Bachelor's thesis in the course of Information Design


# Enhance experience, while and after an event with the help of an interactive appliance

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# Abstract

Family events are providing a fertile environment for positive experiences. With the help of latest scientific research in psychology and user experience design a concept is developed which should enhance the experience, while and after a family event. The basic framework for this work is an adapted form of the Design Thinking process. This framework is merged with the possibility-driven approach to come up with possibilities to enhance current experience rather than solutions to solve existing problems. Furthermore theoretical approaches like the concept of slow technology and the idea of information appliances are used in this work. The outcome of this work is a proof-of-concept prototype which demonstrates the basic functions of the concept.

# Zusammenfassung

Familienfeiern bilden einen dankbaren Rahmen für das Erleben von positiven Momenten. Anhand aktueller Forschungsergebnisse aus den Bereichen der Psychologie und des User Experience Designs wurde ein Konzept entwickelt, welches das Erleben von Familienfeiern während und auch im Nachgang an die Feier aufwerten soll. Die Grundlage für diese Arbeit bildet der Design Thinking Prozess. Dieses Rahmenwerk wurde mit dem Ansatz des possibility-driven designs verschmolzen, um nicht von Problemen auszugehen, die es zu lösen gilt, sonderm um Möglichkeiten zu erforschen inwieweit das Erleben verbessert werden kann. Des Weitern wurden theoretische Ansätze wie der slow technology sowie das Konzept der information appliances mit einbezogen. Das Ergebnis dieser Arbeit ist proof-of-concept Prototyp, welcher die Funktionalitäten des Konzeptes verdeutlicht.

# Table of Contents

# List of figures

# List of tables

# 1. Introduction

To socialize is something that is in the nature of being human. To surround oneself with family and friends make people happy and content. People feel comfortable with others around them which they like, love or admire. Family events are occasions where (mostly) people are gathering who like each other. Sometimes these people haven't seen each other in a long time, which increases the anticipation of the reunion. Therefore family events are providing a breeding ground for research and ideation of enhancing positive experiences.

Are there possibilities to enhance these positive experiences during a family event? And is it possible to preserve these experience in a way to make them even available after the actual event. This work will explore and utilize application concepts, which are cross-generational applicable and support, create and increase positive experiences within the friend- and domestic circle. On the basis of the latest scientific knowledge of psychology, user experience and design research, the aim of this work is to develop a concept which can be used at family events to enhance positive experiences.

A lot of research about subjective well-being and human flourishing has been undetaken during the last years. Frameworks have been developed which now can be used as guidelines in the process of building concepts, products and services. There are many interesting approaches which should be encountered when it comes to the developing of a concept for enhancing experiences. The approach to shift from problems to possibilities as a starting point opens new ways of thinking and ideation. The consideration of pace and time into the design process enables new persepctives for the development. The framework of postive design constitutes that there are different characteristics in regards of building a product or service which supports human flourishing.

All these different theories, approaches and frameworks are explored, evaulauted and if approved, used to develop a concept which is capable to enhance the experience of family

events, while and after the actual event. The goal of this work is to come up with a well elaborated and sophistcated concept, which has incorporated these studies mentioned above and is using them to their best possible way.

# 2. Frameworks

## 2.1 Design Thinking

Design Thinking is just one example of a variety of different attempts to define the design process. "There seem to be as many kinds of design process as there are writers about it. [There is] little support to the idea that designing is the same under all circumstances, […] the methods proposed by design theorists are just as diverse as are their descriptions of the design process" (Jones, 1992 in Buxton, 2007; p. 231).

Koberg and Bagnall (1982) for example divided their design process into four different steps:

- Input
- Analysis
- Synthesis
- Output

This approach questioned the predominant concept of a "black box model". Within this model it wasn't allowed to see and understand what happens inside the human mind.

Another example is the "Basic Design Cycle" defined by Roozenburg and Eekels in 1995. This model includes eleven single steps, namely

- function
- analysis
- criteria
- synthesis
- provisional design
- simulation
- expected properties
- evaluation
- value of the design
- decision
- approved design

as well as iterative loops and interconnections among the different steps.

The Design Thinking framework is another definition of the design process. The Design Thinking method was invented and elaborated by IDEOs David Kelley and is based on the belief that true innovation can only happen, if different disciplines intersect and work together with their respective strengths.

It became quite popular during the last years and it has evolved while being used in many different successful projects and areas. Tim Brown, the current president of IDEO is says that "Design thinking is a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success." (Brown, 2014). Therefore this method with it's respective tools and parameters, is providing the fundamental structure of this work.

One challenge for this work was that the Design Thinking method and the possibility-driven approach may seem contradictory. Design Thinking is usually used as a problem-driven approach to solve existing problems. Although in this project the possibility-driven approach (Desmet & Hassenzahl, 2012) is one of the theoretical frameworks, which will be described later. For this project the idea was to combine both frameworks and make use of their strengths likewise. Therefore the starting point for this project was not an existing problem, rather than a task, which is verbalised in the title of this work: „Enhance experience, while and after an event with the help of an interactive appliance".

The Design Thinking framework splits the design process up into six different steps.

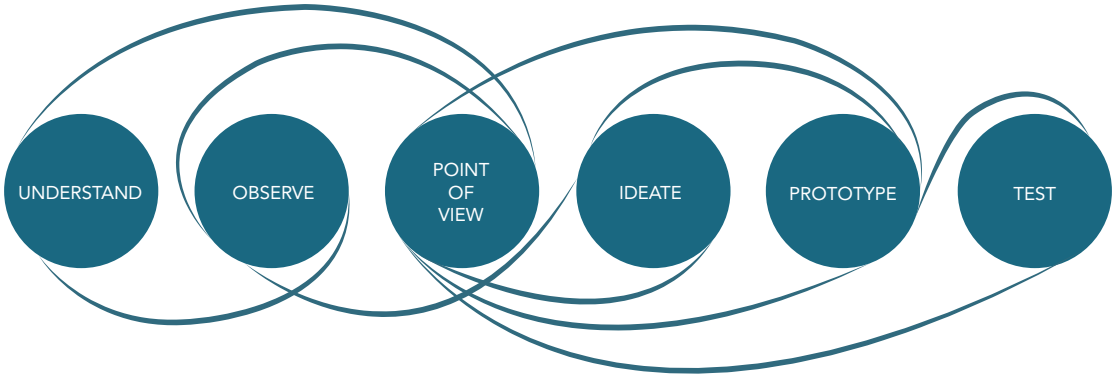


Fig. 1: Design Thinking process (qt. dschool Stanford, 2014)

**Understand & Empathize**

One important focus within this framework is empathy, which can be seen in the two first steps. „Empathy is the foundation of a human-centered design process.“ „ [...] you need to understand the people for whom you are designing.“ (Hasso Plattner - Institute of Design at Stanford, 2014). The Nielsen axiom „Know the user“ (Nielsen, 1993) can be seen as the basic requirement to start with the Design Thinking method. The framework is built on a deep understanding of the later users and their, maybe unconscious needs. Asking and observing people how and why they act with their environment is giving clues and insights about how users behave, think and feel. It is important to engage with people directly since only direct interaction reveals a tremendous amount about the way they think and the values they hold. This gives the possibility to interpret intangible meaning of those experiences in order to uncover insights. Sometimes these insights, thoughts and values are not obvious to the people who hold them. A deep engagement can surprise both the researcher as well as the interviewed people (Hasso Plattner - Institute of Design at Stanford, 2014). Therefore „Understand“ and „Observe“ are crucial steps within the design process. They are laying the foundation for any further work.

The goal of the first step is to get a broad overview about the users, the respective environments, possible patterns and needs. The idea is to gather as many insights and as much knowledge about the topic as possible. Laseau (1980) is describing the design funnel as opening in this phase, since it is all about the broad understanding of the user.

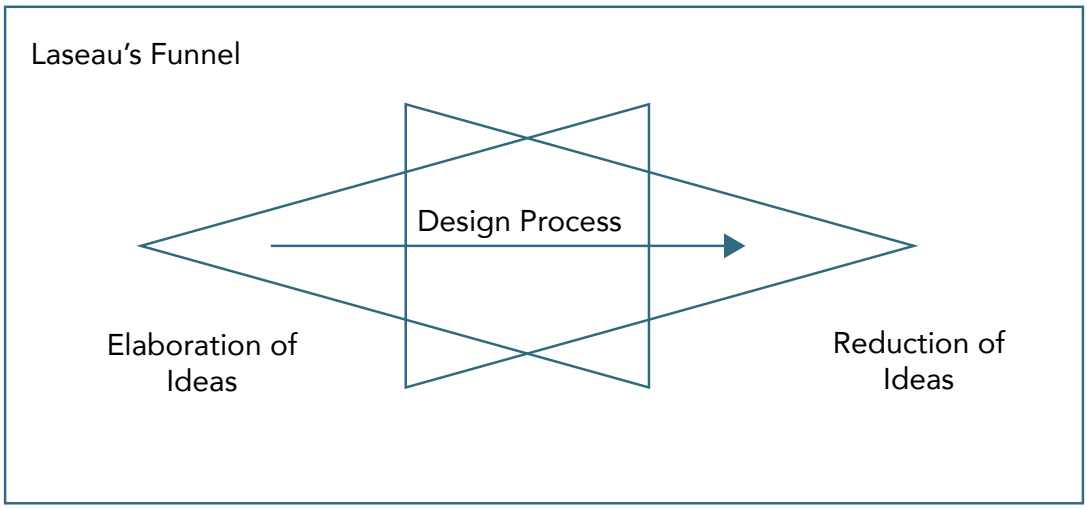


Fig. 2: Lasseau's Funnel (qt. Buxton, 2007)

**Point of VieWw**

From the results of the understanding and observing parts, a point of view is formed. This can be seen as the vision which is derived from the outcomes of the first two steps. But the „Point of View“ is not irrevocable. It can be seen as something more fluid, which evolves over iterations. Already in the beginning of the whole process a point of view is gradually formed. This point of view is changing according to the results of surveys, observations and other methods. It can be said, that the point of view is moulded by the user, since the user is giving the necessary insights. „It is a mode of “focus” rather than “flaring.” Two goals of the define mode are to develop a deep understanding of your users and the design space and, based on that understanding, to come up with an actionable problem statement: your point of view.“ (Hasso Plattner - Institute of Design at Stanford, 2014) The „Point of view“ step can be seen as a first emerging phase because the results of the understanding and observing phases are distilled into a definition. The definition is shaping the scope and the direction of the future work.

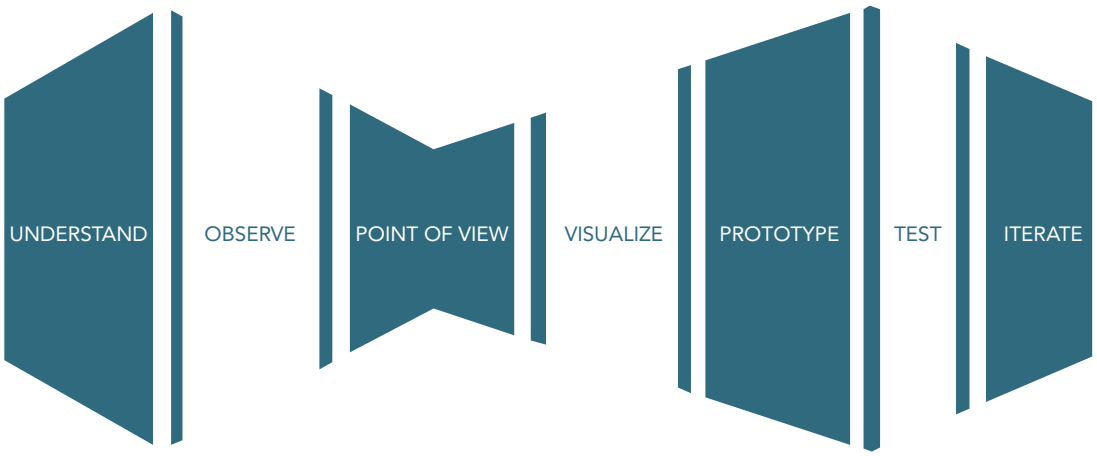


Fig. 3: Design Thinking dashboard (qt. dschool Stanford, 2014)

Desmet & Hassenzahl (2012) state that “Design needs a starting point, an idea, a seed to nourish and grow.” But there is a little difference between the regular approach of Design Thinking and the adapted approach which is used in this work. Usually during the point of view-phase the problem which will be addressed, is expressed explicitly. However, the merged approach of Design Thinking and the possibility-driven design is not striving to

solve an explicit problem. It is rather about to identify possibilities which are rooted in the knowledge of happiness and human needs, and explore them.

**Ideation**

The next step is the ideation phase, which is a divergent phase again and can be seen as the „creative“ phase. „Ideate is the mode during your design process in which you focus on idea generation. Mentally it represents a process of “going wide” in terms of concepts and outcomes—it is a mode of “flaring” rather than “focus.”“ (Hasso Plattner - Institute of Design at Stanford, 2014).

The ambition of ideation is to think of a broad range of different ideas. There should be just lose borders which limit the ideation phase. It is the purpose to come up with as many ideas as possible, in quality and quantity sense. Ideation allows the designer to be not constricted by feasibility or complexity and it is important to get these limitations out of the head. During the ideation phase  there are at first no bad ideas, but only ideas in itself. A designer should not discard ideas during this phase, since it will restrict it‘s creativity. Ideation will get obvious solutions out the head and uncover unexpected areas of exploration (Hasso Plattner - Institute of Design at Stanford, 2014).

