what problems and questions arise in doing so. Afterwards, the designer was interviewed for approximately 30 minutes to receive feedback on his designs as well as their process in preparing them.

In the following chapter, the data analysis methods of the different parts of the study are described.

5 DATA ANALYSIS

In the following, the data analysis methods for the different parts of the project are described, concentrating first on out-of-use electronic devices in people's homes and then on all mentioned items by the participants.

5.1 OUT-OF-USE ELECTRONIC DEVICES

This first part of the analysis concentrates on rarely used or out-of-use electronic devices in the participants' homes and their reasons for keeping them. By doing so, it was sought to get a better in-depth understanding of how and why people maintain inventories of electronic devices they no longer use. The aim is not only to detect what kind of devices people retain in their homes, but also to comprehend the relationship with unused items as well as the nature of those attachments.

The transcribed and translated data was analyzed using an inductive open coding process to identify the relevant items, and organize them into emerging categories. This was conducted by characterizing the different kinds of out-of-use electronic devices and combining them into categories, which were derived from the mentioned reasons why those out-of-use electronic devices are retained: *Perceived Residual Value to Others, Perceived Residual Value to Owner, Backup to a Newer Device, Value of the Content Not the Device, Personal History, Perceived Historical Value, and Inertia.* Those will be explained further in Chapter 6.1. (See Appendix G Data Analysis Documents – Out-Of-Use Electronic Devices)

5.2 ALL DATA

This part of the analysis comprises all data collected. It regards the different kinds of items in the participants' homes and their attitude towards them. The aim was a better understanding of how relationships between humans and objects arise.

The transcribed and translated data was analyzed using an inductive open coding process to identify the relevant items, and organize them into emerging categories. Those categories were then combined to comprise higher level categories. Those were then used to derive categories that fit the existing framework by Odom et al. (2009). The derived categories are: *Engagement, Augmentation, Histories, Perceived Durability, Perceived Worth, Actual Durability, Personal Attachment and Event Attachment.*

Personal Attachment and Event Attachment are the two categories which are strongly influenced by emotions. The category *Personal Attachment* comprises those items which were gifts by persons with a special importance to the owner. For example, an embroidered placemat P13 got from her grandmother:

> *(P13) "My grandmother decorated a placemat, which reads [P13s name] and "Happy Birthday" in Swedish. And a pretty flower wreath. ... No [she wouldn't give it away], because my grandmother made it for me."*

The category *Event Attachment* comprises those objects, which represent a special occasion for the participant. For example, P3 regards travel scrap-books which he made together with his family for each vacation as very important:

> *(P3) "We went on a lot of nice vacations with the family, with the children. … And during the trips, we made travel scrap-books together with the kids, using the brochures and later photos. And depending on the age, one of the kids wrote a report, the daily report, during the trip or afterwards."*

Those reasons for attachment cannot really be applied to the design of electronic devices and were therefore omitted from the framework. (See Appendix H - Data Analysis Documents – All Data)

The categories *Engagement, Augmentation, Histories, Perceived Durability, Perceived Worth and Actual Durability* are defined in Chapter 6.2, to present them as a complete framework, enriched with exemplary quotes and design implications, which can be used by designers in the conceptualizing of digital artifacts.

In order to test the derived framework, a preliminary application of it was done by giving it to an industrial design student. This student was to apply the categories of attachment when drafting first designs for electronic devices.

The following chapter will introduce the results of the study as well as the derived framework and design implications. It will further give a short overview of the drafts the designer created and the feedback provided.

6 RESULTS

This chapter introduces the results of the study. First, it will look at out-of-use electronic devices and why participants retain those. Second, it will look at different items in people's homes and the nature of their attachment to them. Finally, the results of the design project will be recognized.

6.1 OUT-OF-USE ELECTRONIC DEVICES

This part of the analysis has been submitted to the Conference on Human Factors in Computing Systems (CHI) 2012 as a short paper submission. The submission can be found in Appendix I - Short Paper Submission to CHI.

The participants had a wide variety of electronic devices in their homes, which were used with varying frequency. This section of the analysis concentrates on out-of-use devices. A number of reasons were offered by participants why they are keeping non-functional as well as functional devices in their homes despite the fact that they were no longer using them. The following categories of attachment were derived: *Perceived Residual Value to Others, Perceived Residual Value to Owner, Backup to a Newer Device, Value of the Content Not the Device, Personal History, Perceived Historical Value, and Inertia.*

6.1.1 PERCEIVED RESIDUAL VALUE TO OTHERS

This is the most prominent of the categories of attachment to out-of-use devices, which people keep in their homes. It encompasses all those electronic devices, which are kept in hope of reselling or giving them to someone who has still a use for them. The length of time that those devices are stored varied. On one hand, one participant described finding a new owner for her coffee maker very quickly:

> *(P18) "Up until yesterday, we had our old coffee maker lying around, because we got a new one. We were keeping it until we found someone, who wanted to take it. That took a week or two."*

On the other hand, items were also kept for longer periods of time, even an indefinite amount of time. For example an iPod, which one participant pointed out and will be keeping for years, before she finally gives it away:

> *(P16) "I still have an iPod, which I don't use anymore. ... Maybe … I might use it again. Or maybe I think I find someone to give it to. I don't know, maybe my goddaughter will be old enough one day, she's 5 now. And maybe someday she can use a computer."*

6.1.2 PERCEIVED RESIDUAL VALUE TO OWNER

Another reason for keeping out-of-use devices was that people felt that they might find something valuable about it later in time, because they might start using it again, for example a Playstation (P4, P7), a VCR (P1, P2), and a scanner (P12). The participants had not replaced those items with something serving a similar function, but rather believe that they might find a use for the device at some point in the future. One participant, for example, described keeping a scanner for 15 years, even though he has never actually used it:

(P12) "One of the reasons for me is that I might suddenly need it. And then I wouldn't have … the option to scan things … It might be possible that one night we decide we really need to scan something."

Figure 1: Out-Of-Use Scanner and Playstation

In a similar notion, one couple bought a used VCR so they could watch their old video tapes, but used it only for a very short time before abandoning it:

(P1) "If we want to record a movie, then we can do that with the TV. We have room for almost 100 hours, so we don't need the VCR."

(P2) "We only have it to watch the old videos."

(P1) "Which we never do."

6.1.3 Backup to a Newer Device

Participants also kept some of the devices with a hope for future use, even though they have replaced them with newer objects, which have the same or similar functionality. Those items were kept as a backup, just in case something happens to the device currently in use. One frequently mentioned item were old mobile phones (P4, P14, P18), even though it seemed more important to have a backup mobile phone than it actually being functional. This was illustrated by one participant describing her old mobile phone:

(P14) "I think I still have one [mobile phone] in my drawer ... in case my current one doesn't work. However, I don't know if it still works ... and whether or not I still have the battery charger."

Retaining small devices, like mobile phones, may seem apparent, because they only require a small amount of storage space. However, there were some participants who kept also considerably larger devices. For example, one participant kept a desktop computer as a backup device and used it very infrequently:

(P12) "The one I use the least ... maybe once a month. It's basically the backup PC, in case the other one isn't working, so I can use it."

6.1.4 Value of the Content, not the Device

With some devices, participants did not attribute actual value to the device, but rather to the content or data stored on the device, which they considered as important to themselves or did not want others to have access to it. Privacy concerns were the reason for one participant to keep two out-of-use laptops:

> *(P9) "I still have a computer in another room which I don't use ... I have another one which is even older ... I probably still have some data on that computer ... I would have to completely destroy the hard drive myself so I could be sure nobody can access it."*

The attachment to data stored on the device is another reason for keeping out-of-use devices. It was the main factor for one participant to keep his old Atari personal computer for at least 25 years. The participant stored software on it he had written himself, which is perceived by him of such great importance, that he is certain to keep the device as long as the software is only stored on this device, even if it is for an indefinite amount of years:

> *(P12) "The Atari, [I keep] because of the data. There is software on it, which I wrote myself. I mean, I could put the software on a floppy disk and then run it on a different Atari ... But it's pretty complicated to do so. That's one of my projects ... But as long as the project is not finished, it's important to me not to give [the Atari] away ... I've had it at least 25 years ... I haven't turned it on in 6-7 years ... It's in the basement."*

6.1.5 Personal History

Emotional significance was also a reason for attachment. This could originate from the fact ,that the owner received the item for a special occasion or from a special person and therefore attribute a personal history to the device. An 18-year old participant for example received a digital camera for finding an apprenticeship (P19). She also kept a CD/cassette player, which she got for her communion by her godfather:

> *(P19) "For example the radio. Now it's more decoration, I don't really use it anymore, but I've used it a lot in the past. And I still really like it ... [I keep it because] I got it from my godfather for my communion, and because that was special."*

This participant also mentioned a digital camera, which she kept for sentimental reasons, because she received it for a special occasion. This kind of attachment was mentioned only by this one participant in relation to electronic devices. This suggests that a personal history with an item might not be very common when building an attachment to an electronic device.

6.1.6 Perceived Historical Value

Having an enduring appeal to the owner is a reason why somebody attributes value to something, even if the item is of no use to them or does not even functioning properly anymore. This is a perceived historical value, which is not necessarily connected with the real value of the electronic device. One participant (P17) for example kept a vintage radio, which he only used as a decorative piece:

> *(P17) "I have a radio that hasn't worked in a while ... It's probably something that looks good, maybe also one of the things that's a cool decorative piece. But I don't even know if it's still working or not… It's small and somewhat nostalgic."*

The appearance of an item is not solely a reason for attachment in this category. Old Polaroid cameras were for example kept not only because of an appreciation for their physical appearance, but mostly for the kind of pictures they make, for which the participant (P16) has a nostalgic appreciation for:

(P16) "I still have old Polaroid cameras at home ... It's more like a classic now… But I haven't used it in a while ... They are for sure at least 10 years old. We used to take so many pictures with them, but at some point they were replaced with digital cameras ... I think we kept them because they are sort of a classic."

6.1.7 INERTIA

Another reason to keep out-of-use electronic devices was simply because the owners expect the act of disposing them as too much of an effort. This was not caused by a lack of knowledge in regards to how and where to get rid of something, but rather by a perceived substantial effort. For example, when one participant was not immediately able to find a buyer for his used DVD player, he decided to not try again:

(P7) "I also have a DVD player, which I put in the basement … I could throw or give it away … It would almost be too much of an effort to get rid of it, because almost everyone has one and they are really cheap nowadays. I once tried to sell it via [an auction website], but no one bought it."

Perceiving the tasks required to sell his previous entertainment system as too tedious was the reason for one participant to not even try to sell it:

(P4) "I don't know what to do with [my old entertainment system]. And I'm kind of too lazy to sell it on eBay … I would have to clean [it], if I wanted to sell it. And all the cables are a mess, they are really long so I would have to roll them up, then put it all in its original packaging, and bring it to the post office. Like I said, that takes a lot of effort."

6.1.8 DISCUSSION

The results presented in this chapter suggest various reasons for people's attachment to out-of-use electronic devices. These attachments can either be strong and very driven by emotions as for example with the CD/cassette player participant P19 received as a communion present from her godfather, or can be significantly more tenuous, as the attachment of P7 to his old DVD player. A number of the derived attachment categories are similar to previous findings in other works regarding retaining of out-of-use electronic devices and support those findings. However, there are also some differences in the derived findings from the conductes interviews that give previous findings some new aspects.

The study was conducted with participants from Switzerland as well as longtime Swiss residents, in contrast to previous studies, which have focused on residents of the US only. Since the study was conducted using a number of 19 participants, the findings are not representative of Swiss households in general. Nevertheless, the interviews suggested some paradigms, which point out deviations to the findings in the US-based studies (Chetty, 2010; Kim & Paulos, 2011). One of the major differences compared to Kim and Paulos's study (2011) is that none of the Swiss participants mentioned a lack of knowledge or resources to dispose of old electronic devices. This reason on the other hand was cited by many of Kim and Paulos's participants as their reason for retaining technology. The participants in the study of this thesis were actually aware of their options for disposal, for example the options to either return an old device to an electronics retailer for recycling or to have scheduled e-waste pickup dates. This awareness is most likely due to laws regulating the disposal of e-

waste in Switzerland[1].Interestingly, even though participants were knowledgeable about their options of disposal, they still retained an inventory of out-of-use electronic devices, because of the amount of effort they perceive it would require to dispose of them. Also, unlike in Chetty's study (2010), remaking, meaning constructing something new, was not mentioned as a reason for retaining electronic devices by the participants in this study. This could be caused by the anecdotal observation that the participants in Switzerland usually seem to use electronic devices for a very long time, mostly until they are not functioning anymore or are otherwise very outdated. Due to this, the devices owned by the Swiss participants might be less suitable or appealing when it comes to remaking than the electronic devices mentioned by the participants in Chetty's study (2010). To definitely validate this proposition, further research as well as data collection is required.

However, this research focuses on people's handling of as well as attachments to old electronic devices in their homes. The data collected in this study was further analyzed, additionally considering non-electronic devices in general as well as in use electronic devices. The results of the complete analysis are described in the following.

6.2 ALL DATA

The following chapter will present the results derived from the findings of the interviews. These are presented in categories building upon Odom et al.'s (2009) framework of owner-object relationships. The categories will first be defined and then exemplified with quotes by the participants.

6.2.1 ENGAGEMENT

"Engagement - the extent to which an object invites and promotes physical engagement with its owner during use." (Odom et al., 2009)

This category was extended in this study by including the owners effort:

Engagement - the extent to which an object is used because its owner invested time in learning how to function it.

This category describes objects, which actively engage the user into functioning it, either constantly or for some time at the beginning.

For example, one participant owns a wallet, which he lost at some point, but even though he got a new one to replace the lost one, he still uses the old one since he got it back, because he is used to the layout:

> *(P4) "I have two wallets ... I lost one at some point, so I bought a new one, but I got back the other one as well ... so I have two. ... But I'm still attached to the old one. ... I'm used to it, how I organized it, which was the same when I got it back, so I have no reason [to use the new one], the new one might have different pockets, a different layout. So I stayed with the old one."*

The same participant also has a universal remote control, which replaces all his other remote controls:

[1] Verordnung über die Rückgabe, die Rücknahme und die Entsorgung elektrischer und elektronischer Geräte (VREG) (http://www.admin.ch/ch/d/sr/8/814.620.de.pdf)

(P4) "A universal remote control for all my equipment. I always thought of it as knickknack, but then there was a good deal ... it was a spontaneous purchase, I thought I would try it. And I can't complain. I replaced all other remote controls. now I have only one. And even though I have to recharge it regularly, I got used to that. ... I wouldn't like to handle 5 remote controls."

Figure 2: Universal Remote Control

Another participant (P5) continues using her Blackberry, since it took her some time to learn how to use it, even though she is entitled by her mobile phone provider to get a new one:

(P5) "I've had my Blackberry for 3 years, and now I know how to handle it. I don't see a reason why I should replace it, now that I know how it works. An newer one would take too much time to understand how to use it."

DESIGN IMPLICATIONS

Based on this definition and the supporting examples, implications for design were derived.

"Look for opportunities to increase an owner's involvement in the motor tactile nature of using an object for a function. How can we engender deeper and more aesthetically pleasing physical engagement with interactive digital products? How can such engagement lead to more useful and satisfying interactions with technology?" (Odom et al., 2009)

Another aspect to be considered is how an electronic device can be designed in a way that is regarded as more gratifying the more familiar it gets, without making it too difficult to adopt it in the first place?