**Prototyping**

Prototyping is another key-element of the design thinking process. With prototypes an idea is becoming a physical form, which can be anything between a hand-drawn paper-prototype and a high-resolution physical mock-up of the product. The resolution of the prototype corresponds to the level of elaboration of the project. „ In early explorations keep your prototypes rough and rapid to allow yourself to learn quickly and investigate a lot of different possibilities.“ (Hasso Plattner - Institute of Design at Stanford, 2014).

Tom Brown, the president of IDEO says: „Never go to a meeting without a prototype. At whatever stage of development, one week, one month, six months“ (Brown, T. in Barth et al., 2013) This quote makes it clear, how important prototypes are in the sense of Design Thinking.

And there are multiple reasons why prototypes are seen as key-elements:

- Empathy: Deepen the understanding of the design space and the users
- Exploration: Use prototypes to develop ideas further
- Testing: Test and refine solutions
- Revelation: Use prototypes to demonstrate your vision
- Inspiration: Inspire others by demonstrate your vision.

Many of the goals of prototyping are shared across all five of the above categories.

- Learn: Prototypes are giving the possibility to learn from and with physical objects
- Communicate: By demonstrating a vision via prototypes miscommunication and misunderstanding can be reduced.
- Integrate: Prototypes are used to start conversations with potential users, since prototypes provide a point of reference of what users can talk about.
- Efficiency: Prototypes in the different stages of the projects allows to test a variety of ideas at only a little cost.

Warfel (2009, p.4) states that "As a generative process, prototyping often leads to innovation and a significant savings in time, effort, and cost. Prototyping helps you get ideas out of your head and into something more tangible—something you can feel, experience, work through, play with, and test."

**Test and Iterate**

"Testing is the chance to refine our solutions and make them better. The test mode is another iterative mode in which we place our low-resolution artifacts in the appropriate context of the user's life. Prototype as if you know you're right, but test as if you know you're wrong." (Hasso Plattner - Institute of Design at Stanford, 2014). Testing and iterating is the basic cycle of refinement for a product or service. The results from the testing-sessions shape the next iterations of the product or service. Nothing will give more input on a designed

product or service as involving users into the development phase. With a multitude of testing sessions and iterations the design funnel (Laseau, 1980) is closing. This can be seen as a focus phase again. "Don't invest too much time perfecting the ideas before feedback – the point of re-engaging customers is to change the solutions, not to prove that they are perfect. The best feedback is that which makes you rethink and redesign." (IDEO HCD ToolKit, 2009).

which understands design as an activity focused on removing problems. "The aspiration is to make the world a better place through solving its problems." (Desmet & Hassenzahl, 2012). It is about solving problems or avoiding them before they appear. But this absence of issues or problems doesn't need to lead to positive emotions. "Health is state of complete positive physical, mental, and social well-being and not merely the absence of disease or infirmity" (Desmet & Hassenzahl, 2012). To explore ideas based on possibilities rather than problems provides a broad new scope for the development of products and services. It opens the horizon for designers to not only reach a status quo, but pass this point and think about prospects which can contribute to subjective well-being rather than just solutions to cure diseases. Accordingly to the mentioned characteristics above, the possibility-driven approach to design products or services is used in this work.

## 2.2 Possibility-driven approach

Since decades the initiator to start thinking about new products or services was an existing problem. The hegemonic point of origin to tackle an issue was to encounter it. There was no need for a solution if no problem had been discovered. Hassenzahl (2010) identified an implicit notion underlying this problem-driven approach, which he calls the „disease model of human technology use.“ Problem-driven design focuses on „curing diseases“, which means removing prevailing problems, instead of focusing on what makes people happy (Desmet & Hassenzahl, 2012). Desmet (2010) describes problem-driven design as the attempt to „keep the demons asleep“. Peoples' concerns, values and needs are sleeping demons, awoken only when the situation poses a threat to their fulfillment. (Frijda, 1986 in Desmet & Hassenzahl, 2012). But in the attempt to repair existing damages, the possibilities of making interventions to make people happier have been overlooked (Seligman, 2004)

Whereas the possibility-driven design approach has a higher goal. It aims to create products, objects, devices without a direct reference to any problem or suffering, but still rooted in human practice and needs (Desmet & Hassenzahl, 2012). This approach can be seen as a paradigm shift in designing products and services. The word "eudaimonic", which is one of the two kinds of happines which have been identified by Aristotle (Desmet & Hassenzahl, 2012 , p.9) consists of the the greek prefix "eu" which means good and "daimon" which can be translated with spirit and therefore avails the demon-metaphor as well.

Possibility-driven design can be seen as a counter-approach to "problem-driven design", which understands design as an activity focused on removing problems. "The aspiration is to make the world a better place through solving its problems." (Desmet & Hassenzahl, 2012). It is about solving problems or avoiding them before they appear. But this absence of issues or problems doesn't need to lead to positive emotions. "Health is state of complete positive physical, mental, and social well-being and not merely the absence of disease or infirmity" (Desmet & Hassenzahl, 2012). To explore ideas based on possibilities rather

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## 2.3 Framework for positive design

Initiatives in the field of positive design intend to increase peoples' subjective well-being deliberately and hence increase the appreciation of their lives (Desmet & Pohlmeyer, 2013, p.7) With the framework of positive design, which was introduced by Desmet & Pohlmeyer in 2013, they are trying to combine and compliment recent developments in design theory and current research in the field of positive psychology.

"Positive psychology is an umbrella term for the study of positive emotions, positive traits, and enabling institutions [...] The intent is to have a more complete and balanced scientific understanding of the human experience - the peaks, the valleys, and everything in between." (Seligman & Steen, 2005). There are some similarities between the paradigm-shift of the possibility-driven design approach and the refocusing on positive aspects in psychology. Both are questioning the predominant belief that their only raison d`être is to fix problems, cure diseases or neutralize negativity. "The aim of positive psychology is to begin to catalyze a change in the focus on psychology from preoccupation only with repairing the worst things in life to also building positive qualities." (Seligman & Csikszentmihalyi, 2000). Hence positive design is rooted in this scientific field of positive psychology which evolved during the last years. A lot of research has been done in this area which is building the foundation for further elaboration within positive design for subjective well-being.

Subjective well-being (SWB) is defined as 'a person's cognitive and affective evaluations of his or her life' (Diener, Lucas, & Oshi, 2002, p. 63). People's moods and emotions reflect online reactions to events happening to them. "Each individual also makes broader judgments about his or her life as a whole, as well as about domains such as marriage and work. Thus, there are a number of separable components of SWB" (Diener, 2000, p.34). "[...] subjective well-being is a more scientific-sounding term for what people usually mean by happiness" (Seligman & Csikszentmihalyi, 2000).

Happiness is one of the major, of not the ultimate goal, for every human being a happy life is highly desirable (Desmet & Hassenzahl, 2012; King & Napa, 1998). To be happy is a quality in itself and a lot of research has been devoted to identify the conditions for, and the cause of, happiness. Happiness promotes constructive and creative thinking. Happy people are healthier, more successful and contribute more to the life of others. "The essence of happiness is pausing to savor the gift of our present moments (Myers, 1992, p.203). Seligman (2002) states that "happiness" is a scientifically unwieldy term and that for serious disputation the term should be split up into three distinct and better defined routes to "happiness": (a) positive emotion and pleasure (the pleasant life); (b) engagement (the engaged life); and (c) meaning (the meaningful life).

Aristotle identified two distinct kinds of happiness which he called "Hedonism" and Eudaimonia". Hedonism focuses on happiness which is a result from life's pleasures. But "although pleasure is an essential component of subjective well-being, it takes more than pleasure to flourish" (Desmet & Pohlmeyer, 2013). If subjective well-being is seen as a spectrum, the lower end is characterized as "languishing" and the higher end as flourishing (Huppert et al., 2009 in Desmet & Pohlmeyer, 2013). Eudaimonia, or a virtue-based point of view focuses on happiness that comes through the fulfillment and engaging in meaningful activity [...] (Deci & Ryan, 2000 in Desmet & Hassenzahl, 2012). Ed Diener proposed that activities which aim to have a desired outcome rather than just avoid an undesired one will give people the impulse to experience new challenges and take new possibilities (Diener & Suh, 1999 in Desmet & Hassenzahl, 2012). This rationale is leveraged in this work to enable people to experience possibilities and help them to flourish.

Flourishing is defined by Aristotle as optimal human functioning and living to its full potential (Ryan & Deci, 2001). Csikszentmihalyi used a similar description to define the experience of flow, which can be compared, but should not be mixed up with flourishing (Csikszentmihalyi, 1996). "According to Seligman (2011), to flourish, besides having positive emotions, an individual must also have a sense of meaning, engagement, interest, and purpose in life."

(Desmet & Pohlmeyer, 2013). Desmet & Hassenzahl (2012, p.8) state that "A challenge for those who want to increase their happiness is that there is no single determinant of happiness." They are using a recipe analogy, where "there are several crucial ingredients, none of them alone sufficient to make a person happy (2012, p.9). The same analogy is used by Desmet & Pohlmeyer in 2013 to describe their framework of positive design which addresses three main components of subjective well-being and results in three ingredients of positive design.

The framework combines three key ingredients of Positive Design:

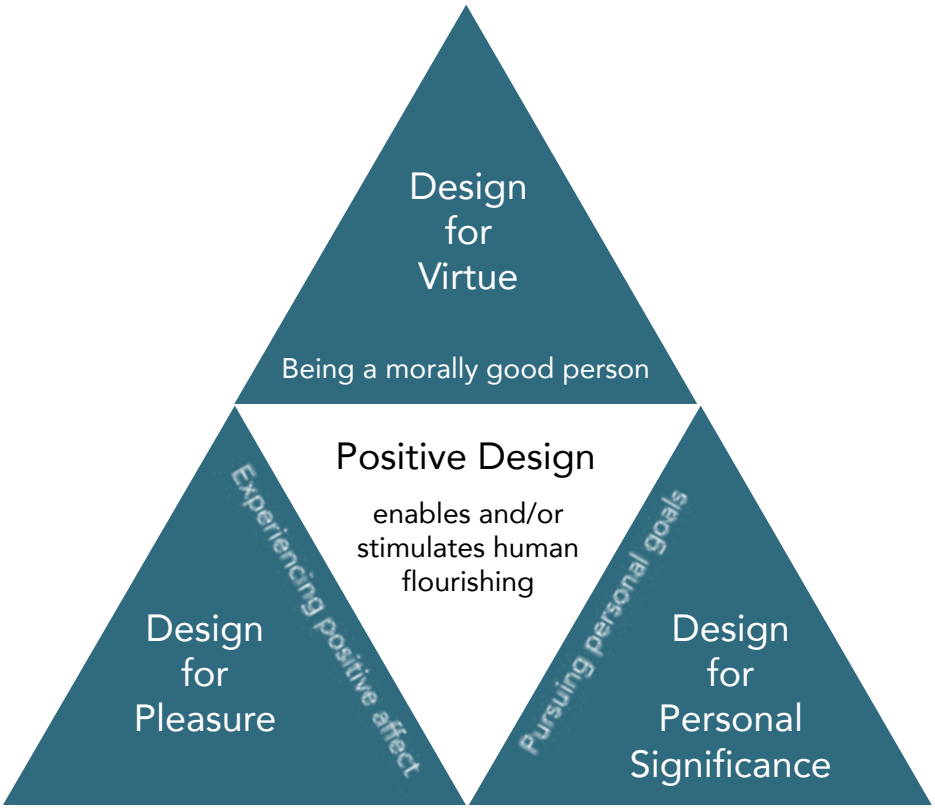


Fig. 4: Framework for positive design (qt. Desmet & Pohlmeyer, 2013)

Desmet & Pohlmeyer argue that the three high-level constitutes of subjective well-being — pleasure, personal significance, and virtue — embody the essential ingredients of positive design. Although the essential ingredients are universal, their manifestations are personal and depend on contact and life domain (Desmet & Pohlmeyer, 2013, p.8). Therefore the constellations and impacts are varying between different people. This should be seen as a guiding framework and not as a set of strict laws and rules.

**Design for pleasure:**

The first ingredient - design for pleasure - is describing the momentary happiness of enjoying the present. E.g. subjective well-being that is caused by all the different pleasures in a current instant. "The focus is on the here and now, the presence of positive affect and the absence of negative affect: being relaxed, having fun, being free of problems" (Desmet & Pohlmeyer, 2013).

Design itself can also affect the momentary experience of pleasure (Desmet & Pohlmeyer, 2013, p.8). The american artist Deru had put a lot of thought and effort into the physical form of his 2014 released record and art-project "Obverse box" (Deru, 2014). The box can be seen as a modern time-capsule and consists of a pico-projector with the record stored on a storage media, both built in a CNC-milled block of walnut wood. The lovingly crafted form of the Obverse box intends to delight people during the use already just through its form-factor.

In regards to the general scope of this work, the momentum of social interactions, like in this case, family events, can be leveraged to design for pleasure. A family event can provide a framework where the present has positive effect on the general mood of the participants, that is the users.