6.2.2 HISTORIES

"Histories - the extent to which the materials of an object preserve personal histories or other memories, either by explicitly showing physical signs of use or implicitly by virtue of its persistence over time." (Odom et al., 2009)

This category describes objects, which the owner assigns a certain distinctiveness to because of its history. This can be some mundane object like plastic cups, which were regarded as really important by one participant:

(P11) "One thing is really important to me. It's pretty trivial, but it's some plastic cups. When I was in the hospital in America during the births of my sons, they served coffee in it. And it [the cup] wouldn't get too hot to hold and the coffee in it stayed hot for very long. … And for inexplicable reasons, we have really moved a lot, those plastic cups stayed with us. And every day I drink my morning coffee out of those plastic cups.

Because it‘s very close to me somehow. As a reminder of the births of my sons and also of the independent and nice time that we had. ... [that was] 30 years [ago]. … And the older they get, the more memorable they are.“

Figure 3: Plastic Cups and Bassinet

It can also be some items kept since the owner’s childhood, which can be used now by their own children as one participant describes bringing her own children’s furniture from her parents place:

(P6) “That chair ... that I‘ve used as a child. I took that from my parents‘ house, and I glued it together again. And the table, this might be even older, because it also belonged to my mother. ... We used to sit a lot at that table [when they were children], on those chairs doing handicrafts, painting, or even eating, when my parents had company. Then we were sitting at that table, the children were eating at the small table, the adults at the big table.”

Or can even be used by their grandchildren, like in the case of this participant, who describes a doll basinet, which she recently brought back upstairs from the basement.

(P2) “I played with it [bassinet] as a child. And then my sister didn‘t want to keep it, so I took it. And my daughter used to play with it, so I painted it white and put the bug stickers on it. And it used to be in the basement.“

In the case of another participant, her husband kept a knife, which he received from his deceased grandmother and still keeps it, even though it is broken:

(P8) “My husband had a knife, which he always used to use, that he got from his grandmother. I think he had very sentimental attachments to it. And he used it for a long time, until the blade came off the handle. And he would always fix it, but I think at some point it just became too hard to fix. So he stopped using it, but he would use it, if he could.. ... I think [he doesn‘t get rid of it], because it‘s from his grandmother and he was quite close to his grandmother. ... I think he got it, when he was a teenager from her. So it must be about 100 years old or something.”

DESIGN IMPLICATIONS

Based on this definition and the supporting examples, implications for design were derived:

“Look for opportunities to use materials that can record in the form of patina or otherwise histories of use that enrich the ensoulment of an object rather than just cause the appearance of something that is used and needs to be replaced. In the context of digital

devices, the data associated with a history of personal use could be used to establish a non-physical, or perhaps physical in some way to be imagined but certainly digital, patina which makes a particular physical computing device and its associated personal data history hold personal and nostalgic value. How can unique histories evolve over time and be tied to a particular object, increasing the significance of this object? How can signs of everyday use be represented digitally— either on a screen or through physical manifestations of digital information? Moreover, how can such emergent digital signs of use help contribute to ongoing narrative between an object and its owner or owners?" (Odom et al., 2009)

6.2.3 AUGMENTATION

"Augmentation - the extent to which an object has been reused, renewed, modified, altered or otherwise made to be a part of something augmented beyond its original intended use and as such has become a symbol of the resourcefulness and/or creative expression of its owner." (Odom et al., 2009)

This category describes objects, which have been altered either by the owners themselves or by somebody altering the object for them, making it thereby more special. One participant described reusing an alarm clock, which used to be part of a stereo system, serving now as his own wake-up light after augmentation:

> *(P12) "My digital alarm clock which wakes us in the morning, that I wouldn't give up. ... It basically just runs on electricity and you can attach whatever you want to it. Right now, we connected a lamp to it, previously it was connected to the hi-fi system. And it's really easy to use. You can easily choose which time, or when not to wake us up. And it's a nice design and belongs to a stereo/hi-fi system, which I got for my confirmation, just a part of it. ... And I think it would be a pity if it were gone."*

Another participant received a bracelet as a gift, to which she continuously adds charms, representing special occasions:

> *(P19) "The bracelet I got from my best friends for my communion and I'm wearing it every day. And now I have gotten a lot of charms from my parents, friends and so on. So now it's important to me. ... Yes [she would like to have more charms], but they are pretty expensive. And it should be things I have an association with. For example my 18th birthday. ... The 18, which I got for my 18th birthday, which was special."*

The same participant also described a candleholder, which is special to her, because she invested time into changing its appearance:

> *(P19) "The candleholder, that you don't use that often. But when I got it, I used it every single night and was really happy about it. And now it's more a decorative item. No [she wouldn't give it up], because I bought it at an antique store and then I polished it, since before it wasn't sparkling and now it does. I'm really proud of that."*

But not only augmentations done by the owners themselves are regarded as making an item special. In the case of one participant, she owns a chair that she received as a wedding present, which was embroidered by her husband's godmother:

> *(P9) "That chair was embroidered by ... the godmother of [my husband] for our wedding. … And that's also something that I would never give up …. Because it was so much work and it was really nice of her to do that for us. She [her husband's*

godmother] embroidered it together with a friend of her, an old lady. That‘s incredible!“

Figure 4: Bracelet and Embroidered Chair

DESIGN IMPLICATIONS

Based on this definition and the supporting examples, implications for design were derived:

“The use of materials to reconstitute, reuse, renew, customize, or otherwise augment an object may lead to high strength of attachment. For example, materials like wood invite reconditioning with means like paint or varnish. In the context of digital objects, what is needed is more modular and reconfigurable and adaptable design of the physical components of digital artifice. In which ways can digital products promote resourceful and creative physical augmentation with respect to reuse, renewal, or customization? Established and emerging areas of HCI research—including end-user programming, modular computing, and DIY culture [5]—may consider the implications of their work in terms of product attachment.” (Odom et al., 2009)

6.2.4 PERCEIVED DURABILITY

“Perceived Durability - the extent to which an object’s owner regards an object as long lasting either in terms of function or in terms of longevity or both.” (Odom et al., 2009)

This category describes objects, which are not necessarily particularly durable, but are perceived as persistent over time by the owner. One participant described an old ball gown that belonged to her grandmother and which is hand sewn. She perceives it as durable since everything was handmade, but also admits that the fabric is slowly falling apart and that she has never actually worn it:

(P10) “A ball gown which belonged to my grandmother. ... I guess it‘s probably 75 years old. But the silk is slowly dissolving. But I will still keep it. It‘s somewhere stored in a box. ... It‘s all hand sewn and my grandmother made it. ... Since there were no zippers back then, only buttons, and the buttons are all bordered by hand. ... And even though it‘s just lying around somewhere, and I don‘t use it, I still know it‘s there.”

Another participant has a sideboard, which used to be a very modern piece at the time she bought it, but is now considered more of a classic piece. Therefore, she perceives it as a very long-lasting piece even though she admits it is not especially functional:

> *(P5) „My furniture [sideboard and bar cabinet], which I‘ve had for 23 years. ... In my opinion, even though it used to be an ultramodern sideboard, it‘s now more of a timeless piece. It used to be modern art. … And if I look at it now, after 22 or 23 years, I think it pretty much became a timeless sideboard. I don‘t see anything modern there anymore, but it‘s neither antique. I think it‘s timeless. It would be difficult for me to give it away. Even though it‘s not that functional. It has very little space. But I love it.“*

Figure 5: Sideboard

Furthermore, in addition to being durable, another participant describes a kitchen table, which he got from his grandparents. The table looks like new and still serves its function, even though it is almost 60 years old:

> *(P7) “The [kitchen] table is the oldest thing. It‘s from 1952, from my grandparents. Handmade from a carpenter in the Engadin. … And for me it‘s pretty important, because it‘s from her [his grandmother] and she and her husband ate from that table for 50 years and it still looks as good as new. It‘s a very good quality, it‘s an old Swiss stone pine table [kind of pine tree].“*

Another participant also mentioned a kitchen table he got from his grandfather, which is even older but also still very functional:

> *(P12) “My parents had the [kitchen table]. ... That is such a beautiful piece of furniture. ... It‘s probably a little older than my deceased grandfather, it might be around 150 years old.“*

DESIGN IMPLICATIONS

Based on this definition and the supporting examples, implications for design were derived:

“Perceived durability—perceived durability owes to the perceived quality of materials and their ability to hold up to use or perception of holding up over time. In the context of digital objects, what is needed is to construct the casing materials of much higher quality materials, even if the insides of such objects change frequently. Protocols such as USB or universal power supply adaptor kits make it easier to modify and update existing digital objects in a less device dependent way than before and such universal ways to attach computing objects

together need to be foreground in the minds of designers. Such universal device independence needs to carry over to other aspects of digital artifice, including at the chip level and software and operating system levels. To what extent is it possible to design interactive digital products that are perceived to endure functionally and in terms of longevity? Can new technologies and materials, such organic user interfaces and transitive materials, allow us to construct digital products with a higher perceived durability? How can modularity and upgradability contribute to perceived durability? How can people be given greater control over the repair, maintenance, and customization of their digital artifice?" (Odom et al., 2009)

6.2.5 PERCEIVED WORTH

The existing framework by Odom et al. (Odom et al., 2009) was extended using the results of the study, adding two categories, one of which is *Perceived Worth*.

Perceived Worth - the extent to which an object is continued to be used or repaired, because its owner regards it as too valuable to dispose of as well as the extent to which the owner elaborates when buying something new, because the object is regarded as valuable.

This category describes objects, which are perceived of great worth, and therefore the future owner elaborates on what to buy or are kept, even though they might not be very functional anymore. For example, one participant continues to use the dinnerware she got for her wedding, even though the shape of it causes her trouble while eating off of it:

> *(P18) "My dinnerware. That we wished for for our wedding. And I still think it's pretty. But it's kind of impractical. I would get something totally different now. ... The plates are somewhat sloped, so when you put the flatware on it, it will slide down and fall down. It might be pretty but it's really not useful in everyday life. ... I wouldn't get rid of it because of that. ... No, because it was way too expensive."*

In a similar notion, this participant keeps a sofa, which she considers as neither especially functional nor pretty:

> *(P8) "Maybe the sofa you are sitting on. When we first saw it, we liked it a lot. And actually it's quite good, because you can pull it out to a bed. But the problem is it's white leather and it's dirty, especially with children. And we can't seem to get it clean. So in a way we thought it would be very useful, and it looked nice. And then in the end it's not that practical, because it's not so comfortable to lie on, I find, as a sofa. … I would probably like to change it at some point. But then at the same time, because it was so expensive, I don't want to throw it away either."*

Another participant repeatedly has a pair of boots repaired, since repairing them is cheaper than buying new shoes:

> *(P18) "My cowboy boots. I'm sure I've had them for at least 6 years. And I've probably repaired them 10 times. Well, repaired in terms of getting a new sole, a rubber coating. And those I would repair again. ... They are comfortable and I haven't seen any I like as much. And therefore I will keep them as long as I haven't found anything I like more. ... And they are waterproof and keep me warm. They are basically my most aesthetically shoes for bad weather. … Well, maybe it's also the financial part, if I were to buy new ones, then I would have to pay 200 Franks or more and a new heel*

costs me about 30-40 Franks every 12 months. So shying away from a big investment rather than a lot of smaller ones might be a reason as well."

Figure 6: Cowboy Boots

Compared to keeping something because it is perceived as too valuable to dispose of it, this participant talks about considering buying a new dinner table, which she considers as a big investment, which needs careful consideration:

(P10) "A new dinner table. But since we have a very clear idea what it should look like and there is no such thing to buy, we will probably have it special made. And a table like that has to appeal to both of us, so [her husband] has to come along. ... We replaced our chairs and we want a white dinner table and definitely an oval one. A long oval dinner table."

DESIGN IMPLICATIONS

Based on this definition and the supporting examples, implications for design were derived:

Certain products are perceived of greater worth than others, even though the actual worth might be the other way around. To what extend would it be possible to raise the perceived worth of digital artifacts? Can digital devices be made in a way that the cost of repairing them does not exceed the cost of a new product? How can electronic devices be designed that they keep their perceived worth and do not vastly loose it?

6.2.6 ACTUAL DURABILITY

The existing framework by Odom et al. (Odom et al., 2009) was extended using the results of the study, adding two categories, one of which is *Actual Durability*.

Actual Durability - the extent to which an object is continued to be used as long as it is functional.

This category describes objects, which are considered long-lasting because of their continued functionality. One participant continues using a stereo system, which is 15 years old, because it still functions as it is supposed to:

(P15) "The stereo equipment is the same age [15 years]. I think it is even a little older. And keeps on working. Actually, I would like a new one, but it's such a sound device,

it keeps on working, that‘s why we still have it. And still serves it‘s purpose. … That‘s something we use a lot.”

Figure 7: Stereo Equipment

Even though this participant (P4) thought about buying a new tennis racket, he still uses his old one, as it fulfills its purpose:

(P4) “I still have an old tennis racket. It is 4 or 5 years old. … I was planning on buying a new one, but I haven‘t had time. And now I‘m not playing that often. It‘s still Ok, so I still use it.”

On the other hand, functional items are also kept, even though they might not be used anymore. Like this participant, who describes having a tandem bike, which she used to use a lot, but has not used it for some time:

(P8) “We have a tandem bicycle downstairs, which we used to use a lot, because in the beginning I wasn‘t so comfortable biking for longer distances alone. So we would bike together. Then I realized that wasn‘t so comfortable, because on the tandem you can‘t choose how you bike, you always have to go with the, the person in front is deciding how fast and when to stop and where to go. … So it‘s downstairs, and we could use it, but we just haven‘t. ... Probably for about two and a half years, two years. ... [They don‘t get rid of it] Because it still works and maybe we use it again.”

One participant described her replacement pattern for computers and cell phones as following:

(P16) “Until the computer breaks down, it takes about 5 years, the cell phone takes maybe 2-3 years…. Sometimes I get the feeling that the devices are designed in a way that they don‘t have a long life guarantee, so they break after 2 years. ... [She buys a new cell phone, computer] When it‘s really not working anymore. ... Because of wear and tear. ... The computer I‘ve had for a while ... At least four years. But right now, it‘s getting really hot, so it might, well I don‘t hope so [break].”

DESIGN IMPLICATIONS

Based on this definition and the supporting examples, implications for design were derived:

As with the computer which is used until it is not working anymore, objects are mostly used until they lose their functionality. How can electronic devices be designed in a way that they keep their functionality over a longer period of time? What can be done to make electronic devices in a way that they can be upgraded in case people perceive them as outdated?

6.2.7 DISCUSSION

The results presented in this chapter suggest various reasons for people's nature of attachment to objects. Strongly emotionally driven attachments (*Personal Attachment, Event Attachment*) were omitted from this framework because of their inapplicable nature to the design of electronic devices. The other categories of attachment (*Engagement, Augmentation, Histories, Perceived Durability, Perceived Worth, Actual Durability)* were explained, exemplified and design implications were presented. Some of the findings support the previous findings of the Personal Inventories studies, and some findings amend the existing framework.

Since the study was conducted with participants from Switzerland, which were either Swiss or longtime residents, it stands in contrast to previous studies that have concentrated on US residents only. However, since there were only 19 participants in this study, the findings are not representative of Swiss households in general. Nonetheless, there were some relationships to objects mentioned, which were not revealed in the US studies. Those categories were added (*Perceived Worth and Actual Durability*) and in one case the categories definition was extended (*Engagement*) to fit the motivations mentioned by the participant, which were similar but not exactly matching the definition of Odom et al. (2009).