**Design for personal significance**

The second ingredient addresses happiness that comes from one's personal goals and aspirations. They are appealing from a sense of personal meaning. Here, present moments are not the focus rather than personal significance. These goals can be manifold and could be derived from the awareness of one's past achievements or from a sense of progress toward a future goal. (Desmet & Pohlmeyer, 2013). Products can help users to remind them of their personal goals or be instrumentalized to achieve these goals. Design for personal significance appeals to the set goals of the user and is contribute to its fulfilment.

In the given context of family events, personal significance plays also an important role within the positive design framework. An eventual goal could be the fostering of personal relationships with family and friends. Personal bonds to affiliates are a very important aspect in the social life and in correlation with subjective well-being.

**Design for virtue**

Desmet & Pohlmeyer (2013) describe the happiness which comes from virtuous behavior as the third ingredient, which can be seen as an idealized human value. They argue that there is an ideal mode of behavior which people are striving for an which is leading to a virtuous life.

Design itself can support the effort of behaving morally correct and honorably - e.g. thank-you cards help people to express their gratitude. (Desmet & Pohlmeyer, 2013). This expression of appreciation features altruistic behaviour. People are doing something nice, without the expectation of getting paid back. An altruistic life, or rather a life which supports altruistic behaviour can support a virtuous life.

In the view of the fact that this project has its scope within family events, virtue characteristics which appear in this context like gratitude, appreciation and kindness can be addressed and leveraged.

## 2.4 Slow technology

Pace is a key-aspect for innovation and the predominant goal in terms of speed is making everything even faster. But the concept of slow technology challenges this maxim and raises the question if time could be considered not only in the velocity-sense, but also in the continuous or the mature sense of the word. This means, that time should not only be seen as a factor which can be decreased, but also increased for the sake of design. Hallnäs & Redström (2000) state that as computers are increasingly woven into the fabric of everyday life, interaction design may have to change – from creating only fast and efficient tools to be used during a limited time in specific situations, to create technology that surrounds us and therefore is a part of our activities for long periods of time.

The slow technology approach seems contradictory to the current development of the technical world. But on contrary, slow technology aims at reflection and moments of mental rest rather than efficiency in performance and is considering the time factor in it's design process. Therefore slow technology propagates a more sustainable and forward-looking approach to the current dealing with technology.

There are some clear and obvious differences between the concept of slow technology and the current fast technology. Fast technology tries to take away time in terms of making the user more efficient when working and making the artifact as such as fast and easy to use as possible (Hallnäs & Redström, 2000, p.166). The decreasing of time is the driving force and since there is just a limited amount of hours during one day, the overarching goal is to shrink the necessary time-slots for one task to make room for more tasks in general.

Slow technology though has the ambition to rectify the pace of technology-use. It embraces the time-factor in the design of technology and creates multiple new possibilities.
„Slow technology is technology, which is slow in various degrees […] What is important to note here is that the distinction between fast and slow technology is not a distinction in

terms of time perception; it is a metaphorical distinction that has to do with time presence. (Hallnäs & Redström, 2000, p.167)

The authors define different kinds of "slow" in regard of slow technology which can not only be seen as drawbacks, but also as intended characteristics for reflection. Technology can be slow, when...

- it takes time to learn how it works,
- it takes time to understand why it works the way it works,
- it takes time to apply it,
- it takes time to see what it is,
- it takes time to find out the consequences of using it.

Hallnäs & Redström argue that the property "slow" doesn't necessarily mean that something is tedious, boring or frustrating. If the time factor, in the sense of appearance as well as presence, is considered in the design beyond pure aesthetics of a product or a service, many new possibilities are emerging. Time becomes a central and explicit notion which is another dimension and can or rather should be explored during the design process.

There are three different aspects of slow technology:

- reflective technology
- time technology
- amplified environments

**Reflective technology**

Reflective technology, as the name implies, invites the user for reflection and is reflective in itself, as well. "The basic challenge is to design technology that in its elementary expression opens up for reflection and ask questions about its being as a piece of technology. It is technology that could be awkward if it is used without reflection" (Hallnäs & Redström, 2000, p. 170). Reflective technology appeals the user to deal with it, think about it and furthermore discuss it. It implies questions in itself which the user has to contemplate and reflect about.

### Time technology

This aspect of slow technology is revealing the presence of time. The product or service is consciously or unconsciously giving time to the user. It considers the time-factor and uses it to amplify presence, e.g. it is possible to stretch time or slow it down to create awareness of time presence (Hallnäs & Redström, 2000, p.170)

### Amplified environments

This theme is concerning the amplification of given environments. It enlarges a current state to broaden the possibilities and scope with the use of technology. It provides new ways to execute tasks and reinforces the development of expression of a given situation in space and time. Slow technology can use slow design approaches to amplify the time-factor (Hallnäs & Redström, 2000, p.171).

"A basic principle of slow technology is to amplify the presence of things to make them into something more than just a silent tool for fast access to something else." (Hallnäs & Redström, 2000, p. 182). Slow technology plays with the appearance of expression. It stands above pure aesthetics in regards to the form and function. Functionality doesn't have to be obvious through its form. It interacts with the given context and reveal itself, maybe over time, in the environment. It is also possible that the form may be the same for everybody but the function is shifting between different users.

# 3. Definitions

## 3.1 Information Appliance

A common problem of recent technology is its suffering of so called "featuritis" or "feature creep". This means that there is a desire to provide more and more functions for a product with the intend to build universal solutions. But this attempt creates more than often unnecessary complexity and drawbacks when it comes to the individual functions (Norman, 1998).

An information appliance is a technical device, which is designed for a specific task and is intended to perform this task to the best possible degree. The focus on one specific function allows the device to be designed around a certain task, which determines the necessary complexity, its physical form and the features of the appliance. Donald Norman (1998, p.53) argues that making a proper information appliance has two requirements:

- the tool must fit the task
- there must be universal communication and sharing

Furthermore Norman defines three axioms for Information Appliances:

- Simplicity - The complexity if the appliance is that of the task, not the tool. The technology is invisible.
- Versatility - Appliances are designed to allow and encourage novel, creative interaction.
- Pleasurability - Products should be pleasurable, fun, enjoyable. A joy to use, a joy to own

These axioms should be seen as guidelines for the development of an Information Appliance. It is not necessary that all three of them are obeyed to the max. But during the design process it should be checked repeatedly if they are still applicable. They should help to not succumb the temptation of building another feature-packed device which doesn't serve the task to the extent to which it would be beneficial.

## 3.2 Intrusive technology

Donald Norman describes in his book „The Invisible Computer“ today's technology as intrusive (N.B. the book is from 1998). He states that e.g. „a camera is an intrusive technology, one that gets in the way of the act“ (Norman, 1998, p.127). He describes technology that is standing between the task and the human being. The user has to consciously interact with the technology and has to adapt to it or gets distracted by it.

„Drawing on the other hand, is enhancing technology, one that by it's nature requires concentration, focus, and reflection upon the event being drawn“(Norman, 1998, p.127). The act of drawing is executed with the help of a pen or brush, but these artifacts can be seen as a natural extension of the human body. The tool is supporting the task and disappears in the act of using, in contrast to intrusive technology which attracts attention to itself. „Note taking is somewhat akin to sketching […]. The process of note taking is what matters; it focuses the mind, minimizes the tendency to daydream, and causes one to reflect upon the events being recorded so well, that at the conclusion of the event, the notes can discarded“. (Norman, 1998, p.128)

The goal should be to build non-intrusive technology, which is adapting to the natural behaviour of the user and not the other way around. To integrate technology into established patterns of human beings and align it with the way, people are acting and interacting.

## 3.3 Calm technology

The concept of calm technology distinguishes between the center the periphery of human attention. It is shifting back and forth between both. A calm technology comes to the center of attention when it is appropriate and necessary but vanishes in the periphery when there is no need for being in the center.

To place things in the periphery enables people to attune to many more things than they could, if everything would be in the center of their attention. The system of human perception is still aware of what is placed in the periphery but is not getting overburdened by it (Weiser & Brown, 1996, p. 4). Affordances are located in the periphery of attention until it is necessary to cope with them. Gaver (1986) illustrates the use of peripheral and centered attention in his work about auditory icons, where sound is used to switch between the two modes of attention, e.g. the sound of an e-mail application that indicates the arrival of a new message brings the application to the center of attention.

By recentering the attention from the former periphery, people are getting back control of it. It empowers the user to act on current circumstances than they could while things are in the periphery of their attention. This movement from back and forth is a fundamental enabler to increase awareness and power (Weiser & Brown, 1996).

## 3.4 Affordances

An affordance is the relationship between an object in the world and the intentions, perceptions, and capabilities of a person (Weiser & Brown, 1996). An affordance can be seen as a clue, which holds the functionality of the correspondent object in it. Or put another way, the set of possible actions is called the 'affordances' of the object. But it is important to note that an affordance is not a property, which exists in the same way all the time. It is rather a relationship that exists between the object, the user and the environment (Norman, 1998).

In Normans point of view a differentiation between real and perceived affordances is crucial. "In the design of objects, real affordances are not nearly as important as perceived ones; it is perceived affordances that tell the user what actions can be performed on an object and, to some extent, how to do them (Norman, 1998). Perceived affordances are often shaped by time and that is by conventions. It is not necessary that the perceived affordances are the exact same as real affordances. Perceived affordances can work as a stirrup for real affordances and make them more comprehensive for the user.

# 4. Understand & Observe

## 4.1 Survey

To get a first idea about the feelings and perceptions of social events, in this case family events, a survey was conducted. The advantages of a survey depend on the individual case. Since the topic of family events is a familiar domain to a broad range of people, a survey was a time-efficient method to provide a quick overview about different ways of thinking. Furthermore since there are many online tools which can be used to set up of the survey online, the associated costs were relatively low.

The intention was to get a generic atmospheric picture about the perception and opinion about family events throughout the different kinds of attendees. The survey was set up online and a link to the survey was distributed to people of all ages, genera and educational levels. Besides demographical standard-questions about gender and age, questions about the frequency of family-events, the general anticipation and more elaborating questions were asked in the survey.

The goal was to understand, if people can tell whether there is something particular that makes them happy or sad at a family events and if they may have some special stories to share. Furthermore the survey asked, what they would change, if the people being asked, would organize such event. The purpose was to understand what people are enjoying during an event and if there is something that people dislike during these events. It was intended to find out if there are already patterns established which could be used and leveraged for this work.

**Quantitative analysis**

In total 46 people participated in the survey, with 31 female and 15 male persons. There is a two-thirds majority for female participants, which couldn't be controlled since it was intended that the survey was distributed autonomously further from the attendees. The age range covered ages from 18-20 until 50-59 years, with the majority of ~72% of the people being between 21 and 29 years old (see Fig. 7 & Tab.1).

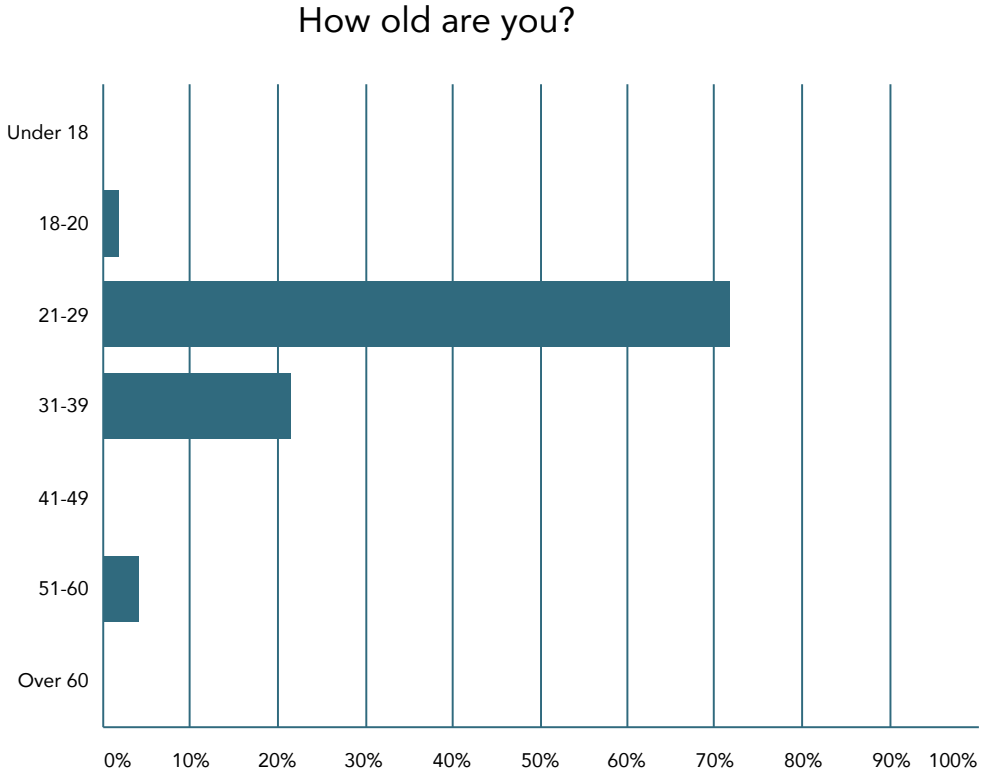


Fig. 7: Results from the survey - Age

| Possible answers | Answers | |
|---|---|---|
| Under 18 | 0,00% | 0 |
| 18-20 | 2,17% | 1 |
| 21-29 | 71,74% | 33 |
| 31-39 | 21,74% | 10 |
| 41-49 | 0,00% | 0 |
| 51-60 | 4,35% | 2 |
| Over 60 | 0,00% | 0 |
| Total | | 46 |

Tab. 1: Results from the survey - Age

The next block of questions concerned the frequency, attendance and anticipation of family events. The range of answers for the question how often family events are taking place in one's family, vary between a majority of 17 people (~39%) with between three and five events a year and five people (~11%) with more than five events a year (see Fig. 8 & Tab.2).

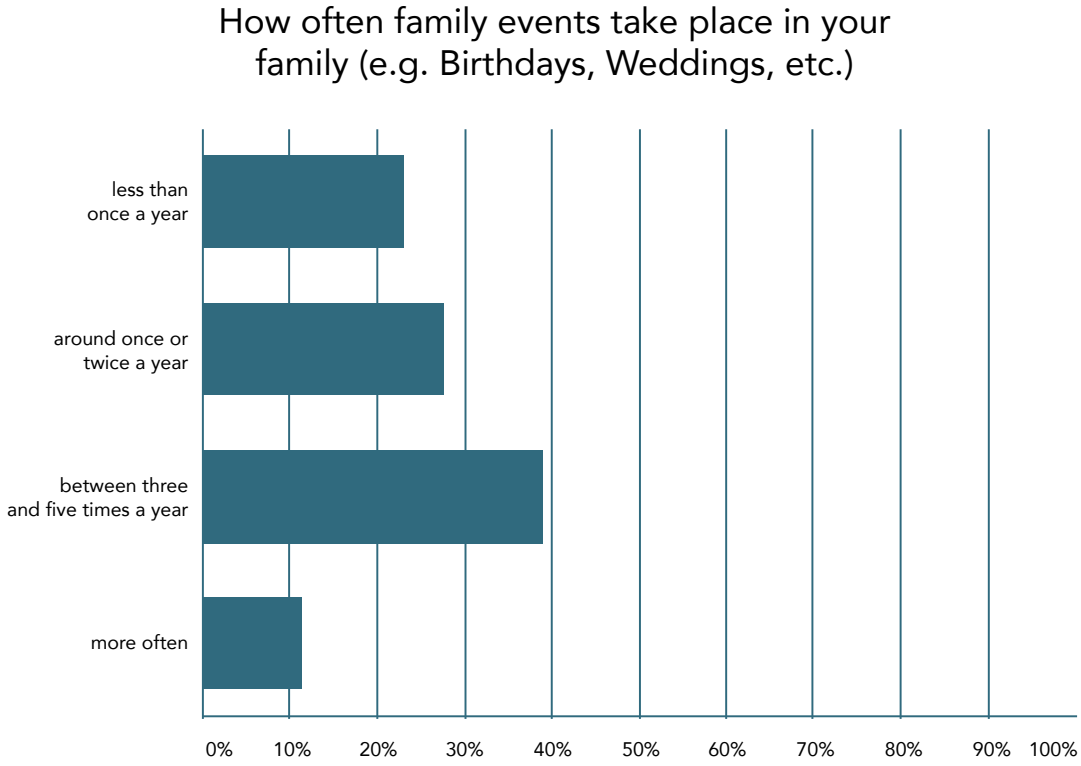


Fig. 8: Results from the survey - Frequency

| Possible answers | Answers | |
|---|---|---|
| less than once a year | 22,73% | 10 |
| around once or twice a year | 27,27% | 12 |
| between three and five times a year | 38,64% | 17 |
| more often | 11,36% | 5 |
| Total | | 44 |

Tab. 2: Results from the survey - Frequency

When it comes to attendance 25 people, more than half of the participants (~55%) attend often at these family events. After all still 15 people (~33%) state that they attend always at family events. In total four people (~9%) state that attend seldomly at these events and one person (~2%) never attends (see Fig. 9 & Tab. 3).

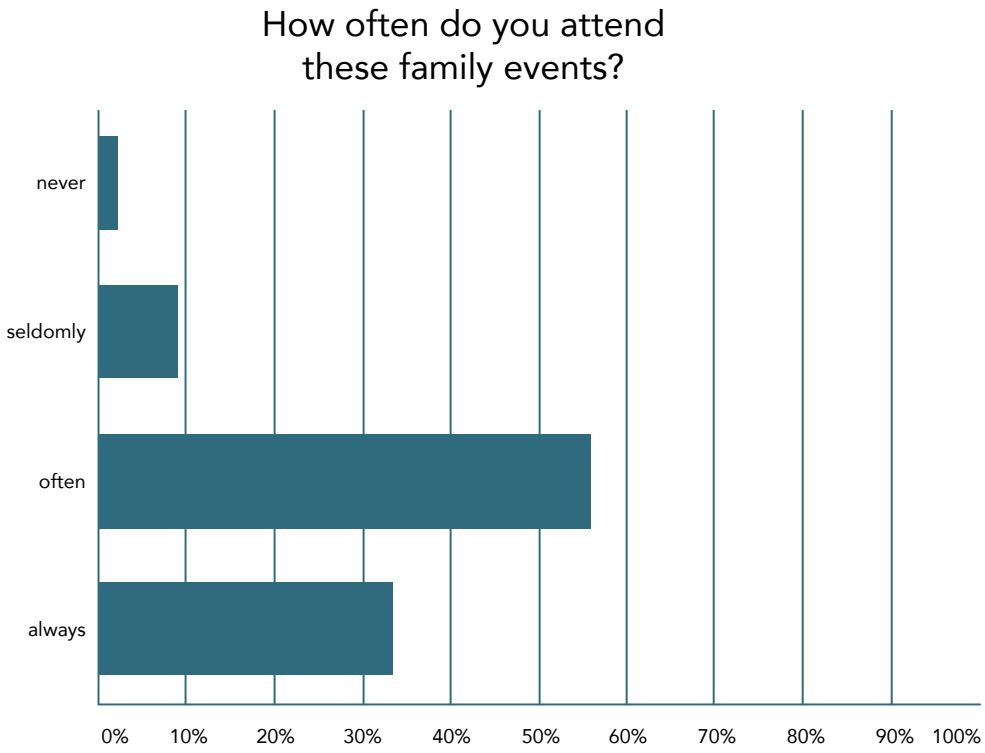


Fig. 9: Results from the survey - Attendance

| Possible answers | Answers | |
|---|---|---|
| never | 2,22% | 1 |
| seldomly | 8,89% | 4 |
| often | 55,56% | 25 |
| always | 33,33% | 15 |
| Total | | 45 |

Tab. 3: Results from the survey - Attendance

The question about how willingly they are visiting family events answered 25 people (~55%) with "willingly" and 13 people (~28%) with "very willingly". Eight people (~17%) answered with "rather unwillingly". None of the people being questioned answered with "unwillingly" (see Tab. 4).

## How willingly do you attend these family events?

| Possible answers | unwillingly | rather unwillingly | willingly | very willingly | Total | Average |
|---|---|---|---|---|---|---|
| Percentage<br>Answers | 0,00%<br>0 | 17,39%<br>8 | 54,35%<br>25 | 28,26%<br>13 | 46 | 3,11 |

Tab. 4: Results from the survey - Anticipation

The answers of this quantitative inquiry are giving the indication, that family events in general are happy and anticipated occasions. For the people who have attended in this survey, which should be a representative cross section, are anticipating family events and have a high rate of participation.

**Qualitatitve analysis**

The next part of the survey was asking more elaborative and personal questions about family events. See the questions below:

*Is there anything particular, that you like at family events? And if so, what?*

*What would be the worst that could happen at a family event?*

*What would be the best, that could happen at a family event?*

*Is there a particular positive or negative memory from a family event?*

*What would you do differently, if you would organise a family event?*

Most of the answers in the survey revealed that the most enjoyable parts of a family event are reconnecting with people who someone hasn't seen in a long time and having nice conversations with them. These answers occurred the general social character of family events. But to be open-minded about meeting people and furthermore have also conversations with them is something that can happen, but it doesn't have to. It is up to the individuals if they want to talk to people and if so, to whom. It may can be taken for granted that the people who attend at family event have shown a general willingness to meet their family and friends, but a forced conversation is nothing desirable or pleasurable and will maybe lead to awkward small talk, which will leave the attendees in a weird situation. Force or pressure won't lead to positive experience since the lack of freedom will make the people feel uncomfortable. But there was something more subtle, more hidden in the results of the survey: It occurred, that people in general like to go to these kinds of events. They're enjoying their time and the company of other people. And it seemed that people have an unconscious desire to express this enjoyment. To announce that they are having a good time.

**Conclusions**

The question which occurred from the results of the survey was, if the assumption that people would like to express their enjoyment, or rather their emotions in general, really true. And also if there was a possibility to leverage this general enjoyment and enhance it. The idea to express and share this enjoyment can be seen as an altruistic approach. While expressing and sharing their enjoyment, gratitude and appreciation people are doing something nice to themselves and other people, without expecting any revenue. They are enhancing their subjective well-being as well as the subjective well-being of the receiver.

To proof these assumptions and to get a more detailed insight of the behaviour at family events, it was necessary to attend in the actual situations. With this direct contact it was possible to evaluate the outcomes of the survey. An observation would provide the perfect opportunity to conduct a field study and to follow real events and the respective behaviour of the attendees.

## 4.2 Participatory observation

To get a better understanding of behavioral patterns, social interaction and conversations two family events have been visited. For the visits a technique called „participatory observation" was used (Ross, 2014). The advantages of a this technique are multifaceted, but there were also some risks which had to be considered. The most obvious advantage was the possibility to observe people in the natural environment of family events, since it would have been very difficult to set up a controlled laboratory situation, where people would behave naturally. Although an observation in a controlled environment has its advantages as well, since all falsifying factors can be disqualified beforehand, there is also the risk that the studied situation would be unrealistic simple (Obrenovic, 2011, p.57-58) Therefore observation in an inartificial environment provided the best precondition for a significant study. Thus many insights could be gathered which may would have not occurred during a lab-session.

Another advantage was to participate at the events as a regular guest, which gave the possibility to be as near as possible at the actual target group (Ross, 2014). To be an actual participant and not just an observer provides a good position to study human behaviour. One thing that attention has been paid to was the avoidance of the Hawthorne effect, which means that observed people would act differently, if they knew that they were observed. (Obrenovic, 2011, p.58) It was important to avoid any influence to the natural behavior of the observed persons. This risk was minimized by observing covert. Although covert observations carry their own drawbacks, it seemed that a covert observation was the better option.

The first event was a first family-meeting of three distantly related families. This circumstance provided also a situation, where it was possible to observe people while they were actually meeting each other for the first time and got to know each other. There was a risk that the knowledge of an ongoing observational study would make the people feel uncomfortable, so a covert observation was undertaken.

To get biased during the event was another risk that was necessary to be avoided. The role of a regular participant carried the risk, that objectivity would get lost. It was important to be more passive than active in conversations and let the other guests act naturally, to stay the least intrusive.

To prepare a participatory observation, some things had to be defined in advance. It was important to know who the people would be that get observed, what are their relationships to each other, what kind of groups will be observed, which are the activities that will be observed and what kind of assumptions drawn from the survey should get evaluated and furthermore get proven or disproven (Ross, 2014). These questions framed the purpose of the observation and worked as guidelines to help to stay focused on the actual observation. If no guidelines would have been set up in advance, there would be a risk that the observer would lose its focus and drift away from the original focus of the observation. Also there would be a risk of information overflow, if no goals and points of attention would have been set. The following has been set as guidelines for the observation:

*Who are the people that get observed?*

The attendees of the two family events will be a mixture of close families, relatives, friends, acquaintances and strangers. Some of them, like close family members will act differently than lose acquaintances or strangers. This composition provides a cross section throughout many different relationships.

*What kind of groups will be observed?*

There will be different groups of people with different states of acquaintanceship. At the family meeting there will be families which know each other individually since years but meet other relatives for the first time. At the wedding there will be families, but also close circles of friends, colleagues and their respective partners. These circumstances should be taken into consideration during the observation.

*Which are the activities that will be observed?*

- social interactions
- behaviour of particular people
- conversations
- thanksgiving
- remarkable persons
- emotions
- gestures
- frequency of actions
- conventions

*What are the assumptions which should get observed, get proven or disproven?*

The survey indicated that there seems to be a desire to express enjoyment, gratitude and appreciation. Are there any evidences to support this assumptions? Is it possible to witness any kinds of expression which may can be leveraged in the later work?

**Outcomes**

According to the pre set guidelines a lot of outcomes has been collected during the two visits. Both family events offered a lot of insights and they were the perfect observation environment to obtain as many information as possible.

There have been a lot of conversations in general, as expected. Although at both events there were relationships between people who have never seen each other before, it seemed that no people were excluded. Especially at the first event, the family-meeting, the possibility of "already-know"-group building was predictable. But at this event as well as at the wedding conversations between all the different people took place. Obviously some people were more talkative than others, but this can be seen as something that is depending on the individual persons. Also a lot of cross-generational conversations could be observed. There were no age- or generational boundaries between the different guests.

Another important notice was that at both events there was a general positive mood and many happy faces could be seen. This can be seen as something that correlates with the occasion by itself. Both events were happy, joyful and positive occurrences where people are happy to attend. This aligns with the results from the survey where people in general are willingly visit family events.