The derived framework was provided to an industrial design student in order to conduct a preliminary test of what designers come up with when applying it. The preliminary results are presented in the following.

6.3 DESIGN PROJECT

In order to test the derived categories of attachment, they were given to a senior industrial design student to witness the ideas he conceptualizes when applying the framework to design studies of electronic devices. Therefore, the definitions of the attachment categories together with exemplary quotes were put together in a design activity description document (see Appendix K Design Activity Description – English Version / Appendix L Design Activity Description – German Version) and given to the designer to work on it for approximately one week. Afterwards, he was interviewed for approximately 30 minutes, in order to provide feedback on his work and his process of deploying the framework.

He provided four concepts (A-D), integrating at least one of the attachment categories. (Appendix M Design Drafts (by Samuel Beer)). The category most prominently represented in his designs is *Augmentation*. In his opinion, this category leads to a stronger emotional attachment thereby extending the lifecycle of a product. Because of that, it was the category which he had most ideas on and therefore applied it most when furthering some of his ideas.

He felt that using the framework as an inspiration for design was exciting, but perceived the activity as difficult, since electronic devices become outdated very fast. He would have liked to draft more examples of electronic devices, but at the same time remarks that this might be hindering the designers in producing creative ideas.

This part of the analysis was preliminary and goes beyond the original intended scope of the master thesis and will be extended as a future work, by having additional designers and design students apply the framework.

7 CONCLUSION

Sustainability has become a major concern in recent years for its environmental, economic and social aspects. It has also become an important focus of the HCI community. A number of researchers have looked at the relationship of people to objects (for example Blevis & Stolterman, 2007; Glenn & Hayes, 2007; Jung et al., 2011; Norman, 2005; Odom et al., 2009) as well as the need for lengthening the product life-cycle of electronic devices (for example Chetty, 2010; Huang & Truong, 2008; Kim & Paulos, 2011; Woolley, 2003). However, most of those studies are conducted using participants from the US, not accounting for people from other countries. The major differences, especially in handling e-waste, foster the need to also examine people's behavior in different countries than the US.

The study and results presented in this thesis provide insight on how people in Switzerland acquire, use and dispose of objects. The findings offer a framework to industrial designers for the conceptualizing of more sustainable electronic devices. In order to support them in doing so, the existing framework of attachment categories by Odom et al. (2009) was extended using the findings of the conducted study, and amended by implications for design. In order to have a preliminary application of the framework, a design project was conducted, where one designer applied the categories in his designs for electronic devices. This has only been done very simplified, since it goes beyond the extended scope of this thesis. Further research needs to be done in this area, also to test the extended framework.

Overall, it became more apparent that people have different kinds of attachments to objects. Those go beyond the derived categories from Odom et al.'s (2009) study in the US. There are eight different categories of attachment, namely:

Engagement, Augmentation, Histories, Perceived Durability, Perceived Worth, Actual Durability, Personal Attachment and Event Attachment.

Since those two categories relying on strong emotional attachments, *Personal Attachment and Event Attachment* cannot be applied to the design of electronic devices. Influencing the design by choosing the giver or place where it is received, does not seem to be a practical application. However, the other categories of attachment can be factored into the design of electronic devices. As one designer argued, some of the categories like *Augmentation* might offer themselves more obviously to the conceptualization of designs, which nevertheless should not limit the application to those.

As part of a future work, the categories of attachment supported with exemplary quotes, will be given to more industrial designers and advanced industrial design students in order to receive a proof of concept. By doing so, more feedback on how well the framework is constructed and in which ways it could be improved or extended should be received. Furthermore, different versions of the framework will be tested, using variable exemplary quotes, as well as it being applied to other objects than limiting it to electronic devices.

There were also other topics of interest, which arose during the course of this study. The subject of buying used electronic devices, which does not seem to be a common practice, as well as the affiliated transferral of emotional attachment, is one research theme, which could be of interest, when it comes to extending product life of electronic devices. In addition, planned obsolescence versus the perceived obsolescence of the users should be looked at, which might lead to further insights on how the time of actual utilization can be extended. Looking ahead in the far future, the question arises whether a cradle-to-cradle approach

(McDonough & Braungart, 2002) might even make the necessity of extending the product life-cycles obsolete.

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APPENDIX

A RECRUITING EMAIL – ENGLISH VERSION

Dear

You are invited to participate in a research project that I am conducting at the University of Zurich. The goal of this project is to understand people's attachment to the objects in their homes. This work will form the basis of my Master's Thesis, and I would greatly appreciate your participation.

If you take part in this study, we will engage in an informal interview lasting approximately one hour, if possible in your own home. We will talk about the objects you have in your home as well as your attitude towards them. With your consent, some objects and the environment in which they are situated will be photographed. You will receive a compensation of SFr 20,- for your participation this study.

If you have any further questions or want clarification regarding this research and/or your participation, please feel free to contact me.

With kind regards
Silke Gegenbauer

Department of Informatics
University of Zurich
Binzmühlestrasse 14
CH-8050 Zürich
(079) 528 7961
silke.gegenbauer@uzh.ch

B RECRUITING EMAIL – GERMAN VERSION

Sehr geehrte

hiermit lade ich Sie ein, an einem Forschungsprojekt der Universität Zürich teilzunehmen. Ziel des Projektes ist es, ein besseres Verständnis über die emotionale Verbundenheit von Menschen zu unterschiedlichen Gegenständen in ihrem Haushalt zu erlangen. Die daraus abgeleiteten Erkenntnisse bilden die Grundlage meiner Masterarbeit, und ich würde mich sehr über Ihre Teilnahme freuen.

Wenn Sie Sich dazu entschliessen an meiner Studie teilzunehmen, werden wir uns zu einem etwa einstündigen Interview treffen. Dieses sollte, wenn möglich, bei Ihnen zu Hause stattfinden. Wir werden uns über ihre Einstellung zu verschiedenen Gegenständen in Ihrem Haushalt unterhalten. Wenn Sie damit einverstanden sind, werde ich auch einige dieser Gegenstände und ihre direkte Umgebung fotografieren. Sowohl Ihre Aussagen während des Interviews als auch die Fotos werden ausschliesslich in anonymer Form gespeichert und ausgewertet. Als Aufwandsentschädigung für die Teilnahme an dieser Studie erhalten Sie eine Vergütung von SFr 20,-.

Sollten Sie Rückfragen zu diesem Forschungsprojekt und Ihrer Teilnahme daran haben, dann melden Sie sich gerne bei mir. Ich freue mich sehr über Ihre Zusage.

Mit freundlichen Grüssen
Silke Gegenbauer

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Universität Zürich
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C CONSENT FORM

Research Project Consent Form

"Personal Inventories"

We invite you to take part in the "Personal Inventories" study, being conducted by researchers at the University of Zurich. The purpose of this project is to better understand people's strength of attachment to objects in their home, and understand how these attachments come about.
If you agree to participate in this study you will be interviewed for approximately one hour, taking part in an informal discussion about things that you own. If possible, the interviews will take place in your own home or at another place of your convenience. You will be asked questions about the objects you use as well as your attitudes towards them.

By participating in the study, you agree to the following:

- The interview session will be audio recorded, and may be transcribed or partially transcribed. If you wish to not be audio recorded, please state so at the beginning of the session.
- The objects you mention and the environment in which you use them will be photographed.
- The only personal identifying information collected will be your voice, as well as some demographic information such as gender, age, profession and living arrangement.
- All data collected will be kept secure either on password protected computers or in locked university filing cabinets. Only the researchers involved in this study will have access to the data.
- Participation in this study does not incur any costs.
- There are no particular risks associated with the study above those with normal everyday activity.
- You will receive a compensation of SFr 20,- for participating in this study.
- The result of this study will potentially be used in both internal and external presentations and publications. It will be presented in the form of a Master thesis project and may additionally be published in academic journals or conference proceedings.
- You will remain anonymous in all publications. Your comments from the interview as well as the pictures will only be referred to with a participant number.
- You are at least 18 years of age.
- Participation in this study is completely voluntarily and confidential. You are free to cease participation at any time during the study without providing a reason. Any information you contribute up to the point at which you choose to cease participation will be retained and used in the study, unless you request otherwise.

In no way does this waive your legal rights or release the researchers or involved institutions from their legal or professional responsibilities. You should feel free to ask for clarification or new information at any time during your participation.

Participant‘s Name (please print):

Participant‘s Signature:

Date:

Researcher‘s Name (please print):

Researcher‘s Signature:

Date:

If you have any further questions or would like further information regarding this research and/or your participation, please contact:

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Department of Informatics
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(079) 528 7961
silke.gegenbauer@uzh.ch

If you have any complaints or concerns about your participation in this study, please contact:

Prof. Dr. Elaine M. Huang
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University of Zurich
Binzmühlestrasse 14
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(044) 635 4411
huang@ifi.uzh.ch

A copy of this consent form has been given to you to keep for your records and reference. The interviewer has kept a signed copy of the consent form.

D EINVERSTÄNDNISERKLÄRUNG

Einverständniserklärung

Einverständniserklärung zur Mitwirkung an der Studie „Personal Inventories“

Hiermit laden wir sie ein, an der Studie „Personal Inventories“ teilzunehmen, welche von Forschern der Universität Zürich durchgeführt wird. Ziel dieser Studie ist es, ein besseres Verständnis über die emotionalen Verbundenheit von Menschen zu Gegenständen, die sie besitzen, zu erlangen.
Wenn Sie sich dazu entscheiden, an dieser Studie teilzunehmen, dann werden Sie für etwa eine Stunde zu verschiedenen Gegenständen in Ihrem Haushalt befragt. Dieses Interview sollte, wenn möglich, bei Ihnen zu Hause stattfinden. Sie werden einige Fragen gestellt bekommen, welche sowohl Gegenstände die Sie besitzen, als auch Ihre Einstellung dazu betreffen.

Bei Teilnahme an der Studie erklären Sie sich mit folgenden Punkten einverstanden:

- Das Gespräch wird mit Hilfe von Tonaufnahme festgehalten und ganz oder teilweise transkribiert. Wenn Sie keine Tonaufnahme wünschen, teilen Sie dies bitte vor Beginn des Gesprächs mit.
- Wenn Sie einverstanden sind, dann werden die Gegenstände, welche Sie im Interview erwähnen, sowie deren direkte Umgebung, fotografiert. Diese Aufnahmen werden ausschliesslich anonym gespeichert.
- Es werden im Rahmen der Studie keine persönlichen Daten erhoben, ausser der Aufnahme Ihrer Stimme, sowie folgende demographische Daten: Geschlecht, Alter, Beruf, Wohnsituation.
- Alle erhobenen Daten werden entweder auf passwortgeschützten Computern oder in verschlossenen Aktenschränken aufbewahrt werden. Die Daten werden ausschliesslich zu wissenschaftlichen Zwecken verwendet.
- Es haben ausschliesslich die an der Studie beteiligten Personen Zugriff auf die Daten.
- Die Teilnahme an dieser Studie ist kostenlos.
- Es sind keine besonderen Risiken mit dieser Studie verbunden, welche über alltägliche Aktivitäten hinaus gehen.
- Als Aufwandsentschädigung für die Teilnahme an dieser Studie erhalten sie eine Vergütung von SFr 20,-.
- Die Ergebnisse dieser Studie können sowohl in internen als auch in externen Präsentationen und Publikationen verwendet werden. Sie werden in Form einer Studienarbeit vorgestellt und möglicherweise zusätzlich in Fachzeitschriften oder Konferenzbeiträgen veröffentlicht.
- Sie werden in sämtlichen Publikationen dieser Studie anonym bleiben. Ihre Äusserungen in den Interviews sowie die Fotos werden in den Veröffentlichungen ausschliesslich unter Verwendung einer Teilnehmernummer genutzt.
- Sie sind mindestens 18 Jahre alt.
- Die Teilnahme an dieser Studie ist freiwillig und wird absolut vertraulich behandelt. Es steht Ihnen jederzeit frei, die Teilnahme ohne Angaben von Gründen zurückzuziehen. Alle Informationen, die Sie bis zu diesem Punkt beigesteuert haben, werden weiterhin verwendet, es sei denn Sie wünschen dies nicht.

In keiner Weise bedeutet die Unterschrift dieser Einverständniserklärung den Verzicht Ihrer Rechte noch entbindet diese die Wissenschaftler und beteiligten Institutionen von Ihrer fachlichen oder rechtlichen Verantwortung. Sollten Sie weitere Fragen haben, dann dürfen Sie diese jederzeit während Ihrer Teilnahme stellen.

Name des Teilnehmers (bitte in Druckbuchstaben):

Unterschrift des Teilnehmers:

Datum:

Interviewer Name (bitte in Druckbuchstaben):

Interviewer Unterschrift:

Datum:

Wenn Sie Fragen haben oder weitere Auskünfte über dieses Projekt und/oder Ihre Teilnahme wünschen, dann wenden Sie sich bitte an:

Silke Gegenbauer
Institut für Informatik
Universität Zürich
Binzmühlestrasse 14
CH-8050 Zürich
(079) 528 7961
silke.gegenbauer@uzh.ch

Wenn Sie irgendwelche Beschwerden oder Bedenken bezüglich Ihrer Teilnahme an dieser Studie haben, kontaktieren Sie bitte:

Prof. Dr. Elaine M. Huang
Institut für Informatik
Universität Zürich
Binzmühlestrasse 14
CH-8050 Zürich
(044) 635 4411
huang@ifi.uzh.ch

Sie erhalten eine unterschriebene Kopie dieser Einverständniserklärung für Ihre Unterlagen. Eine weitere unterschriebene Kopie behält der Interviewer.

E INTERVIEW PROTOCOL – ENGLISH VERSION

Interview Protocol

Bring:
2 Recording Device
Camera
Notepad
Interview Protocol
2 Consent Form
Compensation
Compensation Receipt Form

Interview Guide:
Subject Number:
Age:
Gender:
Profession:
Living Situation:

I am doing a Master‘s program at the University of Zurich. In order to complete my studies, I have to write a Master‘s thesis, for which I am conducting a research study. To achieve my goal of better understanding people‘s strength of attachment to objects, as well as their motive for doing so, I am interviewing several people. Thank you for agreeing to participate in my study.
In the following hour, I will ask you about objects, which you have in your home and your attitude towards them. If you agree, I would like to record the interview as well as take some pictures of the objects in their usual environment.

If you have any questions during the interview, please feel free to ask at any point in time.

[go through consent form, questions, sign, collect one, leave one]

1. Pick a thing and tell us everything about that thing you can think of.
2. What things do you have that you love?
    How long have you had this item?
3. Why do you love the things you do?
    Is there a story behind this item that you would like to tell?
    Is there another thing that you love or like a lot?
4. What things do you have that you thought you would love but don‘t?
5. Why do you not love the things you don‘t?
    Is there a specific reason why you have not yet replaced it?
    Would you like this thing more if it were new?

6. What things do you have that you didn‘t expect to love but do?

    What is the reason for that?

7. What things do you have more than one of?

    What kind of things do you own that have the same functionality?

8. Why do you have more than one of some things?

    Have you thought about throwing the duplicates out?

9. What are the oldest things you have? That you still use?

    How old are those things?

    How long have you had those things?

    Is there a reason why you have not replaced them?

10. That you no longer use but would not discard?

    Have you replaced those things or their functionality?

    Do you have anything that you think you might use again, but have not in a long time? Why do you not discard them?

    What kind of things would you have repaired? What not?

    Do you own something which you yourself or somebody else repaired?

    Do you own something that you would never discard?

11. Why do you keep things you don‘t use?

    Where do you store things that you do not use?

    What items do you keep there?

    Do you thing you will at some point use them again?

12. What things do you use most frequently?

13. Which item you own do you think is the most useful?

14. Which item do you think is the least useful?

    Why do you not discard it?

15. What are the newest things you have?

    Why did you decide to buy those things?

16. What do you acquire most frequently?

    What kind of things do you replace regularly?

    In what frequency do you replace them?

    What do you frequently get as a present?

    What are you planning to buy soon?

17. What would you only by new?

    Does it matter whether or not you receive or buy something from someone you know?

18. What prompts you to acquire new things?

19. What would you only by used?
20. Why do you buy used things?
21. Why do you prefer some old things to new ones?
22. Why do you prefer some new things to old ones?
23. Would it be possible to walk through your place, maybe you will remember some other things then?
24. May we photograph your environments of use? Some of your things?

Thank you for your time.

[Turn of/put away recording device, camera, notepad, hand out compensation, remember to ask demographic questions]

F INTERVIEW PROTOCOL – GERMAN VERSION

Interview Protokoll

Mitbringen:
2 Recording Device
Camera
Notepad
Interview Protocol
2 Consent Form
Compensation
Compensation Receipt Form

Interview Guide:
Subject Number:
Age:
Gender:
Profession:
Living Situation:

Ich absolviere einen Master-Studiengang an der Universität Zürich. Um mein Studium abzuschliessen schreibe ich eine Masterarbeit, in dessen Zuge ich eine Studie durchführe. Ziel dieser Studie ist es die Stärke der emotionalen Verbundenheit von Menschen an Gegenstände, sowie deren Beeinflussung, besser zu verstehen. Aus diesem Grund interviewe ich mehrere Leute. Vielen Dank, dass Sie sich dazu bereit erklärt haben an meiner Studie teilzunehmen.

In der folgenden Stunde werde ich Sie zu Gegenständen befragen, welche Sie besitzen und wenn Sie damit einverstanden sind, das Gespräch aufzeichnen und die Gegenstände in ihrer direkten Umgebung fotografieren.

Wenn Sie während des Interviews irgendwelche Fragen haben, können Sie diese selbstverständlich jederzeit stellen.

[go through consent form, questions, sign, collect one, leave one]

25. Wählen Sie einen Gegenstand aus und erzählen Sie uns alles über diesen Gegenstand, was Ihnen dazu einfällt.
26. Welche Gegenstände besitzen Sie, die Sie gerne mögen?

    Wie lange besitzen Sie diesen Gegenstand?
27. Warum mögen Sie diese Gegenstände?

    Gibt es zu diesem Gegenstand vielleicht eine Geschichte die Sie gerne erzählen würden?

Gibt es noch einen weiteren Gegenstand, den Sie gerne mögen? Vielleicht fällt Ihnen was ein, wenn Sie in Gedanken durch Ihr Haus/Ihre Wohnung gehen?

28. Welche Gegenstände besitzen Sie, von denen Sie dachten Sie würden sie gerne haben, tun es jedoch nicht?

29. Warum mögen Sie diese Gegenstände nicht so gerne?

Gibt es einen Grund, warum Sie diesen noch nicht ausgetauscht/entsorgt haben?

Wenn es dieser Gegenstand ganz neu wäre, würden Sie ihn dann lieber mögen?

30. Welche Gegenstände besitzen Sie, die Sie gerne mögen, dies jedoch nicht erwartet haben?

Warum mögen Sie diesen Gegenstand doch?

31. Welche Gegenstände besitzen Sie mehr als einmal?

Welche Gegenstände besitzen Sie, die die selbe Funktion erfüllen?

32. Warum besitzen Sie diese Gegenstände mehrfach?

Hast Du/Haben Sie darüber nachgedacht die doppelten Gegenstände zu entsorgen?

33. Welches sind die ältesten Gegenstände, die Sie besitzen und immer noch benutzen?

Wie alt sind diese Gegenstände?

Wie lange besitzen Sie diese Gegenstände?

Gibt es einen Grund, warum Sie diese Gegenstand noch nicht ersetzt haben?

34. Welches sind die ältesten Gegenstände, die Sie besitzen und nicht mehr benutzen?

Haben Sie diese Gegenstände oder deren Funktion durch neuere ersetzt?

Gibt es vielleicht einen Gegenstand von dem Sie denken den benutzen Sie eventuell noch einmal, haben ihn aber schon sehr lange nicht mehr benutzt? Warum entsorgen Sie diese nicht?

Gibt es Gegenstände welche Sie eher reparieren lassen würden als andere?

Gibt es etwas was Sie selbst repariert haben oder repariert haben lassen?

35. Warum behalten Sie Gegenstände, welche Sie nicht mehr benutzen?

Wo bewahren Sie Gegenstände auf, die Sie nicht mehr verwenden?

Was haben Sie dort für Gegenstände?

Denken Sie, Sie werden für diese Gegenstände noch einmal Verwendung haben?

Gibt es etwas, was Sie niemals entsorgen würden?

36. Welchen Gegenstand benutzen Sie am häufigsten?

37. Welchen Gegenstand empfinden Sie als nützlichsten?

38. Welchen Gegenstand empfinden Sie als nutzlosesten?

Gibt es einen Grund, warum Sie diesen Gegenstand noch nicht ersetzt/entsorgt haben?

39. Welches sind die neusten Gegenstände die Sie besitzen?

Warum haben Sie sich dazu entschieden diese Gegenstände zu kaufen?

40. Was kaufen Sie am häufigsten? (Gegenstände die ersetzt werden)

    Welche Gegenstände ersetzen Sie regelmässig?

    In welchem Rhythmus tauschen Sie diese aus?

    Was bekommen Sie regelmässig geschenkt?

    Was planen Sie sich als nächstes anzueignen?

41. Was würden Sie nur neu kaufen?

    Macht es einen Unterschied, ob Sie den Gegenstand von jemand fremdes oder jemand den Sie kennen erhalten?

42. Warum kaufen Sie neue Gegenstände?

43. Was würden Sie gebraucht kaufen?

44. Warum kaufen Sie gebrauchte Gegenstände?

45. Warum ziehen Sie bei bestimmten Gegenständen gebrauchte Gegenstände vor?

46. Warum ziehen Sie bei bestimmten Gegenständen neue Gegenstände vor?

47. Wäre es möglich einmal durch Ihr Haus/Ihre Wohnung zu gehen, vielleicht fällt Ihnen dann noch etwas ein?

48. Ist es in Ordnung, wenn wir Ihre Umgebung fotografieren? Und einige Ihrer Gegenstände?

[Turn of/put away recording device, camera, notepad, hand out compensation]

Vielen Dank

G Data Analysis Documents – Out-Of-Use Electronic Devices

It’s too much work to get rid of it

- DVD Player
- Laptop
- Playstation
- Mobile Phone
- Surround System

I want to keep the data

- Atari

I keep it as a backup

- Playstation
- PC
- Scanner
- VCR
- Mobile Phone
- Radio
- Phone

I might find someone to give it to

- iPod
- Coffemaker

It’s sort of Iconic/Nostalgic/Decorative

- Radio
- Polaroid Cameras

I keep it out of Respect for the Person who gave it to me/I got it for a special occasion

- Camera
- Radio

Backup to a newer device

I keep it as a backup

Perceived residual value to owner

I keep it as a backup

Perceived residual value to others

I might find someone to give it to

Value of the content not the device

I want to keep the data

Personal history

I keep it out of Respect for the Person who gave it to me/I got it for a special occasion

Perceived historical value

It’s sort of Iconic/Nostalgic/Decorative

Inertia

It’s too much work to get rid of it

H DATA ANALYSIS DOCUMENTS – ALL DATA

1) I keep it, because it‘s still working.
   e.g. Playstation (P4, P7), tandem (P7), telephone (P6, P17), binoculars (P15), wetsuit (P4), snowboard and cups (P18), TV (P3), BBQ (P9), iPod (P16)
2) I like it, because I‘v learned how to use it.
   e.g. wallet (P4), blackberry (P5)
3) I get something fixed, because it‘s valuable. I get something fixed/if fixing it is cheaper than getting something new.
   e.g. cowboy boots (P18), dress (P16)
4) I keep using something even though I don‘t like it, because it was very expensive.
   e.g. dinnerware (P18)
5) I like something, because one of the reasons I bought it was some special feature.
   e.g. mobile phone and laptop (P4)
6) I don‘t like it, because I wasn‘t well informed, when I bought it/I don‘t like something because it doesn‘t work like it‘s supposed to
   e.g. DVB-T receiver (P4), steamer (P5), number key pad (P13), vacuum cleaner (P12+13)
7) I like it, because when I saw it for the first time, I wanted to have it/because I always wanted to have it/I like it so much that I put money aside in order to buy it
   e.g. chandelier (P2, P9), photo and BBQ (P9), poster (P15), sculpture (P10), glass cat (P8)
8) My data is more important than the device itself.
   e.g. (P6, P12, P14, P18)
9) I fix it because it can be fixed
   e.g. fairies (P1+P2), porcelain angel (P10)
10) I keep it because it‘s still good and I don‘t know anybody who wants it.
    e.g. cello (P3)
11) I replace something because it‘s worn out.
    e.g. bike (P3), sofa (P15)
12) I like it because it simplifies my life.
    e.g. remote control (P4), build in coffee maker (P5)
13) We take our time deciding whether or not to buy something more expensive
    e.g. dinner table (P4, P10), patio furniture (P15)
14) I like the function of the item.
    e.g. table (P6), bed (P17, P18), mobile phone (P19), bike (P12), car (P15)
15) I don‘t like something because it‘s damaged (but still works).
    e.g. fruit basket cover (P6), sofa (P8)
16) I keep it as a backup.
    e.g. mobile phone (P4, P14)
17) I‘m too lazy to get rid of it.
    e.g. entertainment system (P4)
18) I keep it/take care of it, because it belongs to someone else.
    e.g. furniture (P9)
19) I keep it, because I might use it again.
    e.g. scanner (P12+13)
20) I buy something new because of additional functionalities.
    e.g. mobile phones (P19)

A I love it, because I got it from someone I love.
e.g. pear picture (P8), necklace (P19), shot glasses (P19), perfume (P6), paintings (P5)

B I love it, because I got it for a special occasion.
e.g. radio, bracelet+charms, camera (all P19), rooster (P5), paintings (P5), stone figure (P10)

C I love it, because I always had it.
e.g. baby blanket (P8, P19), christening shoes (P19), teddy bear (P10, P16)

D I love it, because I only wear it on special occasions and therefore it‘s special to me.
e.g. sweater (P8)

E I love it, because someone I love made it.
e.g.Tiffany glass (P1+2), paintings (P5)

F I love it, because it reminds me of a vacation.
e.g. souvenirs (P8), Sardinian flag (P14)

G I keep things out of respect for the person who gave it to me.
e.g. (P19), table (P11)

1) I keep it, because it‘s still working.
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   e.g. DVB-T receiver (P4), steamer (P5), number key pad (P13), vacuum cleaner (P12+13)
15) I don‘t like something because it‘s damaged (but still works).
   e.g. fruit basket cover (P6), sofa (P8)
16) I like it, because when I saw it for the first time, I wanted to have it/because I always wanted to have it/I like it so much that I put money aside in order to buy it
   e.g. chandelier (P2, P9), photo and BBQ (P9), poster (P15), sculpture (P10), glass cat (P8)
17) I like it because it simplifies my life.
   e.g. remote control (P4), build in coffee maker (P5)

18) My data is more important than the device itself.
e.g. (P6, P12, P14, P18)

19) I like the function of the item.
e.g. table (P6), bed (P17, P18), mobile phone (P19), bike (P12), car (P15)

A I love it, because I got it from someone I love.
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e.g. radio, bracelet+charms, camera (all P19), rooster (P5), paintings (P5), stone figure (P10)

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e.g. baby blanket (P8, P19), christening shoes (P19), teddy bear (P10, P16)

D I love it, because I only wear it on special occasions and therefore it‘s special to me.
e.g. sweater (P8)

E I love it, because someone I love made it.
e.g.Tiffany glass (P1+2), paintings (P5)

F I love it, because it reminds me of a vacation.
e.g. souvenirs (P8), Sardinian flag (P14)

G I keep things out of respect for the person who gave it to me.
e.g. (P19), table (P11)

H I keep it/take care of it, because it belongs to someone else.
e.g. furniture (P9)

Actual Durability

I keep it, because it‘s still working.
e.g. Playstation (P4, P7), tandem (P7), telephone (P6, P17), binoculars (P15), wetsuit (P4), snowboard and cups (P18), TV (P3), BBQ (P9), iPod (P16)

I fix it because it can be fixed
e.g. fairies (P1+P2), porcelain angel (P10)

I keep it, because I might use it again.
e.g. scanner (P12+13)

I replace something because it‘s worn out.
e.g. bike (P3), sofa (P15)

I keep it because it‘s still good and I don‘t know anybody who wants it.
e.g. cello (P3)

I‘m too lazy to get rid of it.
e.g. entertainment system (P4)

I keep it as a backup.
e.g. mobile phone (P4, P14)

Perceived Value

I get something fixed, because it‘s valuable. I get something fixed/if fixing it is cheaper than getting something new.
e.g. cowboy boots (P18), dress (P16)

I keep using something even though I don‘t like it, because it was very expensive.
e.g. dinnerware (P18)

We take our time deciding whether or not to buy something more expensive
e.g. dinner table (P4, P10), patio furniture (P15)

Distinctiveness

I like something, because one of the reasons I bought it was some special feature.
e.g. mobile phone and laptop (P4)

I buy something new because of additional functionalities.
e.g. mobile phones (P19)

I like it, because I‘v learned how to use it.
e.g. wallet (P4), blackberry (P5)

I like it because it simplifies my life.
e.g. remote control (P4), build in coffee maker (P5)

I don‘t like it, because I wasn‘t well informed, when I bought it/I don‘t like something because it doesn‘t work like it‘s supposed to
e.g. DVB-T receiver (P4), steamer (P5), number key pad (P13), vacuum cleaner (P12+13)

I don‘t like something because it‘s damaged (but still works).
e.g. fruit basket cover (P6), sofa (P8)

Eagerness

I like it, because when I saw it for the first time, I wanted to have it/because I always wanted to have it/I like it so much that I put money aside in order to buy it
e.g. chandelier (P2, P9), photo and BBQ (P9), poster (P15), sculpture (P10), glass cat (P8)

My data is more important than the device itself.
e.g. (P6, P12, P14, P18)

I like the function of the item.
e.g. table (P6), bed (P17, P18), mobile phone (P19), bike (P12), car (P15)

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e.g. radio, bracelet+charms, camera (all P19), rooster (P5), paintings (P5), stone figure (P10)

C I love it, because I always had it.
e.g. baby blanket (P8, P19), christening shoes (P19), teddy bear (P10, P16)

D I love it, because I only wear it on special occasions and therefore it‘s special to me.
e.g. sweater (P8)

E I love it, because someone I love made it.
e.g.Tiffany glass (P1+2), paintings (P5)

F I love it, because it reminds me of a vacation.
e.g. souvenirs (P8), Sardinian flag (P14)

G I keep things out of respect for the person who gave it to me.
e.g. (P19), table (P11)

H I keep it/take care of it, because it belongs to someone else.
e.g. furniture (P9)

Actual Durability
the extent to which an object is continued to be used as long as it is functional.