A couple of times during both events, grateful comments addressed to the hosts, the initiators or other guests could be overheard or heard directly. The thanking, praising or in general nice and friendly words were varying in reasons as well as in extent. But it seemed that these gestures meant a lot to the people who said them. Obviously, they made the people who received these nice words happy as well.

Some quotes which were said at the events: (translated)

> *"I would like to thank my cousin for coming up with the idea and so initiating this event."*
>
> *"I want to thank all the guests who have been made their way to this festive occasion."*
>
> *"I really like the idea of meeting so many people which are related more or less with me. Even the long journey doesn't matter."*
>
> *"At first I doubted, because I thought that this event wasn't necessary. But now I'm here and I am impressed by the amount of people and all the effort that people have put into it."*
>
> *"I am happy to meet you. I heard a lot about you, but I was really keen to meet you in person."*
>
> *"I actually don't like weddings, but this one is quite nice."*

In summary it can be stated that the assumptions from the survey, which indicated that people are trying to express their enjoyment, gratefulness and appreciation are proven. On several occasions people have expressed these and other feelings or perceptions. It seems that there is some kind intrinsic aspiration of people to express positive emotions, especially

gratitude and appreciation. Lambert and Fincham (2011) have stated that the expression of gratitude is an important aspect of relationship maintenance. Emmons & Mishra (2010) showed in their work many correlations between gratitude and subjective well-being. Gratitude can be seen as a part of the higher human need of relatedness. In their study about the facets of user experience, Hassenzahl, Diefenbach & Göritz (2010) came to the conclusion that in social situations "relatedness" was the most salient positive emotion that can occur during the use of an interactive product. These findings were laying the foundation for the further design and conceptual process of this work

# 5. Point of View

## 5.1 Define values

In the original Design Thinking framework the outcome of the "Define" phase is an actionable problem statement. This point of view statement focuses on users, needs and insights to tackle the designated problem (Hasso Plattner - Institute of Design at Stanford, 2014). Since in this work a merged form of the Design Thinking framework and the possibility-driven approach is used, the outcome of the Define phase are requirements, or values, which were identified to develop the best possibilities.

To get a broader and more elaborated visual impression for stating these values, a key visual was developed from the pictures which have been taken at the actual family events (see Fig. 10). The key visual is a collage of images from the family events. It should help to visualize relations, behaviours and patterns. It was used together with the notes and sketches which had been made during the observations.

The key visual as well as the observations disclosed alleged values, questions and challenges which both have to be considered in the design process. These are the values which have been identified and determined as a point of view:

- available
- visible
- inviting
- intuitive
- familiar
- friendly
- social
- safe

Fig. 10: Key Visual (censored)

These values are framing the approach of this work. A difference between "available" and "visible" is made, since it is possible that a product is generally available, but simply not visible to the user. Therefore the value of presence is split up into two single requirements, which are correlated, but should not be seen synonymously. Another key value is "inviting". This requirement approaches the idea that the design of the interactive appliance should provide the necessary impulse for use. A visual invitation should be created to pique the user's curiosity. The appliance should carry an intrinsic motivation for its use.

If the user has accepted this invitation for use, the interface between him and the product or service shouldn't slowdown its interest. Therefore a simple and "intuitive" interface is necessary. To avoid any discouraging of the use, "familiar" and "friendly" are two more values which should be considered. A certain degree of familiarity and a friendly, non-aggressive design can reduce anxiety in the use of the product or service. As there is no "driving-force" like a problem which pushes the user to solve it and provides the necessary kinetic energy, it should kept in mind to build something familiar and friendly to invite the user to try it out. But it is also important that the value inviting, which can also be seen as interesting, is not contradicting to the values familiar and friendly. A balance between these two characteristics is what should be strived for. Since the ambit of the aspired product or service are family events, it is important that it has a "social" character which should be factored into the design.

The last value which was determined was the attribute "safe". Odom et al (2012) have shown, that safety of personal data as well as the knowledge where the data is stored are extremely important to people regarding personal mementos like photographs, personal notes or audio- and video-recordings. Therefore the product or service should consider this concern in its concept and provide a possibility to ensure peoples data are saved securely.

But there are also some challenges which arose. Since the audience of family events is multigenerational, a designed interactive appliance should be cross-generational applicable. It

is not necessary, that everybody can use it in the exact same way and with the exact same effort, but no one should be excluded in advance due to age or health issues. This also raises to the question about the potential use of a metaphor, and if so, which metaphor would fit its purpose? A metaphor for interactive products or services is used to describe environments, properties and functions which are familiar and transferable (Stapelkamp, 2007, p. 152). Therefore a metaphor, if appropriately chosen, is widely understandable by most of the people and in addition should also fit smoothly into the respective environment of the usage (Petrelli, 2010). Therefore the chosen metaphor should support the defined values of familiar and friendly.

Another challenge which occurred was that the device should be inviting to use, that is to have an obvious, perceived affordance (Norman, 1998). The affordance should also be closely related to the benefits or rather reveal the benefits for the user. The real affordance as well, but even more the perceived affordance is highly depending on the form factor and the applied metaphor of the product or service. It should be strived for the most sensible and empathic integration of a solution that considers the necessity of an obvious perceived affordance and the beneficial value.

## 5.2 Scenarios

According to Rosson, Maass & Kellogg, 1989; Weidenhaupt, et al. 1998 Scenario-Based-Design can be seen as a description of people using technology. These scenarios are essential in discussing and analyzing how the technology is (or could be) reshaping their activities. Furthermore scenario descriptions can be created before a system is build and its impacts felt.

The scenarios contain of different aspects:

- Setting
- Actor
- Task Goals
- Plans
- Evaluation
- Actions
- Events

Two scenarios were created which were built on the results of the survey as well as the observations from two actual family events. Furthermore storyboards were sketched according to the narrative scenarios to describe and visualize certain aspects of the processes. The described storyboarding methods from Greenbergs et al. (2012) have set the guidelines for these storyboards. Spies states, that storyboards have a special issue when it comes to interactions in space. They should describe and show, what kind of interactions (e.g. gestures) the user is executing to interact with the environment (Spies, 2012, p. 202).

**Scenario 1:**

John is having a nice conversation with his sister Stacy and her husband Matthew. They haven't seen each other in a while and although there are a lot of different ways to get in touch, daily routine is preventing them to have regular contact. Therefore all three of them are more than happy to have this opportunity to see each other again.

They are sitting at a table at the yearly family-event and are chatting about the past, the present and the future. They are in a good mood and everybody is smiling. It's a good feeling to have the occasion and the time to talk.

After that John has talked a bit about his new job and all agreed that the his new boss seems like a funny guy, Stacy is clearing her throat. She says that Matthew and her are having some news for John. They tell him, that he soon will become an uncle of their first child. And there is more. They also wanted to ask John, if he wants to be the godfather of the child, once it is born.

John is overwhelmed by the news. He is speechless and can't believe what he has just heard. Of course he wants to be the godfather and he is feeling very honored and thankful for the trust they both put in him. He congratulates them both for their happy news and hugs them delightedly.

Stacy and Matthew went on to see grandma Gladys and tell her the good news. John is still feeling great and is happy about the news. He wants to express his feelings and gratitude for this wonderful event that provided the setting for this great evening. He is going over to the appreciation box and wants to verbalize his thoughts. He starts the appreciation box and is expressing what comes to his mind. He thanks the host for this wonderful event, that he has a great time here and is enjoying the evening very much.

After he has done this, he his feeling great, since he has now said what he wanted to say. A warm and satisfying feeling is spreading inside him.

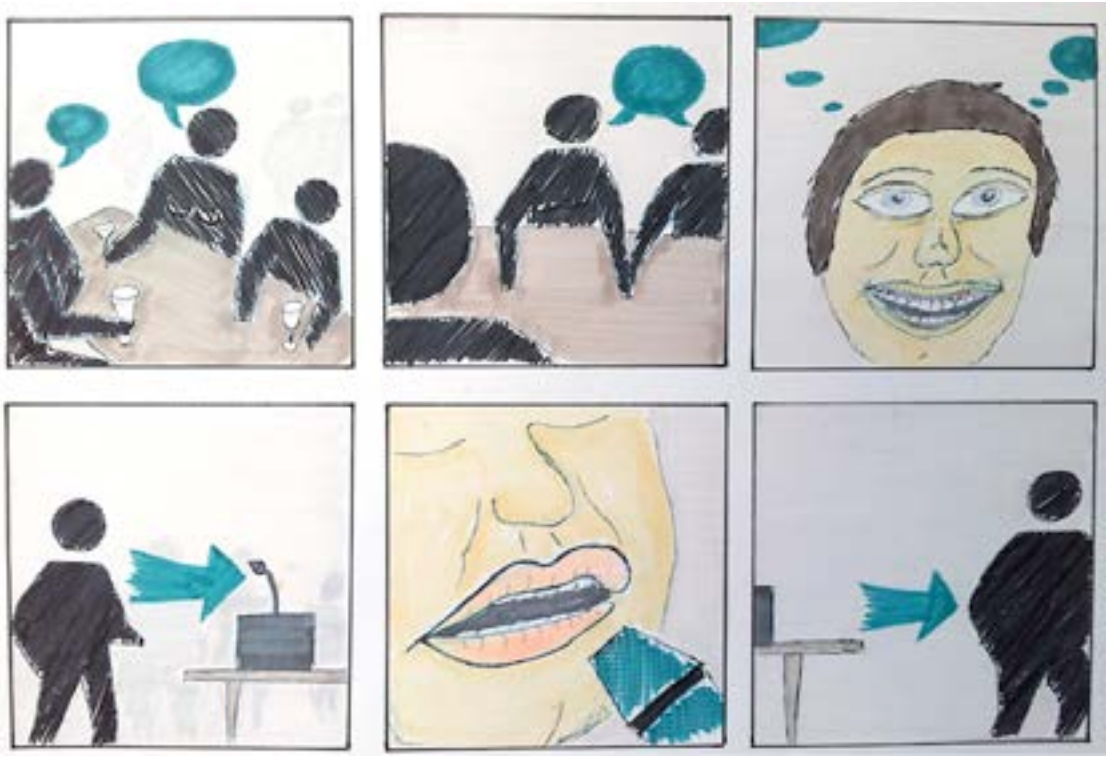

Fig. 11: Scenario 1

The second scenario has a more visionary character, but was also considering the results from the survey and the observation. in this scenario the approach of slow-technology was also taken into consideration, because one of the findings of the observations was, that people were expressing their feelings to whoever was standing near them. This is in general no problem at all, but maybe this was defeating its purpose. For this scenario the possibility-driven approach was applied since there was a possibility to enhance this action. The idea was to bring the nice messages directly to the intended receiver.

**Scenario 2:**

A couple of weeks after the family event, Frank Newman is receiving a notification via the appreciation box. There is a message for him, which was recorded at the family event.
He is playing the message and is listening carefully. He is hearing the voice if his son John, who is telling him, that he has a great time at the event, and that he is very grateful that he is able to see so many people again, who he hasn't seen in a long time. He thanks his dad for organizing this event.
Furthermore he just had a great conversation with his sister Stacy and her husband (***). They have told him that they will have a baby together and they asked him if he wants to be the godfather of the child. John says, that he is unbelievable happy about this and that the family event is the perfect occasion for news like this. He wants to share his experience, his enjoyment and happiness with somebody, so he recorded this message for his father.
Frank is very touched. He remembers the event and that he enjoyed his time as well. He also remembers when Stacy told him that he will be grandfather soon. He enjoys remembering at the event and his very pleased that the people have enjoyed their time there.

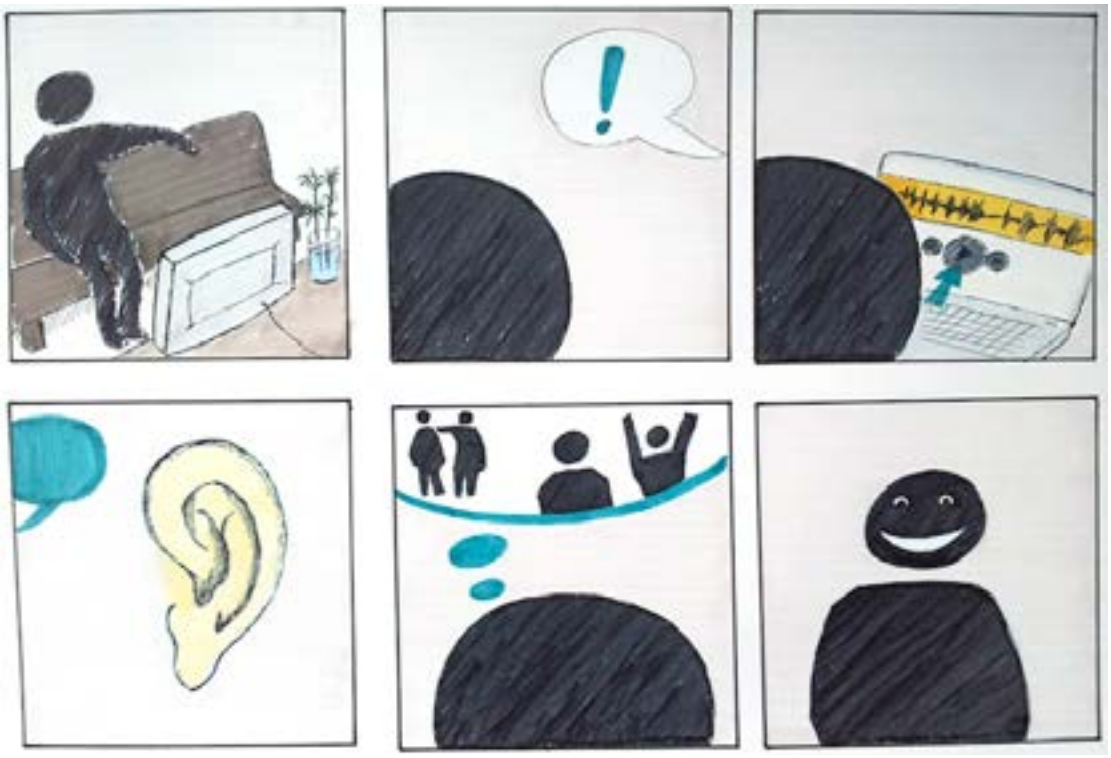


Fig. 12: Scenario 2

These scenarios are building a found story as a starting point, extracting the patterns, contextualize them and significantly re-scripts them. What is described in the scenarios didn't happen at the events, but there was a possibility that this, or something similar, could have happened there. The re-scripting of the story and the thinking of possibilities is an act of Experience Design in the light of a possibility-driven approach (Hassenzahl, 2010).