I keep it, because it‘s still working.
e.g. Playstation (P4, P7), tandem (P7), telephone (P6, P17), binoculars (P15), wetsuit (P4), snowboard and cups (P18), TV (P3), BBQ (P9), iPod (P16)

I fix it because it can be fixed
e.g. fairies (P1+P2), porcelain angel (P10)

I keep it, because I might use it again.
e.g. scanner (P12+13)

I replace something because it‘s worn out.
e.g. bike (P3), sofa (P15)

I keep it because it‘s still good and I don‘t know anybody who wants it.
e.g. cello (P3)

I‘m too lazy to get rid of it.
e.g. entertainment system (P4)

I keep it as a backup.
e.g. mobile phone (P4, P14)

Perceived Worth
the extent to which an object is used because its owner regards it as too valuable to dispose of.

I get something fixed, because it‘s valuable. I get something fixed/if fixing it is cheaper than getting something new.
e.g. cowboy boots (P18), dress (P16)

I keep using something even though I don‘t like it, because it was very expensive.
e.g. dinnerware (P18)

We take our time deciding whether or not to buy something more expensive
e.g. dinner table (P4, P10), patio furniture (P15)

I like something, because one of the reasons I bought it was some special feature.
e.g. mobile phone and laptop (P4)

I buy something new because of additional functionalities.
e.g. mobile phones (P19)

Earned Value (-> merge with Engagement)
the extent to which an object is used because its owner invested time into learning how to function it.

I like it, because I‘ve learned how to use it.
e.g. wallet (P4), blackberry (P5)

I like it because it simplifies my life.
e.g. remote control (P4), build in coffee maker (P5)

I don‘t like it, because I wasn‘t well informed, when I bought it/I don‘t like something because it doesn‘t work like it‘s supposed to
e.g. DVB-T receiver (P4), steamer (P5), number key pad (P13), vacuum cleaner (P12+13)

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e.g. (P6, P12, P14, P18)

I like the function of the item.
e.g. table (P6), bed (P17, P18), mobile phone (P19), bike (P12), car (P15)

Personal Attachment

A. I love it, because I got it from someone I love.
e.g. pear picture (P8), necklace (P19), shot glasses (P19), perfume (P6), paintings (P5)

B. I love it, because someone I love made it.
e.g.Tiffany glass (P1+2), paintings (P5)

C. I keep things out of respect for the person who gave it to me.
e.g. (P19), table (P11)

D. I keep it/take care of it, because it belongs to someone else.
e.g. furniture (P9)

Event Attachment

E. I love it, because I got it for a special occasion.
e.g. radio, bracelet+charms, camera (all P19), rooster (P5), paintings (P5), stone figure (P10)

F. I love it, because I always had it.
e.g. baby blanket (P8, P19), christening shoes (P19), teddy bear (P10, P16)

G. I love it, because I only wear it on special occasions and therefore it‘s special to me.
e.g. sweater (P8)

H. I love it, because it reminds me of a vacation.
e.g. souvenirs (P8), Sardinian flag (P14)

iPods, Ataris, and Polaroids: A Personal Inventories Study of Out of Use Electronics in European Households

ABSTRACT
The retention of old electronic devices is a practice of importance to sustainable HCI. In this research, we aim to better understand the nature of people's attachments to out of use electronic devices. Using the Personal Inventories qualitative method, we conducted 17 in-home visits to learn what technologies people keep and explore their relationships with out of use technologies. We identify various categories of attachment that build upon existing work on electronics and sustainability.

Author Keywords
Sustainability, consumer electronics, Personal Inventories

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous

INTRODUCTION
Environmental sustainability is a topic of increasing focus within the HCI community, as evidenced by a proliferation of publications on the topic within the last few years [4]. Several of these works have considered the environmental implications of the ubiquity and increasing consumption of electronic devices [1, 2]. Others have considered the need for retaining, reusing, transferring, and remaking devices as a way of lengthening their life cycles [3, 6, 7, 8], thus reducing their rate of proliferation and the amount of electronic waste that they yield.

Underlying these suggestions is the idea that people maintain an inventory of decommissioned electronic devices; this finding has been addressed and confirmed in studies surrounding people's practices with mobile phones [5, 6], PDAs [7], and other technologies [3, 8]. Although these works uncover some of people's motivations for keeping old technology, these are generally secondary findings and not the primary focus of study.

In this work, we seek to understand in depth how and why people maintain inventories of out of use electronics. Our goal in this research is not only to discover what people keep, but also to unpack their relationships with retained technology and the nature of their attachments to these objects in a systematic fashion. To achieve this, we conducted a study of out of use electronics in European households based on Blevis and Stolterman's Personal Inventories method [2] to discover and understand people's personal attachments to their possessions. Through this work we hope to inform design efforts aimed at lengthening the life cycle of devices through transferral, remaking, and other means.

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BACKGROUND AND RELATED WORK
In 2007, Blevis introduced the concept of Sustainable Interaction Design (SID), in which he considered the issue of whether interactive technologies can be designed in such a way that they might later attain heirloom status [1]. Subsequent work by Huang and Truong investigated how people replace and dispose of mobile phones, and in the process argued for design that encourages longer use and retention of mobile phones [5]. A follow-up study by Huang et al. extended this work by considering the issue of transferring ownership of mobile phones and what barriers might exist to transfer [6]. Related work by Huh et al. focused on people who adopted used PDAs rather than buying new ones, and investigated the motivations and reasons behind this practice [7].

Two recent works have looked in some depth at people's reasons for retaining old or out of use technology. A CHI 2010 workshop position paper by Chetty on the topic of remaking technologies focused on people's retention of home networking equipment such as modems and computers [3]. Her qualitative study identified the intent to remake technologies, the intent to transfer ownership, and concerns about data security as the main reasons that people retained old networking devices. A CHI 2011 paper by Kim and Paulos on reuse of technology for creative purposes also included a background survey on out of use technologies [8]. This survey, conducted using participants via Amazon's Mechanical Turk, identified the possibility for future use as people's main reason for retaining technology, and sentimental value and lack of knowledge or resources for disposal as less frequent reasons.

In this work, we aim to build upon these previous studies and existing knowledge through in-home qualitative studies

of people's technology inventories intended to unpack the nature of people's attachments to their no longer used electronic devices. In contrast to the studies mentioned above which focused on US residents, our participants are residents of Central Europe, all of whom are either European or longtime (>7 years) residents of Europe. Although it was not our intention to position our study as a means of contrasting European and American practices and attitudes towards technology retention, our findings include some variations that we believe supplement prior knowledge and contribute to a more complete picture of the retention of out of use technology.

STUDY DESIGN

We used a slightly modified version of the Personal Inventories method invented by Blevis and Stolterman [2] and later used by Odom et al [9] for our inquiry. The method entails visiting participants in their homes, and conducting contextual interviews using a protocol that inquires about items they have in their home and their attitude towards them. The method also includes home tours to probe for additional items that participants might not otherwise bring up in conversation [9]. We adapted the method by adding a few additional questions, such as: *What would you only buy new? What would you only buy used? Why do you buy used things? Does it matter whether or not you get something used from someone you know?*

Nineteen participants in 17 households were recruited using snowball sampling. Participants ranged in age from 18 to their early-70s with a variety of occupations, including a doctor, an engineer, hoteliers, a dance instructor, a retired minister, a full-time mother, and graduate students. Households represented included families, couples, people living alone, and people living with roommates. In all but two cases only one member of the household participated in the study. Interviews lasted for approximately one hour and were conducted in a language in which the participants had native fluency (18 in German, 1 in English). We photographed items that participants mentioned, and audio recorded the interviews. The interviews were transcribed and translated into English prior to analysis.

As in the original deployments of the Personal Inventories method, we did not focus our interviews on any particular class of objects or possessions, and instead allowed the participants to bring up the objects of discussion, electronics or otherwise. In this analysis of our data, however, we focus specifically on rarely or no longer used electronic devices in the home, and people's reasons for retaining them. We analyzed the transcribed data using an inductive open coding process to identify the relevant items, and organize them into emergent categories.

FINDINGS

Our participants had a wide variety of electronic devices in their homes, used with varying frequency. Participants offered numerous reasons for keeping non-functional (i.e. broken) as well as functional devices in their home despite no longer using them. We derived categories of attachment from these reasons as follows.

Figure 1. Out of use Playstation (left) and never used scanner (right) in participants' homes.

Perceived Residual Value to Others

This category was the most prominent among the out of use devices in people's homes. It encompasses those electronic devices people kept in hopes of giving or selling them to someone who had use for them, and the length of time that people kept the devices in this state varied. For example, one participant described being able to find a new owner quickly:

(P18) "Up until yesterday, we had our old coffee maker lying around, because we got a new one. We were keeping it until we found someone, who wanted to take it. That took a week or two."

Other devices were kept a longer or even indefinite amount of time, such as an iPod that a participant suggested she might keep for years before giving it away:

(P16) "I still have an iPod, which I don't use anymore. ... Maybe ... I might use it again. Or maybe I think I find someone to give it to. I don't know, maybe my goddaughter will be old enough one day, she's 5 now. And maybe someday she can use a computer."

Perceived Residual Value to Owner

People also kept devices because they felt that they might one day derive further value from them through resumed use, for example a Playstation (P4, P7), a VCR (P1, P2), and a scanner (P12). In these cases, participants had not replaced the item with something that served a similar function, but believed that they might need the device again at some point in the future. For example, a participant described a scanner that he bought 15 years ago, but never actually used:

(P12) "One of the reasons for me is that I might suddenly need it. And then I wouldn't have ... the option to scan things ... It might be possible that one night we decide we really need to scan something."

Similarly, one couple bought a used VCR to watch their old video tapes, but only used for a short time before abandoning it.

(P1) "If we want to record a movie, then we can do that with the TV. We have room for almost 100 hours, so we don't need the VCR."

(P2) "We only have it to watch the old videos."
(P1) "Which we never do."

Backup to a Newer Device

For some out of use devices, people believe they may use them in the future, but have also replaced them with newer objects that serve the same or similar purpose. The used items are kept as backup in case something happens to the one currently used. For example, people kept old cell phones (P4, P14) and a desktop computer (P12).

In some instances, simply having a backup seemed more important than the functionality of the backup, as in the case of one participant's cell phone:

(P14) "I think I still have one [mobile phone] in my drawer ... in case my current one doesn't work. However, I don't know if it still works ... and whether or not I still have the battery charger."

Keeping a small device like a mobile phone may seem intuitive on account of the fact that they require little space, but people also kept larger devices. One participant kept a desktop computer as a backup, but used it infrequently:

(P12) "The one I use the least ... maybe once a month. It's basically the backup PC, in case the other one isn't working, so I can use it."

Value of the Content, not the Device

In some cases, participants kept devices not because they attributed significant value to the device, but because they housed content or data that they either did not want to lose or did not want others to have. Privacy and accessibility of stored data were reasons some of our participants kept electronic devices, a finding supported by Chetty's work as well [3]. For example, one participant pointed this out as his reasoning behind keeping two old laptops:

(P9) "I still have a computer in another room which I don't use ... I have another one which is even older ... I probably still have some data on that computer ... I would have to completely destroy the hard drive myself so I could be sure nobody can access it."

The attachment to stored data was another reason for keeping devices. In some cases the data is perceived to be of such importance that the whole device is kept to ensure the owner has continued access to the data. One participant kept his old Atari for 25 years not out of nostalgia for the device but because he had software that he had written stored on it:

(P12) "The Atari, [I keep] because of the data. There is software on it, which I wrote myself. I mean, I could put the software on a floppy disk and then run it on a different Atari ... But it's pretty complicated to do so. That's one of my projects ... But as long as the project is not finished, it's important to me not to give [the Atari] away ... I've had it at least 25 years ... I haven't turned it on in 6-7 years ... It's in the basement."

Personal History

Some devices had emotional associations as the primary reason for attachment. These connections might have arisen because of a specific person who gave the device to the user, or a special occasion for which the user received the device. Items mentioned in this category were a camera that an 18-year old participant got for finding an apprenticeship (P19) as well as an old CD/cassette boombox that the same participant received from her godfather for her confirmation (P19):

(P19) "For example the radio. Now it's more decoration, I don't really use it anymore, but I've used it a lot in the past. And I still really like it ... [I keep it because] I got it from my godfather for my communion, and because that was special."

She also mentioned keeping a camera because of sentimental value since she got it for a special occasion. Surprisingly, sentimental attachment was only mentioned by one participant regarding electronic devices. This may suggest that personal history with an object may not be a common or prominent factor in forming attachments to electronic devices.

Perceived Historical Value

In some cases, owners attribute value to the item because they perceive it to have an enduring appeal, even though it might not function properly or be of much use to them. One example of a device in this category was a vintage radio (P17) that was only kept as a decorative piece:

(P17) "I have a radio that hasn't worked in a while ... It's probably something that looks good, maybe also one of the things that's a cool decorative piece. But I don't even know if it's still working or not... It's small and somewhat nostalgic."

Another participant kept old Polaroid cameras not only out of appreciation for their physical appearance, but because of nostalgic appreciation for the type of pictures they make:

(P16) "I still have old Polaroid cameras at home ... It's more like a classic now... But I haven't used it in a while ... They are for sure at least 10 years old. We used to take so many pictures with them, but at some point they were replaced with digital cameras ... I think we kept them because they are sort of a classic."

Inertia

Some objects were kept simply because their owners anticipated that getting rid of them would require substantial effort. Even though they had knowledge of where and how to dispose of an object, from the owners point of view the perceived effort was too great. In one case, a participant was unable to find a new owner for the device at first, and subsequently did not want to try again:

(P7) "I also have a DVD player, which I put in the basement ... I could throw or give it away ... It would almost be too much of an effort to get rid of it, because

almost everyone has one and they are really cheap nowadays. I once tried to sell it via [an auction website], but no one bought it."

Another participant simply had not tried to sell his previous entertainment system because he believed the tasks necessary to do so would require too much effort:

(P4) "I don't know what to do with [my old entertainment system]. And I'm kind of too lazy to sell it on eBay ... I would have to clean [it], if I wanted to sell it. And all the cables are a mess, they are really long so I would have to roll them up, then put it all in its original packaging, and bring it to the post office. Like I said, that takes a lot of effort."

DISCUSSION

The findings presented in this work indicate the variety of ways in which people are attached to out of use electronic devices. Some attachments to devices, such as the boombox that P19 received from her godfather, are strong and emotionally driven, while others, such as P7's attachment to an old DVD player, are considerably more tenuous. Many of the attachment categories bear resemblance and lend support to previous findings about technology retention, but also point to differences.

Our study was done with European participants and longtime European residents, in contrast to previous studies that have focused on US residents. We acknowledge that with 19 participants, our findings cannot be assumed to be representative of European households general. However, we did identify some interesting patterns that point to subtle differences between our study participants and the US-based participants in previous work [3, 8]. One of the most striking differences is that none of our participants mentioned keeping old electronics because they lacked the resources or knowledge necessary to dispose of them. This finding is in contrast to Kim and Paulos's study, in which many participants cited this as the reason for retaining technology. The participants in our study were aware of specific options for disposing of their items, for example scheduled e-waste pickup days (similar to trash pickup days), and the option of taking electronics to any electronics retailer for recycling. This awareness was likely due to the consistent and widespread options for e-waste disposal in Europe such as those mandated by EU Directive 2002/96/EG[1]. Interestingly, participants still retained unwanted electronics because of the perceived amount of effort required to dispose of them, indicating that even when people have the knowledge and resources to dispose of e-waste, retention still occurs.

Additionally, unlike the participants in Chetty's study, none of our participants indicated the intention to remake technology as a reason for keeping it. Although we cannot make claims regarding this difference with certainty, this finding may relate to our anecdotal observation that the European participants had a strong tendency to use their electronics for a long time, often until they broke or were very outdated. This may make the technologies owned by these participants less viable and appealing candidates for remaking than those owned by participants in Chetty's study. Further study and data collection would be required to validate this possibility.

In this research we have focused on people's practices with and attachments to old electronics in their homes. We are currently analyzing the data we collected in our study on non-electronic devices and in use electronic devices as well. By doing so, we are hoping to further broaden our understanding of people's attachment to their belongings in order to better inform the design of future electronic devices.

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[1]http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:037:0024:0038:EN:PDF

J RECRUITING DOCUMENT – DESIGN PROJECT

Designer für Forschungsprojekt Gesucht

Der Fachbereich Human Computer Interaction am Institut für Informatik der Universität Zürich führt eine Studie durch, mit deren Hilfe die emotionale Verbundenheit von Menschen zu verschiedenen Gegenständen untersucht wird. Die in der Studie gesammelten Daten sollen auch einen Einblick darüber geben, wie elektronische Geräte nachhaltiger gestaltet werden können. Unter Verwendung der bisherigen Ergebnisse haben wurden Kriterien erstellt, die als Maßgabe für die Gestaltung der Geräte verwendet werden können, so dass eine stärke Bindung zwischen Objekt und Besitzer entsteht. Diese soll dazu führen, dass die Geräte entsprechend ihrer Lebensdauer länger verwendet werden, als dies momentan der Fall ist.

Hierfür werden Industriedesigner, Produktgestalter oder fortgeschrittene Designstudenten, die bereits umfangreiche Erfahrungen in Kursen und Projekten gesammelt haben gesucht, welche bereit sind, etwa eine Woche eigenständig an ersten Entwürfen zu arbeiten und anschliessend an einem gemeinsamen Brainstorming teilzunehmen, aus dem weitere Entwürfe hervorgehen.

Wenn Sie Sich dazu entschliessen an dieser Studie teilzunehmen, werden Ihnen die entsprechenden Materialien zugestellt. Sie haben dann etwa eine Woche Zeit, um sich damit auseinander zu setzen. Im Anschluss würden wir Sie gerne zu einem gemeinsamen Workshop eingeladen, im Rahmen dessen Sie Ihre Ideen vorstellen und mit der Gruppe diskutieren können. Ziel hierbei ist es erste Entwürfe für nachhaltiger gestaltete elektronische Geräte zu entwickeln.

Als Aufwandsentschädigung für die Teilnahme an der Studie erhalten Sie eine Vergütung von CHF 100,-. Für die Teilnahme an unserem Workshop erhalten Sie zusätzlich eine Vergütung von CHF 100,-.

Sollten Sie Rückfragen zu diesem Projekt und Ihrer Teilnahme daran haben, dann melden Sie sich gerne bei uns. Wir würden uns sehr über Ihre Zusage freuen.

Der Workshop findet voraussichtlich am 22. November 2011 am Institut für Informatik der Universität Zürich in der Binzmühlestrasse 14, 8050 Zürich statt. Falls Sie nicht an diesem Termin können oder nicht an dem Workshop teilnehmen möchten, so teilen sie und dies bitte bei der Anmeldung mit.

Teilnehmer melden sich bitte bis zum 17. November 2011 bei

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K DESIGN ACTIVITY DESCRIPTION – ENGLISH VERSION

Design Activity Description:

Thank you for agreeing to participate in this study.

As part of a larger research project, we conducted an series of interviews about people's attachment to their personal possessions. From those interviews we derived a set of types of attachment which we would like to use as the basis for designing electronic devices in such a way that a stronger bond between owner and object is created. Ideally, this design should lead to the devices being used longer than is currently the case. The 6 different types of attachment that we identified are described below in this document, along with interview quotes to illustrate the attachment.

In this exercise we ask you to read through the attachment types and illustrative quotes, and use them as the basis or inspiration for creating some preliminary designs for electronic devices. We ask that you create designs for the following electronic devices: laptop, smart phone, tablet/e-reader and mp3-player. You may design for as few or as many of the devices as you would like, but we ask that you provide 4-12 designs in total. Designs should be illustrated in the form of sketches with descriptions, or storyboards. You are welcome to use as many of the attachment types as you like in your designs; each design should clearly indicate which attachment types it addresses.

We would also like to invite you to join us and other designers in a workshop to present ad discuss your ideas, and collaborate on new ones. The exact date will be determined based on the schedules of the participants. It is tentatively scheduled for November 22, 2011 at the Institut für Informatik of the University of Zurich at Binzmühlestrasse 14, 8050 Zürich. [Note that the workshop may be cancelled if we do not have a sufficient number of participants.]

You will receive a compensation of CHF 100,- for your designs as well as CHF 100,- for participating in the workshop.

If you have any questions, please feel free to contact us at any point.

Attachment Types

Engagement: The extent to which an object invites and promotes physical engagement with its owner during use as well as to which an object is used because its owner invested time in learning how to function it.

Wallet: "I have two wallets ... I lost one at some point, so I bought a new one, but I got back the other one as well ... so I have two. I use the second [new] one to go out partying, when I go out. More like a back up, it's a little smaller. It was more by chance that I own two now. But I'm still attaches to the old one. ... I'm used to it, how I organized it, which was the same when I got it back, so I have no reason [to use the new one], the new one might have different pockets, a different layout. So I stayed with the old one."

Blackberry: " I've had my Blackberry for 3 years, and now I know how to handle it. I don't see a reason why I should replace it, now that I know how it works. An newer one would take too much time to understand how to use it."

Remote Control: "A universal remote control for all my equipment. I always thought of it as knickknack, but then there was a good deal ... it was a spontaneous purchase, I thought I would try it. And I can't complain. I replaced all other remote controls. now I have only one. And even though I have to recharge it regularly, I got used to that. ... I've had that for 4 or 5 months, first in my old apartment. but there we only used it with three devices. Well, there I though it's not so useful. But now that we moved, we have more equipment, now it's 5 devices, so now the purchase has paid off. I wouldn't like to handle 5 remote controls."

Augmentation: The extent to which an object has been reused, renewed, modified, altered or otherwise made to be a part of something augmented beyond its original intended use and as such has become a symbol of the resourcefulness and/or creative expression of its owner.

Alarm Clock: " My digital alarm clock which wakes us in the morning, that I wouldn't give up. ... It basically just runs on electricity and you can attach whatever you want to it. Right now, we connected a lamp to it, previously it was connected to the hi-fi system. And it's really easy to use. You can easily choose which time, or when not to wake us up. And it's a nice design and belongs to a stereo/hi-fi system, which I got for my confirmation, just a part of it. ... And I think it would be a pity if it were gone."

Bracelet: "The bracelet I got from my best fiends for my confirmation and I'm wearing it every day. And now I have gotten a lot of charms from my parents, friends and so on. So now it's important to me. ... I think I've had it for 2 and a half years. ... The strawberry came with it. ... Yes [she would like to have more charms], but they are pretty expensive. And it should be things I have an association with. For example my 18th birthday. ... The 18, which I got for my 18th birthday, which was special. That [a ball?] is from Christmas 2010, very cool. And the elephant was just a gift, no special occasion."

Armchair: "That chair was embroidered by ... the godmother of [my husband] for our wedding. For him, well for us. And that's also something that I would never give up. And that we have also taken everywhere with us. Because it was so much work and it was really nice of her to do that for us. She [her husband's godmother] embroidered it together with a friend of her, an old lady. That's incredible. ... When we [got married in] '79. ... And a couple of years later they also gave us that table. ... But it [the chair] to me is worth so much more, because so much work went into it. ... That I would never give up [but also not the table]."

Candleholder: "The candleholder, that you don't use that often. But when I got it, I used it every single night and was really happy about it. And now its more a decorative item. No [she wouldn't give it up], because I bought it at an antique store and then I polished it, since before it wasn't sparkling and now it does. I'm really proud of that."

Histories: The extentextent to which the materials of an object preserve personal histories or other memories, either by explicitly showing physical signs of use or implicitly by virtue of its persistence over time.

Cups: "One thing is really important to me. It's pretty trivial, but it's some plastic cups. When I was in the hospital in America during the births of my sons, they served coffee in it. And it [the cup] wouldn't get too hot to hold and the coffee in it stayed hot for very long. And we were living in a student apartment, since my husband was still a student in Boston. And every time my husband was visiting, he took one of the plastic cups home. Because that way we didn't have to buy any. And for inexplicable reasons, we have really moved a lot, those plastic cups stayed with us. And

every day I drink my morning coffee out of those plastic cups. Because it's very close to me somehow. As a reminder of the births of my sons and also of the independent and nice time that we had. ... [that was] 30 years [ago]. And they still exist. And I still drink my coffee in the morning out of it. [siehe P11 - 3] ... Those plastic cups, well in the beginning, we took them out of usefulness. And now it grow on me, it became something really valuable. Because in the beginning I though, ok let's take them they are useful. And over time I realized they are not just practical, ... every time I hold one of those plastic cups in the hand, it became more of a special memory. And the older they get, the more memorable they are. [siehe P11 - 1]"

Chairs: "That chair ... that I've used as a child. I took that from my parents' house, and I glued it together again. And the table, this might be even older, because it also belonged to my mother. ... [She brought them over from her parents'] About half a year ago. ... We used to sit a lot at that table [when they were children], on those chairs doing handicrafts, painting, or even eating, when my parents had company. Then we were sitting at that table, the children were eating at the small table, the adults at the big table. ... We also have a second chair, which is broken. But I want to see whether it's possible to repair it."

Bassinet: "I used to play with that. But there wasn't really anything that was worth keeping in our home. That simply didn't exist. In your [her husband] family neither, right? There wasn't anything to inherit, or something that has been in our families for generations, something like that simply doesn't exist. ... I played with it [bassinet] as a child. And then my sister didn't want to keep it, so I took it. And my daughter used to play with it, so I painted it white and put the bug stickers on it. And it used to be in the basement."

Knife: "My husband had a knife, which he always used to use, that he got from his grandmother. I think he had very sentimental attachments to it. And he used it for a long time, until the blade came off the handle. And he would always fix it, but I think at some point it just became too hard to fix. So he stopped using it, but he would use it, if he could. ... Ja, he still has it. ... It's in the kitchen. ... I think [he doesn't get rid of it], because it's from his grandmother and he was quite close to his grandmother. She died, must be 15 years ago, 20 years ago. ... It might have a year, if I look at it, I don't know. But it was something she had for a long time so I think, and his grandmother was in her 80s when she died. ... I think he got it, when he was a teenager from her. So it must be about 100 years old or something. I don't know, it was probably made around 1910."

Perceived Durability: The extent to which an object's owner regards an object as long lasting either in terms of function or in terms of longevity or both.

Dress: "A polka-dotted dress, like a petticoat, which my sister gave to me. She is a seamstress and worked in a bridal store. And it's really ugly. I never wore it, but I would never dispose of it. Also, a ball gown which belonged to my grandmother. ... It was her first ball gown, so she was about 15 years old. ... I guess it's probably 75 years old. But the silk is slowly dissolving. But I will still keep it. It's somewhere stored in a box. ... It's all hand sewn and my grandmother made it. ... Since there were no zippers back then, only buttons, and the buttons are all bordered by hand. ... And even though it's just lying around somewhere, and I don't use it, I still know it's there."

Kitchen Table: "The [kitchen] table is the oldest thing. It's from 1952, from my grandparents. Handmade from a carpenter in the Engadin. And I got it, when she [his grandmother] moved into a nursing home. And for me it's pretty important, because it's from her and she and her husband ate from that table for 50 years and it still looks as good as new. It's a very good quality, it's an old Swiss stone pine table [kind of pine tree]. That's the oldest thing I own. ... I got it a year ago."

Furniture: „My furniture [sideboard and bar cabinet], which I've had for 23 years. those are probably the oldest things. ... The reason for that [not disposing of it] is, because I still like them. I

really like them. I liked them, when I bought them and I still do. ... In my opinion, even though it used to be an ultramodern sideboard, it's now more of a timeless piece. It used to be modern art. I saw it at the "Art" in Milan and then I found out how to order it, and it was ultramodern. And if I look at it now, after 22 or 23 years, I think it pretty much became a timeless sideboard. I don't see anything modern there anymore, but it's neither antique. I think it's timeless. It would be difficult for me to give it away. Even though it's not that functional. It has very little space. But I love it. I really like it, I really really like it. But I can't tell why that is. It was love at first sight, and I'm still in love. If it were up to my husband, they were long gone."

Kitchen Table: "My parents had the [kitchen table]. ... That is such a beautiful piece of furniture. ... It's probably a little older than my deceased grandfather, it might be around 150 years old. An I've had it since ...99, so that's 12 years."

Perceived Worth: The extent to which an object is continued to be used or repaired, because its owner regards it as too valuable to dispose of as well as the extent to which the owner elaborates when buying something new, because the object is regarded as valuable.

Bench: "Last weekend, we bought this bench. We don't buy furniture very often, but we have to get some, because the new baby is coming. So we were looking for something for my sons clothes, like a chest of drawers, and then we got this bench, just because we saw it, and we were looking for something like that for a long time. Where you could sit and put on your shoes or take of your shoes. And also to store something inside. It took a long time to find something that fit exactly. But then we just saw it by chance even though we weren't thinking of it. And we bought it."

Dinnerware: "My dinnerware. That we wished for for our wedding. And I still think it's pretty. But it's kind of impractical. I would get something totally different now. ... [They've had it for] 3 years. ... The plates are somewhat sloped, so when you put the flatware on it, it will slide down and fall down. It might be pretty but it's really not useful in everyday life. ... Yes we still do [use it], I wouldn't get rid of it because of that. But if I were to choose something now, I would get something else. ... No [she didn't think about replacing it], because it was way too expensive."

Dinner Table: "A new dinner table. But since we have a very clear idea what it should look like and there is no such thing to buy, we will probably have it special made. And a table like that has to appeal to both of us, so [her husband] has to come along. So this can take forever, because we can eat of this table [the one they have right now] as well. ... We replaced our chairs and we want a white dinner table and definitely an oval one. A long oval dinner table. So that will probably be the next big purchase. But this can take time, like I said, this [table] is working just fine, and I have some white table cloths which match the chairs."

Clothing: "I've had a piece of clothing repaired, because I had only worn it once when it ripped. And it was way too expensive to just throw away, so I've had it repaired."

L DESIGN ACTIVITY DESCRIPTION – GERMAN VERSION

Einführung in das Design Projekt:

Wir freuen uns, dass Sie an unserem Projekt teilnehmen möchten.

Als Teil eines grösseren Forschungsprojekts haben wir eine Reihe von Interviews durchgeführt, um die emotionale Bindung von Menschen zu verschiedenen Gegenständen besser zu verstehen. Mit Hilfe der in der Studie gesammelten Daten haben wir verschiedene Formen der emotionalen Bindung zwischen Objekt und Besitzer abgeleitet, die wir als Massgabe für die Gestaltung von elektronischen Geräten nutzen wollen. Die Gestaltung der Geräte soll eine stärkere emotionale Bindung zwischen Benutzer und Gegenstand erzeugen und dazu führen, dass die Geräte entsprechend ihrer Lebensdauer länger verwendet werden, als dies momentan der Fall ist. Die verschiedenen Formen der emotionalen Bindung, die wir identifiziert haben, werden im Anschluss an diese Einführung zusammen mit beispielhaften Zitaten erläutert.