# 6. Ideation

## 6.1 Design ideation process

For the ideation of the design concept different methods were used to get to most valuable and diverse outcome. This phase can be seen as a divergent phase again, where ideas are generated and evaluated (Hasso Plattner - Institute of Design at Stanford, 2014). Since it was possible to take pictures and get insights from the observations, it was possible to work with them in the ideation process, as well. These visual insights have proved themselves as worthwhile resources during the ideation process.The pictures which have been original material from the observed family events were used in a variety of ways. As mentioned above, the pictures were already used in a first step to deduct key values and formulate a point of view.

In the ideation phase, these pictures have been used again. The methods which were used are called "rotoscoping" (Buxton, 2007, p. 279) and an adapted form of the rotoscoping method which can be seen as "hybrid photographic composition (Buxton, 2007, p.280). Both methods have the original photographic material as a fundamental scaffold to keep its authenticity. The positions, the poses, the environment and the proportion are correct. With the help of these edited visual stories, it was possible to better empathize with the respective situations. Since the possibility-driven approach was used in this work, these methods provided fertile starting-points to explore and elaborate possible design solutions.

For the hybrid photogenic composition method the pictures were edited just a little bit. They have turned into monochrome images to reduce color-intricacy and they were reduced in contrast to have an overall bright impression to make it easier to draw into the pictures. In this way the images where just a little prepared to facilitate the sketch-work with them. But since the image-content is still the same, it was possible to work with all the details. In contrast to the rotoscoping method, details were appreciated in this method. As a matter of fact, details and context were crucial for this method. The goal was to contrive possible

situations that could have taken place in the images and think about potential additions and their respective value and usage.


Fig. 13: Hybrid sketch 1


Fig. 14: Hybrid sketch 2


Fig. 15: Hybrid sketch 3


Fig. 16: Hybrid sketch 4


Fig. 17: Hybrid sketch 5

For the rotoscoping method the original pictures have been traced to retain just outlines of the important parts of the images. Thereby unnecessary complexity was eliminated. In this way it was possible to work directly with the scenes of the outline-images. The focus for this method was on actual interaction between the people in the image, therefore detail and visual complexity was not needed in this step. This method allowed to try various ideas directly within a scenographical environment and put them into the hand of silhouette-like actors, whereby the generated ideas were brought to life.

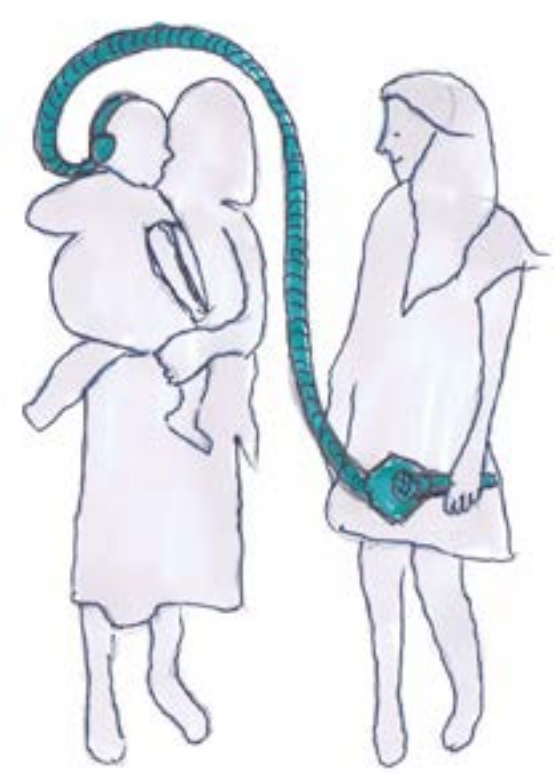

Fig. 18: Rotoscope sketch 1

Fig. 19: Rotoscope sketch 2

Fig. 20: Rotoscope sketch 3

Fig. 21: Rotoscope sketch 4

Fig. 22: Rotoscope sketch 5

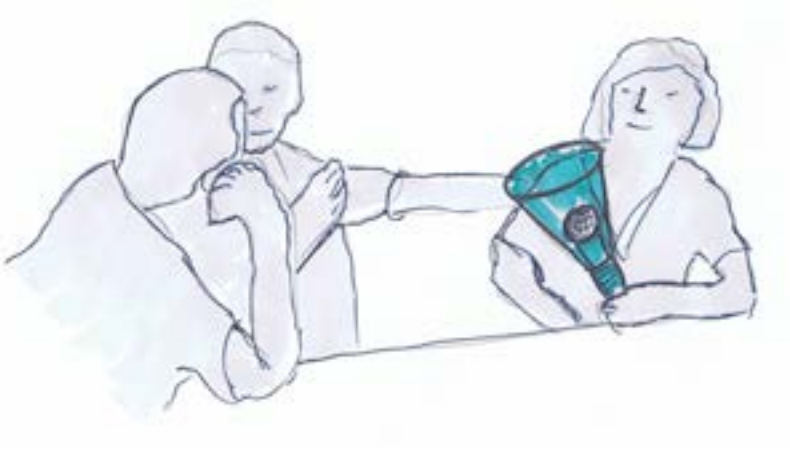

Fig. 23: Rotoscope sketch 6

Fig. 24: Rotoscope sketch 7

Fig. 25: Rotoscope sketch 8

Since the goal was to come up with ideas that support the approaches of positive design and positive psychology, a tool developed by Yoon, Desmet & Pohlmeyer (2013) has been used to connect situations, ideas and thoughts with respective positive emotions. Desmet (2012) has compiled a list of 25 positive emotions, which may can be experienced in a human computer interaction. Based on this work, Yoon, Desmet & Pohlmeyer, 2013) have developed the "Positive Emotional Granularity Tool". These are 25 cards, according to the assembled list of 25 possible emotions, which incorporate definitions of emotion labels, eliciting conditions, and visuals of expressive behavioural manifestations. (Yoon & Jeong, 2013). These cards have been used as a tool to locate and refer emotions to the certain situations at the family events (see Fig. 26 - 31 as examples).


Fig. 26: Emotion card - Anticipation (Yoon & Jeung, 2013)


Fig. 27: Emotion card - Euphoria (Yoon & Jeung, 2013)


Fig. 28: Emotion card - Joy (Yoon & Jeung, 2013)


Fig. 29: Emotion card - Kindness (Yoon & Jeung, 2013)

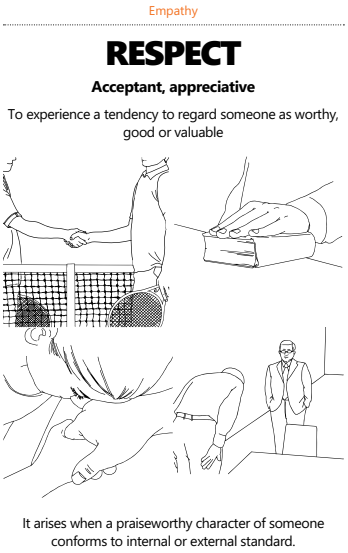


Fig. 30: Emotion card - Respect (Yoon & Jeung, 2013)


Fig. 31: Emotion card - surprise (Yoon & Jeung, 2013)

For the connection of the ideas and the positive emotions, the acquired scenes were evaluated for which social interaction can potentially trigger which positive emotions. Every positive emotion was assessed if it could be experienced in one of the idea-scenes. This method made it obvious where which emotion could potentially occur. After the evaluation with the help of the "Positive Emotional Granularity Tool" it was analyzed which scene/emotion-combination was most congruent to the defined values from the Point of View phase. These worked out ideas were elaborated further end were building the foundation for the further design work.

In a next step, the designated scenes and situations were used to come up with ideas for a product or service. Since the act of drawing helps to see and think with a deeper level of engagement (Baskinger & Bardel, 2013, p.9), drawing was the tool of choice for this step. During the ideation process the goal was to come up with as many ideas as possible, which were meeting the pre-defined values and were fitting into the emotional scenes.