Wir bitten Sie, sich mit den Formen der emotionalen Bindung und den beispielhaften Zitaten auseinanderzusetzen und diese als Grundlage oder Inspiration für die Entwicklung von Vorentwürfen für elektronische Geräte zu verwenden. Wir hätten von Ihnen gerne Entwürfe für eins oder mehrere der folgenden elektronischen Geräte: Laptop, Smart Phone, Tablet/E-Reader oder MP3 Player. Sie können so viele oder so wenige Geräte entwerfen wie Sie möchten, jedoch bitten wir Sie insgesamt 4 bis 12 Entwürfe einzureichen. Die Entwürfe sollten in Form von Skizzen mit Beschreibungen oder Storyboards dargestellt werden. Sie dürfen gerne so viele verschiedene Formen der emotionalen Bindung in Ihre Entwürfe einbeziehen; jeder Entwurf sollte eindeutig gekennzeichnet sein, mit welchen Formen der emotionalen Bindung er sich befasst.

Wir möchten Sie ausserdem gerne dazu einladen, an einem Workshop mit anderen Designern teilzunehmen. Dort können Sie Ihre Ideen präsentieren und diskutieren, sowie gemeinsam weitere Ideen entwickeln. Den genauen Termin werden wir noch mit Ihnen abstimmen, voraussichtlich wird dieser jedoch am 22. November 2011 am Institut für Informatik der Universität Zürich in der Binzmühlestrasse 14, 8050 Zürich stattfinden. [Wir bitten um Ihr Verständnis, dass der Workshop abgesagt werden kann, sollten sich nicht genügend Teilnehmer finden.]

Als Aufwandsentschädigung für Ihre Teilnahme an der Entwurfsphase der Studie erhalten Sie eine Vergütung von CHF 100,-. Für die Teilnahme an unserem Workshop erhalten Sie zusätzlich eine Vergütung von CHF 100,-.

Sollten Sie Rückfragen zu diesem Projekt und Ihrer Teilnahme daran haben, können Sie sich jederzeit gerne bei uns melden.

Kriterien:

Engagement The extent to which an object invites and promotes physical engagement with its owner during use as well as to which an object is used because its owner invested time in learning how to function it.	**Einbeziehung** Das Ausmass in welchem ein Objekt den Besitzer zur physischen Interaktion einlädt oder diese begünstigt sowie das Ausmass zu dem ein Gegenstand verwendet wird aufgrund der investierten Zeit zur Erlernung seiner Benutzung.

Portemonnaie: „ Zwei Portemonnaies ... irgendwann mal hab ich eins verloren, da habe ich mir ein zweites geholt, aber ich habe es dann doch wieder bekommen ... dann hatte ich halt zwei. Nun benutze ich das zweite für den Ausgang, wenn ich dann mal weggehe. So als Backup, es ist ein wenig kleiner. Das war aber auch eher Zufall, dass ich dann auf einmal zwei besessen habe. Aber ich hänge immer noch an dem alten. ... Das war gewohnt, ich hatte dort schon meine Ordnung drin und das war, als ich es zurück bekommen habe genau so wie vorher und jetzt hatte ich da eben keinen Anreiz, das neue hat vielleicht andere Fächer ein bisschen anderes Layout. Da bin ich jetzt erst mal dabei geblieben."

Blackberry: „Mein Blackberry, das habe ich seit 3 Jahren, und jetzt versteh ich es. Ich weiss auch nicht, warum ich es ersetzen soll, weil jetzt weiss ich, wie es funktioniert, und das neue würde zu lange dauern um es zu verstehen."

Fernbedienung: „Eine Multifunktionsfernbedienung für die ganzen Geräte. Ich dachte immer es ist eigentlich so Schnickschnack, aber irgendwann war mal ein Angebot ... es war so ein spontaner Kauf, ich dachte probierst es mal aus. Ja, seitdem kann ich nicht klagen. Alle anderen Fernbedienungen hab ich jetzt ersetzen können. Jetzt hab ich nur noch die eine. Und ja auch wenn ich die jetzt immer aufladen muss aber daran gewöhnt man sich dann auch. ... Die hab ich jetzt seit 4, 5 Monaten. Erst mal in der alten Wohnung noch gehabt. Dort hatten wir drei Geräte zu bedienen. Da dachte ich mir ja gut, für drei Geräte. Aber wo wir jetzt umgezogen sind jetzt sind es mehr Geräte geworden, jetzt sind es 5, ja jetzt hat sich der Kauf dann doch gelohnt. Ich hätte jetzt auch keine Lust mehr mit fünf verschiedenen Fernbedienungen rum zu hantieren."

Augmentation	**Erweiterung**
The extent to which an object has been reused, renewed, modified, altered or otherwise made to be a part of something augmented beyond its original intended use and as such has become a symbol of the resourcefulness and/or creative expression of its owner.	Das Ausmass, in welchem ein Gegenstand wiederverwendet, erneuert, modifiziert, verändert oder auf andere Weise Teil eines erweiterten Verwendungszweckes jenseits des ursprünglichen wird und als solches ein Symbol für den Einfallsreichtum und/oder kreativen Ausdruck seines Besitzers ist.

Wecker: „Mein Digitalwecker, der uns am Morgen aufweckt, den würde ich auch nicht weggeben. Also wenn es genau den gleichen gäbe, würde ich den schon austauschen, aber den würde ich nicht weggeben. ... Der schaltet nur den Strom ein, und man kann dran hängen, was man möchte. Wir haben grade Licht dran, früher hing die Stereoanlage dran. Und das ist extrem einfach zu handhaben. Man kann schnell die Zeit einstellen, man kann schnell einstellen er soll morgen nicht wecken. Und der hat ein schönes Design und gehört zu einer Stereoanlage, die ich zur Konfirmation bekommen habe, einfach ein Einzelteil davon."

Armband: „Das Armband habe ich von meinen besten Freundinnen zur Firmung bekommen und ich habe es eigentlich jeden Tag an. Und habe auch viele Anhänger jetzt von meinen Eltern bekommen, von Freunden und so. Und das ist mir jetzt sehr wichtig geworden. ... Ja [sie hätte schon noch gerne mehr Anhänger] aber die sind recht teuer, und das sollten mehr so besondere Sachen sein. ... Die 18 habe ich zum 18. Geburtstag bekommen, was besonders war. Das [eine Kugel] war Weihnachten 2010, auch mega cool. Und der Elefant war einfach ein Geschenk ohne speziellen Anlass."

Sessel: „Und diesen Stuhl ... die Patentante von [ihrem Mann], die hat das zu unserer Hochzeit gestickt. Für ihn, oder für uns. Und das ist auch etwas, das würde ich nie hergeben. Und der ist auch überall mitgekommen. Weil das ist viel Arbeit und das ist ja so nett von ihr das zu machen. Zusammen mit einer Tante von ihr, also eine ältere Dame und sie haben das gestickt. Das ist doch unglaublich. ... Als wir '79 [geheiratet haben]. ... Und dann ein paar Jahre später haben sie uns

diesen Tisch dazu geschenkt. ... Aber das [der Stuhl] ist viel wertvoller für mich, weil da steckt Arbeit dahinter. ... Das würde ich nie hergeben [auch den Tisch nicht]."

Kerzenständer: „Der Kerzenständer. Den benutzt man auch nicht so oft, aber als ich ihn gekauft habe, habe ich ihn wirklich jeden Abend angezündet und mich sehr gefreut. Und ja jetzt ist er einfach wie Dekoration. Nein, [weggeben] das nicht, weil ich den in einem Antiquitätengeschäft gekauft habe und dann alles poliert habe, weil vorher hat er nicht geglänzt und jetzt schon. Da bin ich schon stolz."

Histories	**Vorgeschichte**
The extent to which the materials of an object preserve personal histories or other memories, either by explicitly showing physical signs of use or implicitly by virtue of its persistence over time.	Das Ausmass, in welchem die Materialien eines Gegenstandes persönliche Geschichten oder andere Erinnerungen konservieren, entweder durch physikalische Spuren der Benutzung oder implizit durch ihr andauerndes Bestehen im Laufe der Zeit.

Plastikbecher: „Ein Gegenstand ist schon sehr wichtig für mich, das ist zwar etwas sehr banales, aber es sind Plastikbecher. Während der Geburten von meinen Söhnen in Amerika wurde Kaffee darin serviert. Und es war nicht zu heiss um zu halten und der Kaffee blieb lange sehr heiss. Und wir hatten so eine Studentenwohnung, weil mein Mann studierte noch in Boston. Und jedes Mal, wenn mein Mann mich besucht hatte, hat er so einen Plastikbecher mit nach Hause genommen. Weil dann mussten wir das nicht kaufen. Und aus irgendwelchen Gründen, wir sind wirklich weiss Gott viel umgezogen, kamen diese Plastikbecher immer mit. Und ich trinke heute noch am Morgen meinen Kaffee aus diesen Plastikbechern. Weil das mir irgendwie sehr nahe ist. Als Erinnerung an die Geburten meiner Söhne und auch an die unabhängige und schöne Zeit, die wir hatten. ... 30 Jahre jetzt [ist das her]. Und die existieren immer noch. Und immer noch trinke ich am Morgen meinen Kaffee. ... Diese Plastikbecher halt, also am Anfang, haben wir die aus Nützlichkeit mitgenommen und das hat sich so als etwas sehr wertvolles für mich, ist gewachsen. Weil ich am Anfang dachte, ja gut, das nehmen wir mit, das war praktisch. Und dann mit der Zeit stellte man fest, dass es nicht nur praktisch ist, ... jedes mal, wenn ich den Plastikbecher in der Hand habe, dann ist das eine ganz spezielle Erinnerung geworden. Und je älter das ist, desto mehr wird das zu einer Erinnerung."

Stuhl: „Der Stuhl ... den hab ich schon als Kind benutzt. Den habe ich von meinem Elternhaus mitgenommen, und den hab ich dann ein wenig zusammen geleimt. Und der Tisch, der ist vielleicht noch älter, den hat schon meine Mutter gehabt. ... Vor etwa einem Jahr [hat sie die Sachen von ihren Eltern mitgenommen]. ... Wir sassen oft [als Kinder] an dem Tisch, auf den Stühlen und haben gebastelt, gemalt, oder sogar gegessen, wenn Besuch gekommen ist. Dann sind wir an dem Tisch gesessen, die kleinen Kinder durften am kleinen Tisch essen und die Grossen am grossen. ... Wir haben noch einen zweiten Stuhl, der kaputt gegangen ist, und da wollte ich mal schauen, ob man den noch reparieren kann."

Puppenbett: „Mit dem [Kinderbett] ich noch gespielt habe. Aber wir konnten auch nichts von zu Hause mitnehmen, etwas das andenkenwürdig ist. Das hat es bei uns nicht gegeben, bei Dir [ihrem Ehemann] eigentlich auch nicht, gell? Wir konnten soweit eigentlich nichts erben, oder etwas das vererbt wurde von Generation zu Generation, dass gibt es bei uns nicht. ... Da [mit dem Puppenbett] hab ich als Kind mit gespielt. Und dann hat es meine Schwester nicht mehr haben wollen und da hab ich es mitgenommen. Und dann hat meine Tochter auch mit gespielt, dann hab ich es mal weiss angemalt und die Käfer drauf geklebt und jetzt ist es immer im Keller gewesen."

Messer: „Mein Ehemann hat ein Messer, das er immer benutzt hat, das hat er von seiner Grossmutter. Ich glaube er hat da eine emotionale Bindung dran. Und er hat es lange verwendet, bis sich die Klinge vom Griff gelöst hat. Und er hat es immer repariert, aber an einem gewissen

Punkt wurde es einfach zu schwierig zu reparieren. Also hat er aufgehört es zu benutzen, aber wenn er könnte würde er es noch benutzen. ... Er hat es noch. ... Es ist in der Küche. ... Ich glaube [er wirft es nicht weg], weil es von seiner Grossmutter ist und er hatte eine enge Verbindung zu ihr. Ich glaube sie ist vor 15 oder 20 Jahren gestorben. ... Ich glaube er hat es von ihr bekommen, als er ein Teenager war. Es ist also etwa 100 Jahre alt oder so. Ich weiss nicht, es wurde wahrscheinlich so um 1910 hergestellt."

Perceived Durability	**Wahrgenommene Dauerhaftigkeit**
The extent to which an object's owner regards an object as long lasting either in terms of function or in terms of longevity or both.	Das Ausmass, in welchem ein Besitzer eines Gegenstandes diesen als dauerhaft erachtet: in Bezug auf Funktion, Langlebigkeit oder beidem.

Kleid: „Ein gepunktetes eine Art Petticoat Kleid, dass meine Schwester mir mal geschenkt hat. Sie ist Damenschneiderin und hat in einem Brautmodegeschäft gearbeitet. Und es ist wirklich hässlich. Ich habe es nie getragen, aber ich würde es nie wegschmeissen. Ausserdem ein Ballkleid meiner Oma. ... Das war ihr erstes Ballkleid, also sie war da etwa 15. ... Es ist etwa, ich nehme an 75 Jahre alt. Aber die Seide löst sich halt langsam auf. Aber ich gebe es trotzdem nicht weg. Es liegt immer noch in einer Kiste. ... Es ist alles handgenäht und meine Oma hat das genäht, es ist 75 Jahre alt. Also ich glaube ... es müsste auseinander fallen. ... Es gab ja noch keine Reisverschlüsse, es wurde alles nur geknöpft, und die Knöpfe sind noch von Hand eingefasst. ... Auch wenn es immer nur irgendwo liegt, ich brauche es auch nicht immer, aber ich weiss es ist da."

Küchentisch: „Der Tisch [in der Küche] ist der älteste Gegenstand, der ist von 1952, von meinen Grosseltern, handgefertigt von einem Schreiner im Engadin. Und den habe ich, wo sie [seine Grossmutter] ins Altersheim gezogen ist geerbt. Und der bedeutet mir eigentlich auch relativ viel, weil er von ihr ist und sie mit ihrem Mann vor 50 Jahren schon vom gleichen Tisch gegessen hat und der eigentlich immer noch aussieht wie neu. Es ist Qualität, es ist ein alter, alter ... Arventisch [Kiefernart]. Und der ist sicher das älteste das ich habe. ... Vor einem Jahr hab ich den bekommen."

Möbel: „Meine Möbel [Kommode und Barschrank], die ich seit 23 Jahren habe. Das sind wahrscheinlich die ältesten Gegenstände ansonsten. ... Ja, da gibt es einen bestimmten Grund, weil die gefallen nach wie vor [deshalb würde sie die nicht entsorgen]. Die gefallen mir wirklich. Die haben mir gefallen, als ich sie ausgesucht habe und die gefallen mir noch immer. ... Ich denke eigentlich dafür, dass das mal ein wahnsinnig moderner Sideboard war, ist das etwas so zeitloses geworden mittlerweile. Weil das war ganz moderne Kunst. Das hab ich in der Art in Mailand gesehen und hab das dort dann rausgefunden, wie man das bestellen kann und das war ultramodern. Und wenn ich mir das jetzt nach 22 oder 23 Jahren anschaue, denke ich es ist eigentlich so ein zeitloses Sideboard geworden. Mit modern sehe ich da gar nichts mehr, aber antik ist es auch nicht. Ich finde es zeitlos. Da würde ich mich jetzt schwer tun das irgendwie weg zu geben. Es ist nicht mal unbedingt funktionell sehr stark, ist es nicht. Der Stauraum ist ziemlich klein. Aber ich liebe es. Ich mag es sehr, ich mag es wirklich sehr. Aber wieso und warum kann ich Dir nicht sagen. Ich war auf anhieb verliebt, und bin es eigentlich immer noch. Ginge es nach meinem Mann wären die Stücke längst weg."