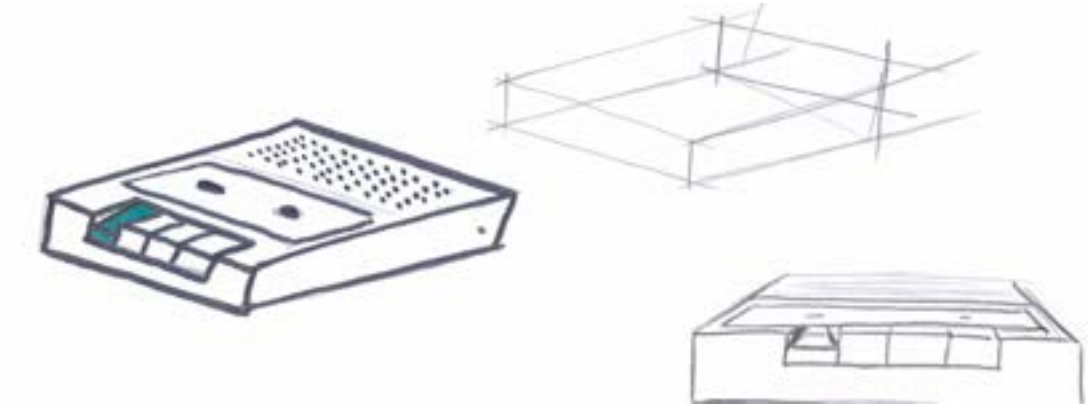

Fig. 32: ideation sketches 1

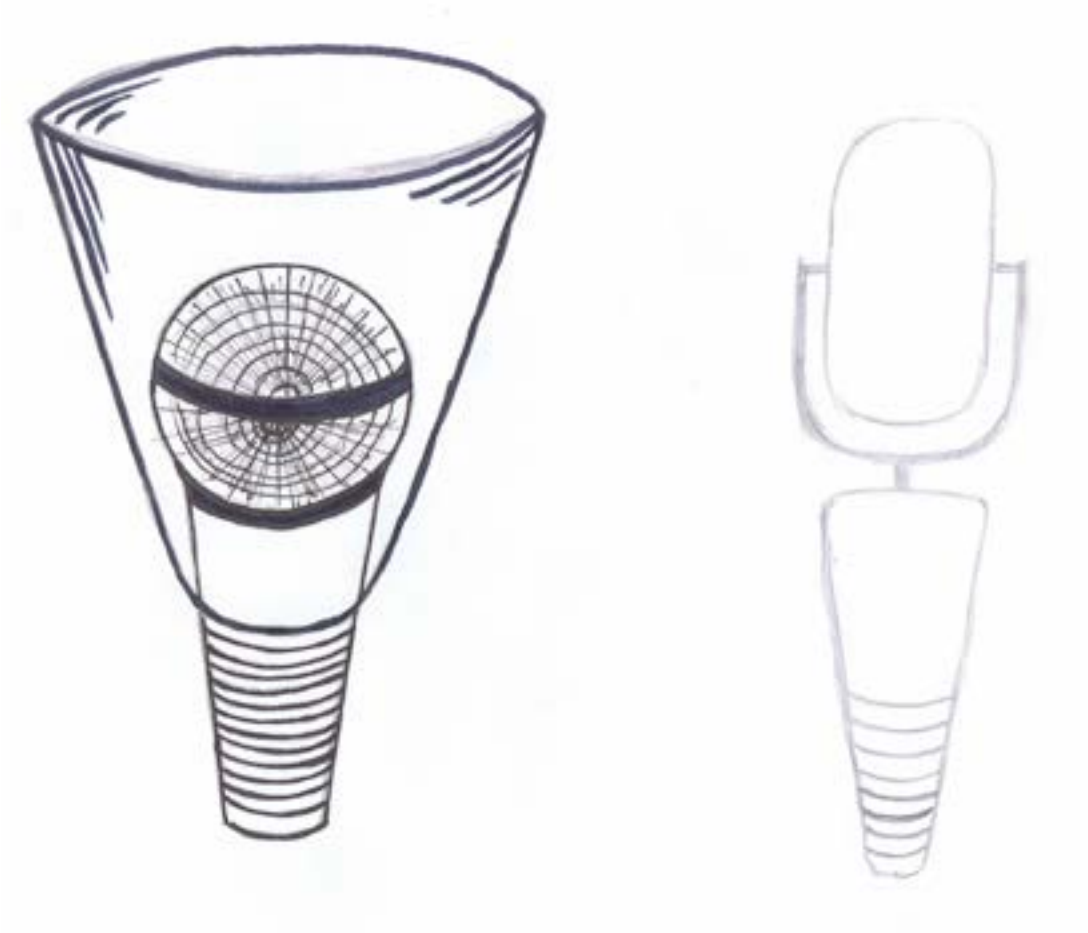

Fig. 33: ideation sketches 2

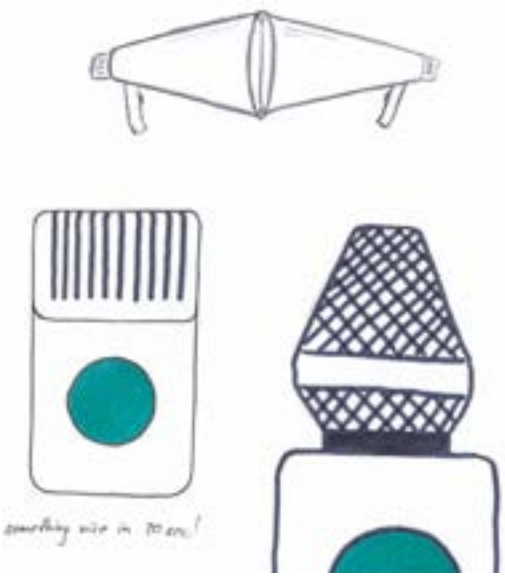

Fig. 34: ideation sketches 3

Fig. 35: ideation sketches 4

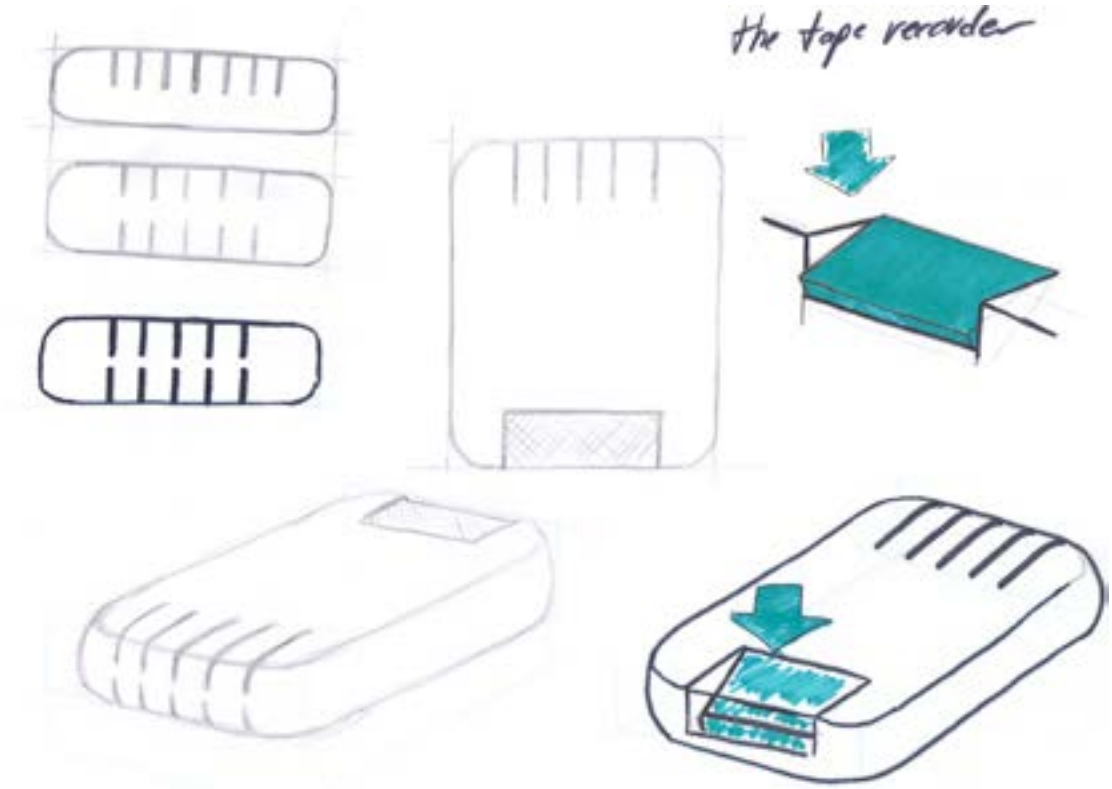


Fig. 36: ideation sketches 5

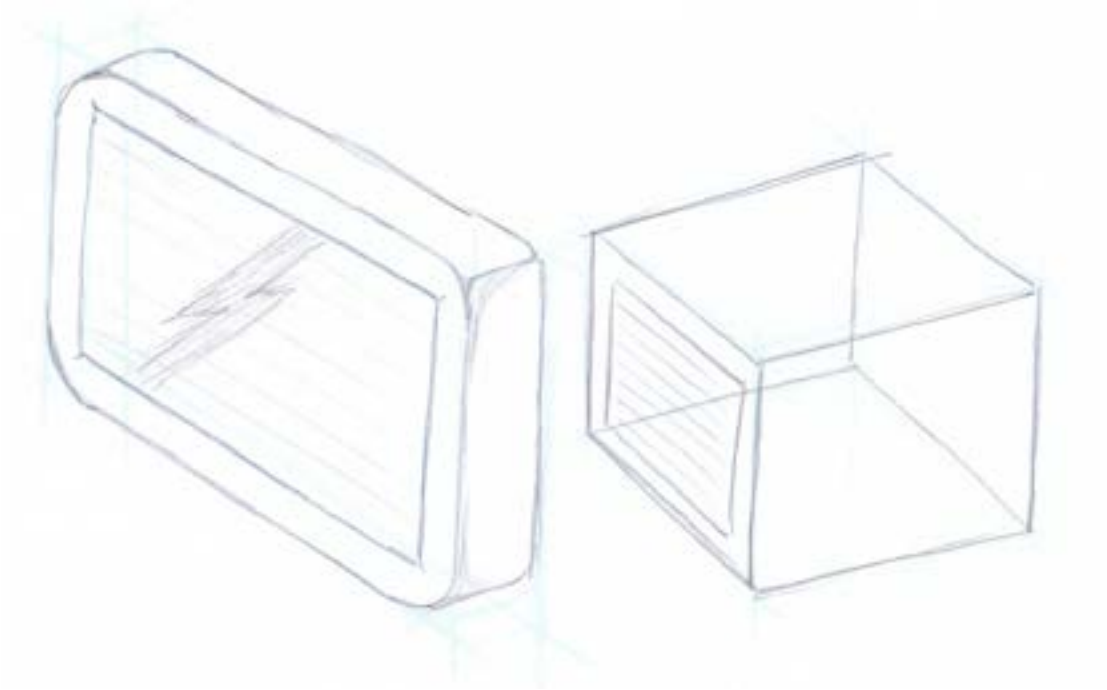

Fig. 37: ideation sketches 6

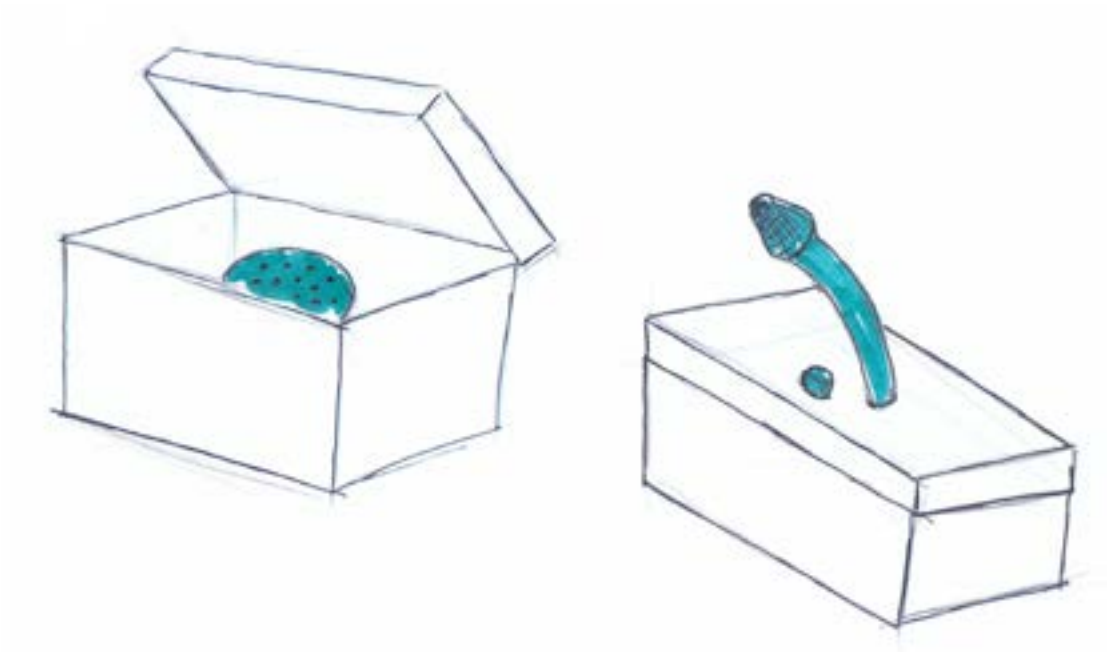

Fig. 38: ideation sketches 7

## 6.2 Concept phase

During the design ideation phase a lot of ideas emerged and were transferred into the concept phase. The goal of the concept phase was to develop ideas further and evaluate them according to the applied theories as well the determined values. The defined values worked as guidelines and assessment references to decide which ideas were supporting the attempt of enhancing events and which don't. Furthermore the described theoretical approaches like slow-technology (Hallnäs & Redström, 2000) and positive design (Desmet & Pohlmeyer, 2013) as well as the concepts of calm technology (Weiser & Brown, 1996) and information appliances (Norman, 1998) were considered to encounter the developing concept of this work.

The basic idea of this work was to enhance the experience of a family event during the attendance and afterwards. This meant that the concept has to consider two touchpoints. One during the actual event and one after the event. During the "Empathize" phase it became obvious that people in general like to attend at family events. Beyond that, the survey and the observations revealed, that there is an intrinsic motivation, that is a human need to experience relatedness. Relatedness can be described as the sense of contact with people who care for each other or in other words, people who are important to each other. Hassenzahl, Diefenbach & Görltz (2010) state relatedness as the most salient need in the sample of positive experience. The expression of gratitude is one aspect of the experience of relatedness. Emmons & Mishra (2010) have shown in their study that gratitude is not only "foundational to well-being" (Emmons & Mishra, 2010, p. 249), but also contributes to subjective well-being to a large extent. They are discussing ten different hypotheses about the correlations between gratitude and subjective well-being. Already this vast amount of possible explanations shows that there are important aspects about the connection of gratitude and subjective well-being. Peterson & Seligman (2004) defined six virtues and 24 character strengths in the realm of positive psychology. There is the character strength of gratitude which is connected to the virtue of transcendence and the character strength of

kindness, which is connected to the virtue of humanity. Furthermore Lambert & Fincham (2011) have shown that expressing gratitude has an impact on relationship maintenance behavior. Therefore the conformation that there is a human need for relatedness in the context of family events, the positive impact of gratitude and kindness to subjective well-being and the correlated positive emotions were building the basic framework for the further development of this concept.

Desmet & Pohlmeyer (2013) argue that positive design is embodied by three ingredients - pleasure, personal significance and virtue. It is not necessary that all of these three aspects are fulfilled to the same extent, but all of them are essential to achieve flourishing. To flourish is described as optimal human behaviour (Ryan & Deci, 2001) and requires besides having positive emotions, a sense of meaning, engagement, interest and purpose in life (Desmet & Pohlmeyer, 2013). The three ingredients of the positive design framework are trying to combine these aspects and work as a pathway to human flourishing. In this work the three ingredients are addressed solely as well as with overlapping approaches.

**Design for pleasure:**

To encounter the aspect of design for pleasure the momentum of family events is leveraged. As the results from the survey and the observations have shown, the attendance at a family event is perceived in a positive manner. Therefore the attendance itself, that is, the present moment is appreciated. This positive effect has to be seen as a conditional aspect which is leveraging the environment.

Another aspect that is encountering design for pleasure is the actual form factor. Aesthetical beauty and appeal are also important factors which are appealing to the present moment. The design of a product is affecting its perception and appreciation in the moment of its actual use and cognition. Therefore the form factor is another important characteristic for the development of the interactive appliance in regards of design for pleasure.

**Design for personal significance:**

To address the characteristic of design for personal significance many findings from research about subjective well-being and flourishing and their correlation with human needs and character strengths are used in this work. Personal significance is appealing from a sense of personal meaning and can therefore be derived from achievements or the progress towards a future goal (Desmet & Pohlmeyer, 2013).

Lambert & Fincham (2011) state that expressing gratitude leads to a more relationship maintenance behavior, which can be seen as a long-term future goal. Hassenzahl, Diefenbach & Göritz (2010, p.357) define relatedness as the most salient need of positive experiences. The striving for fulfilment of this human need contributes to personal significance as well. Seligman & Steen (2005, p.412) are arguing that "although part of the definition of a character strength is that it contributes to fulfilment, strengths "of the heart" - zest, gratitude, hope, and love - are more robustly associated with life satisfaction[...]". Therefore these character strengths are also contributing to the aspect of personal significance.