Küchentisch: „Meine Eltern hatten den [Küchentisch]. ... Das ist noch ein schön bearbeitetes Möbelstück. ... Der wird etwa ein wenig älter sein, als mein verstorbener Grossvater, der ist vielleicht etwa 150 Jahre alt. Und ich habe ihn seit ... 99, das macht etwa 12 Jahre."

Perceived Worth	**Wahrgenommener Wert**
The extent to which an object is continued to be used or repaired, because its owner regards it as too valuable to dispose of as well as the extend to which the owner elaborates when buying something new, because the object is regarded as valuable.	Das Ausmass, in welchem ein Gegenstand weiterhin benutzt oder repariert wird, weil der Besitzer ihn als zu wertvoll zum entsorgen erachtet oder das Ausmass des Abwägens vor einer Neuanschaffung aufgrund des ihr zugeschriebenen Wertes.

Bank: „Letztes Wochenende haben wir diese Bank gekauft. Wir kaufen nicht oft Möbelstücke, aber wir mussten einiges kaufen, weil das neue Baby bald kommt. Deshalb waren wir auf der Suche nach etwas für die Kleidung von meinem Sohn, vielleicht eine Kommode, und dann haben wir diese Bank gekauft, nur weil wir sie gesehen haben und schon lange so etwas gesucht haben. Wo man drauf sitzen kann und Schuhe anziehen kann oder Schuhe ausziehen kann. Und wo man ausserdem was darin unterbringen kann. Es hat lange gedauert, bis wir etwas gefunden haben, das genau passt. Aber dann haben wir es zufällig gesehen, obwohl wir gar nicht daran gedacht haben. Und wir haben es gekauft."

Geschirr: „Was mir spontan noch einfällt ist mein Geschirr. Das haben wir uns zur Hochzeit gewünscht. Und ich finde es nach wie vor schön. Aber es hat sich dann zwischenzeitlich herausgestellt, dass es total unpraktisch ist. Da wird ich zwischenzeitlich was total anderes kaufen. ... 3 Jahre [haben sie das Geschirr]. ... Die Teller sind so abgeschrägt, sprich das Besteck, wenn Du es drauf legst, rutscht Dir immer runter oder fällt runter. Sie sind zwar schön und ästhetisch aber nicht wirklich praktisch im Alltag. ... Ja, klar [benutzen sie es noch], das würde ich jetzt nicht weggeben deshalb. Aber ich würde mir zwischenzeitlich was anderes kaufen, wenn ich noch mal die Wahl hätte. ... Nein [sie hat nicht darüber nachgedacht es zu ersetzen], weil dafür war es zu teuer."

Esstisch: „Einen neuen Esstisch. Aber da wir eine genaue Vorstellung habe, wie er aussehen muss und es den so noch nicht zu kaufen gibt, wird es wahrscheinlich eine Auftragsarbeit. Und das ist so ein Tisch, der muss uns beiden gefallen, also muss [ihr Mann] dabei sein. Und das kann jetzt also noch ewig dauern. Da man an diesem Tisch [den sie jetzt haben] auch essen kann. ... Wir haben die Stühle ersetzt und wir möchten gerne einen weissen Esstisch und einen ovalen vor allem. Einen langen, ovalen Esstisch. Aber das wird sicher die nächste grössere Anschaffung sein. Und das kann aber noch dauern. Weil wie gesagt, er [der jetzige Tisch] tut's ja noch. Und ich hätte auch weisse Tischtücher, die zu den weissen Stühlen passen."

Kleidungsstück: „Ich habe mal ein Kleidungsstück reparieren lassen, weil ich es nur einmal an hatte, und dann ist es kaputt gegangen. Und es war halt zu teuer zum wegschmeissen und das habe ich dann reparieren lassen. Aber es ist nicht ganz sauber repariert worden, leider."

M DESIGN DRAFTS (BY SAMUEL BEER)

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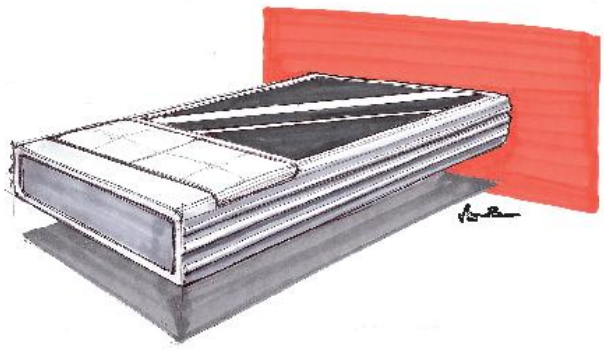
Konzept A
MP3-Player - Materialwahl und Form



Formen der emotionalen Bindung:
- Wahrgenommene Dauerhaftigkeit
- Wahrgenommener Wert
- Einbeziehung

Materialien:
- Gehäuse aus Aluminium
- Bildschirm aus Glas

Bedienung:
- 2 Tasten

Beschreibung:
Konzept A steht für die Art der Materialisierung eines Produktes, wie auch dessen Formensprache. Die an den Seiten angebrachten «Rippen» deuten auf Robustheit und somit Langlebigkeit hin. Aluminium als Material suggeriert zudem Wertigkeit und beeinflusst den wahrgenommenen Wert. Der MP3-Player wird über zwei Tastenelemente bedient.

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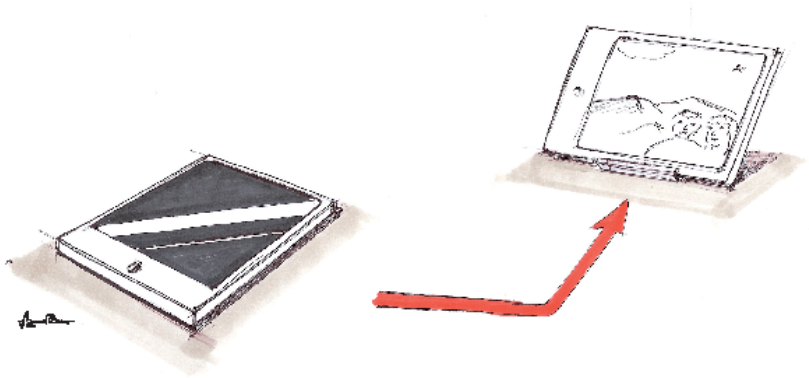
Konzept B
Tablet - Weiterverwenden



Formen der emotionalen Bindung:
- Erweiterung (Weiterverwendung)

Beschreibung:
Ist die Technik eines elektronischen Gerätes wie Tablets, E-Readers, Smartphones etc. veraltet, wird es oft durch ein Neues ersetzt, obwohl es eigentlich noch intakt wäre.
Konzept B sieht vor, den Besitzer des Gerätes dazu zu bringen, dieses anders zu nutzen und so den Lebenszyklus des Geräts zu verlängern.

Ein Tablet oder E-Reader könnte so etwa als digitaler Fotorahmen genutzt werden. Ein Smartphone wäre beispielsweise als Wecker, Eier-Uhr usw. einsetzbar. Im Falle eines Defekts der Elektronik könnte ein Papier-Foto hinter den Bildschirm eines Tablets geklemmt und so das Gerät weiter genutzt werden.
Diese Zweitnutzungsmöglichkeiten könnten durch den Hersteller geziehlt angestrebt werden.

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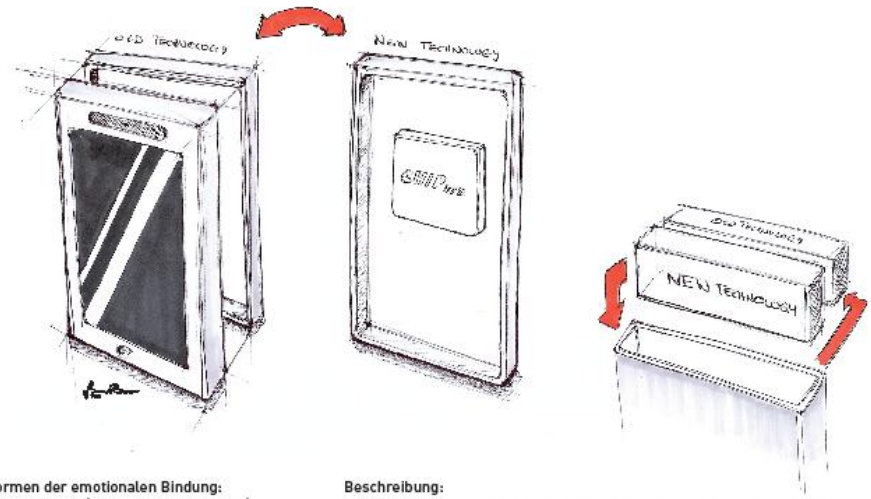
Konzept C
Smartphone - Nutzung bestehender Komponenten



Formen der emotionalen Bindung:
- Erweiterung (erneuern, modifizieren)

Beschreibung:
Auch Smartphones werden oft aufgrund neuer Produkte und dessen Funktionen ausgetauscht. Dabei steht oft die neue Technologie als Haupteinflussfaktor im Zentrum.

Konzept C sieht es vor, jenen Teil eines Smartphones weiter zu nutzen, der noch Stand der Technik ist (etwa der Bildschirm und die Frontabdeckung). Die «alte» Technologie kann durch die «Neue» ersetzt werden. Dabei bleibt ein Grossteil des Gerätes im Einsatz.

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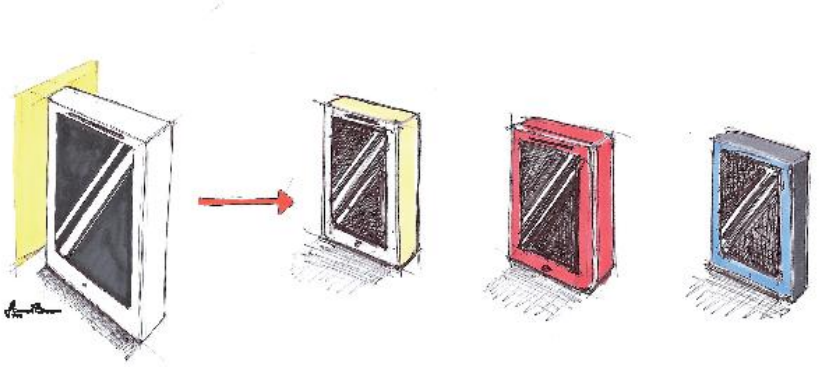
Konzept D1
Smartphone - Individualisierung Stufe 1



Formen der emotionalen Bindung:
- Erweiterung (Einfallsreichtum, Kreativität)
- Vorgeschichte (persönliche Geschichten)

Beschreibung:
Konzept D1 zeigt die Personalisierung des Produktes durch den Besitzer.
Dadurch, dass er auswählen kann, welche Farbe die Front- und Rückseite oder die Tasten haben, gestaltet er sich sein Smartphone individuell.

Seine Partizipation führt direkt zu einer emotionalen Bindung zum Produkt. Er kann sich damit auch gegen Aussen profilieren und zeigen wer er ist.
Wirft er das Gerät weg, so wirft er auch einen Teil von sich - seiner Geschichte - weg.

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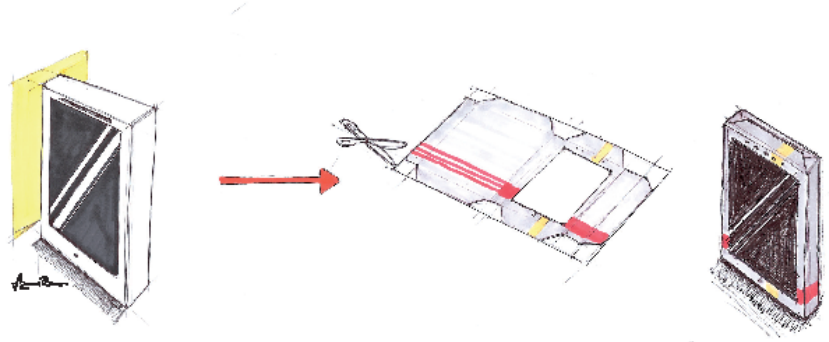
Konzept D2
Smartphone - Individualisierung Stufe 2



Formen der emotionalen Bindung:
- Erweiterung (Einfallsreichtum, Kreativität)
- Vorgeschichte (persönliche Geschichten)

Beschreibung:
Konzept D2 erhöht die Partizipation, im Vergleich zu Konzept D1, des Besitzers um einige Stufen.
Es sieht vor, dass er sein Cover selber kreiert, dieses ausdruckt, ausschneidet und sein Smartphone darin einfügt.
Somit sind der Gestaltung fast keine Grenzen mehr gesetzt.

Der Besitzer erstellt im Laufe der Zeit diverse Covers und behält sie als Andenken.
Diese persönliche Geschichte, die in den Covers enthalten sind, sind so direkt mit dem Smartphone verbunden.

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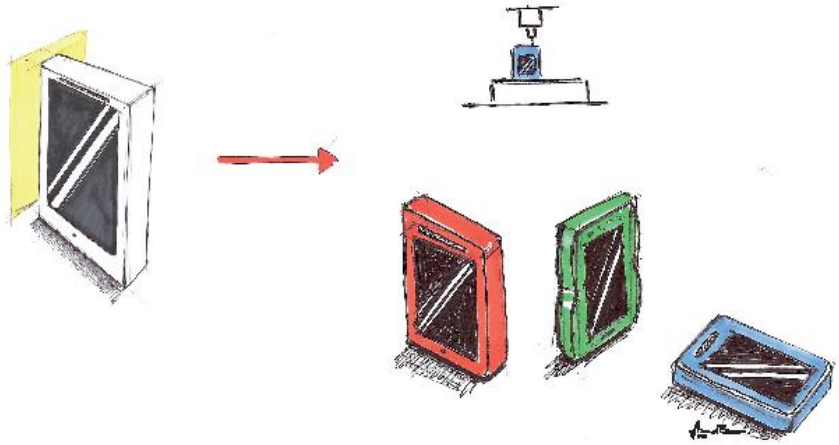
Konzept D3
Smartphone - Individualisierung Stufe 3



Formen der emotionalen Bindung:
- Erweiterung (Einfallsreichtum, Kreativität)
- Vorgeschichte (persönliche Geschichten)

Beschreibung:
Konzept D3 basiert wohl auf dem höchsten Grad der Co-Design-Möglichkeiten.
Der Besitzer des Geräts kann über ein einfaches Tool auf seinem Computer sein eigenes Gerät (Hülle) gestalten.

Die Daten werden danach an eine Zentrale weitergeleitet und dort auf einen 3D-Drucker geschickt.
Der Besitzer kann so sein eigenes Cover aus Kunststoff herstellen.
Dieser Prozess führt zu einer hohen emotionalen Bindung mit dem Gerät und zu einer klaren Verlängerung der Nutzungszeit.

EIDESSTATTLICHE ERKLÄRUNG

Ich erkläre, dass ich die vorliegende Arbeit selbstständig verfasst, andere als die angegebenen Quellen/Hilfsmittel nicht benutzt, und die den benutzten Quellen wörtlich und inhaltlich entnommene Stellen als solche kenntlich gemacht habe.

Die vorliegende Arbeit wurde an keiner Hochschule zur Erlangung eines akademischen Grades verwendet.

STATUTORY DECLARATION

I declare that I have authored this thesis independently, that I have not used any other than the declared sources/resources, and that I have explicitly marked all material which has been quoted either literally or by content from the used sources.

This thesis has never been used for graduation at any academic institution.

Datum Unterschrift