**Design for virtues**

Desmet & Pohlmeyer (2013) state that virtuous behavior, or rather the happiness that evolves from it, is the third ingredient for positive design. Peterson & Seligman (2004) are describing transcendence as a virtue with the connected character strength of gratitude and humanity as another virtues with the connected character strength of kindness as contributors to subjective well-being. In the view of the fact that this project has its scope within family events, virtue characteristics which appear in this context like gratitude and kindness can be addressed and leveraged.

In a next step it was necessary to define how people were expressing their gratitude, their appreciation or other positive feelings at a family event. During the observation there were multiple situations where people expressed their emotions verbally in conversations to the person they were talking to. It can be stated that in most cases this happens on the fly, that

means without much preparing thought. Since people feel that verbal expression is the most natural way to phrase feelings, it was obvious to incorporate this into the concept and to provide the possibility to express emotions and feelings verbally (Oleksik & Brown, 2008, p.169). It was important to not force people to do something they normally wouldn't do. Therefore the idea of audio recording emerged. It should be possible for the attendees of a family event to record their gratitude and appreciation. The interactive appliance should support the idea of spontaneous recordings and use the momentum which appears in the environment of a family event to encourage people to express their emotions.

The concept of calm technology is used to facilitate this idea. The appliance should be in the periphery of the attention, until it is needed to shift into the focus of attention (Weiser & Brown, 1996). To achieve this kind of subtle movement from the periphery into the focus of attention, some other factors should be considered as well. Norman (1998, p.127) states that technology should not be intrusive, that is getting in the way of the act. A designed appliance should therefore have a well-designed and reasoned appearance, as well as a elaborated and thought out behaviour.

One thing that is important to consider is the complexity of the appliance. Since it was important to be non-intrusive and to support the concept of calm technology, it was reasonable to keep complexity as low as possible. The appliance should be designed to support the execution of a certain task and then vanish again in the periphery of the attention. Norman (1998) describes in his book "The Invisible Computer" the concept of an "Information Appliance". An information appliance is designed for one specific task and is able to perform this task in the best possible way. This idea seemed worthwhile for the concept of this work.

Norman describes three axioms for information appliances, which worked as guidelines to develop the concept of this work:

- Simplicity - The complexity of the appliance is that of the task, not the tool. The technology is invisible.
- Versatility - Appliances are designed to allow and encourage novel, creative interaction.
- Pleasurability - Products should be pleasurable, fun, enjoyable. A joy to use, a joy to own

Norman also defines two requirements to develop an information appliance, which are:

- the tool must fit the task
- there must be universal communication and sharing

Although Norman states that "A distinguishing feature of information appliances is the ability to share information among themselves" (p.53), it was decided against any sharing functionality. At first, an idea emerged while the ideation process, that the appliances share a common storage system, where every message of every appliance is saved. From this cloud-like storage system the recorded messages could be sent via email to the respective recipients. But after evaluating this idea, the externalization of storage and the sending of messages would feel like ripping apart the cohesive character of the recordings and leading to the feeling of losing value, since it becomes „just another mail". Furthermore Odom, et. al. (2012) found out that it would make the people feel uncomfortable, if they don't know where their personal data is located. Some of the participants of their study, in which digital ways to store and utilize family heirlooms were explored, said "We put things online to share them, not to preserve them. ...all our intimate [digital] memories, we want to know where they are, keep them in order. ...the thought of them being where someone could get at them. That makes us uneasy" (p.6) and "I'll put things for my work or my music in dropbox, but I wouldn't put anything too valuable to us there. What if our account was hacked or deleted? ...it feels too risky" (p.6). It is quite likely that this feeling would also apply to recorded personal messages since the basic character about personal belongings, either physical or nonphysical is the same.

To further encounter the axiom of simplicity, the set of possible interactions with the appliance was determined to two. The first interaction should trigger the function of the actual audio recording. This interaction should have an obvious perceived affordance to make it easy for the user to perform the task. A second interaction should allow the later recipient to play the recorded message. Both functionality adopts the concept of slow technology. Slow technology embraces the time-factor and brings pace into the design and concept phase. Hallnäs & Redström (2000) argue that if time and pace are considered, many new possibilities emerge. To reveal its own whole character enhances the value of a product or service. This characteristic appeals to the "reflective-" and the "time technology" aspects of slow technology, since it makes the recipient aware of time and encourages him to reflect on the event, the memories and the time which has passed since then.

The recorded messages should not be available for the people who were recording the messages. The execution of the task is done with the end of the recording. It is intended that people should not have to possibility to hear their own messages, or the messages of other guests again. There are two reasons for this decision. On the one hand, the appliance encourages people to record messages spontaneously. The interaction concept of just performing one actual interaction to be ready to record is amplify this spontaneous character. If there would be a way, to rehear the messages, this character would get lost. On the other hand a reason for not allowing people to play messages again is, that people should focus for a short amount of time. This appeals to the aspect of "reflective technology" from the concept of slow technology, since it encourages the user to reflect on his own actions. To become aware of the situation is supporting the perception of the current moment, and will also encourage conceiving the positive emotions discussed above. These two separated interaction-environments are supporting the second axiom of Norman about information appliances - Versatility - since it the partition of sending and receiving messages encourage the users to rethink their concept of appreciation and expressing gratitude.

The third axiom - Pleasurability - is encountered with different aspects of the developing appliance. At first, the physical form of the information appliance itself should appeal to pleasure, fun and enjoyment on both sides, while the actual event but also afterwards. The form factor should be considered to fit into the environment of a family event and also into the home of the later recipient. "Beyond designing explicitly for 'use', this consideration emphasizes the aesthetics of integrating treasured digital materials into environments as a whole over time, a notion parallel to slow technology. Collectively, these findings suggest that to support more sensitive and nuanced engagement with cherished digital familial content requires the artful design of technologies that can be put away, drawn on alongside others, and which evoke rich experiences when interacted with" (Odom et al., 2012, p.9).

These preconditions affected the decisions about the physical form of the appliance as well as the applied metaphor to a large extent. Since personal messages and the respective evoked memories are seen as something particular precious, the metaphor of a treasure chest emerged. A treasure chest is a box, where people put important things, like a treasure or personal belongings inside to keep them safe and protect them from theft or misuse. This understanding of a treasure chest is used as a metaphor for the appearance and the functionality of the information appliance. In the study of Odom et al (2012) people stated that the physical form of a device has impact on the perception of the connected personal data. "Putting our family photos and videos and all in a different folder [on our computer] doesn't do them justice. There is so much on [our computer] that we won't give a toss about in a year. [...]our photos, videos, that's the bit that matters[...] they show you care and makes you want to care for them, tend to them" (Odom et. al., 2012, p.6). Therefore the metaphor of a treasure chest seemed like the right choice for this interactive appliance. The users are putting important things inside the box (personal recorded messages) and the recipients are able to get this messages out of the box again (listen to the messages). But only the recipients should be able to get at the messages. Therefore there should be a way to keep the box closed - e.g. with a lock were only the intended recipient has a key for.

To record and store the messages within a treasure chest-like box as actual audio recordings had furthermore two more advantages. At first, audio recordings are more evocative than pictures. Petrelli et al. (2010) have shown that people experience more elaborative memories when the trigger medium is an audio recording. With a voice message, not only the pure message is recorded, but also the ambient sound like chatter from other people, the clinking of glasses and other sounds which were in the surrounding while the recording. Therefore sound memories let the recipients experience a more deep and cohesive memory and transport them back into the moment, from which the recordings had originally been taken (Oleksik & Brown, 2008, p.167). The box should provide the possibility to store many different messages. A storage element should be implemented to make sure that every message has its necessary space. If the recipients wants to listen to message from the box, he has no influence which message will be played. The messages should be played randomly. Another advantage was the conclusive character of a time-based medium in regards of the applied slow technology approach. A static medium like a picture would feel inappropriate to the general approach.

The question whether there should be one central device, many distributed devices or a mixture of both was also challenging. All possibilities carried their own advantages and drawbacks. Since the decision has been made, that there will be no sharing functionality between many devices, the recipients would receive a fair amount of devices. But since the whole concept is build around the idea of appreciation of precious memories and the expression of personal feelings in one particular treasure chest, many devices would dilute the general approach. Therefore it was decided that their should be one device for each event. In this way one box contains all the collected recordings within itself.

All the decisions and aspects discussed above contribute to the extent to which the three ingredients of the positive design framework are marked. To demonstrate the impact on the respective ingredients as well as on the general framework of positive design a graph has been developed which is based on the scheme of positive design provided by Desmet

and Pohlmeyer (2013). The graph is similar to a radar-diagram but is using the basic triangular structure of the scheme and keeps the three different cornerstones as the respective characteristic-poles. Three axes connect the center of the triangle with every pole of the diagram. A scale from one to five is applied to every axis. The manifestation of each characteristic was evaluated into a value from one to five, acording to the extent of fulfilment of the three ingredients.. Respective to the designated values the axes were connected. The new connections intersect the inner triangle, which is representing the sweet spot of postive design (Desmet & Pohlmeyer, 2013). A plane ocuurs which covers the inner triangle to a certain extent. The resulting striped plane is indicating the congruence of the designed product or system with the framework of positive design. The more the inner triangle is covered from the plane, the more the product or system evaluated is fulfilling the ingredients for positive design.

The three aspects described above are rated as follows:

- Design for pleasure: 3
- Design for personal significance: 4
- Design for virtue: 2

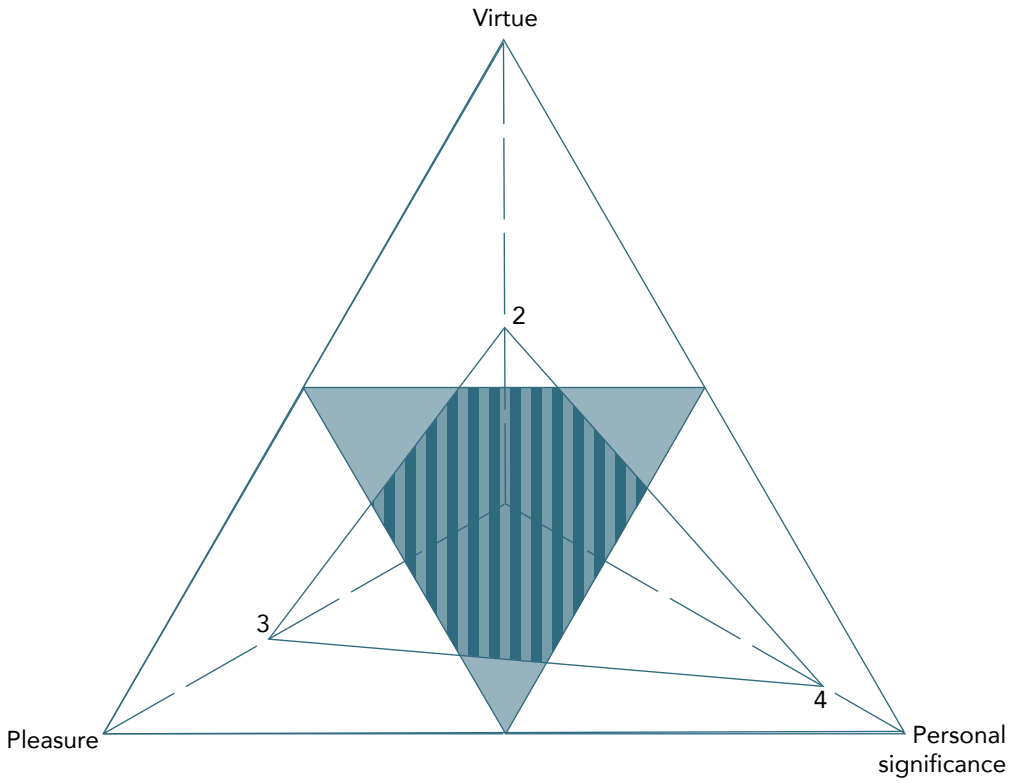


Fig. 39: Congruence-graph of positive design

# 7. Prototype

## 7.1 Set up

To get a better understanding of the theoretical outcomes and also to provide a tangible proof of concept of this work, a prototype with a certain degree of fidelity was built. Prototypes are serving the purpose to give ideas a physical form, to explore these ideas, to test and refine them and to demonstrate the overarching vision of the concept (Hasso Plattner - Institute of Design at Stanford, 2014).

The basic components for the prototypes are:

- a small wooden box to incorporate the treasure chest metaphor
- an electrical sound modul of a sound-greeting card which contains of a board with an attached microphone, speaker, record button, light sensor and a storage element is also build in to store around 20 seconds of sound recording.

Furthermore a shade is used to hide the technology in the lid of the box. (Norman, 1998). The microphone, speaker, record-button and light sensor were detached from the base board and were newly laid. The microphone and the record button should be available from the outside of the box, since according to the concept, that are the necessary elements to record a message into the box. Holes were drilled into to lid to implement the record button and the microphone into the lid. To maintain the overall vintage and noble appearance of the box, these two elements were seamlessly incorporated into the wood carvings of the box.

The light sensor and the speaker were built into the shade at the inside of the lid. A hole was drilled to put the light sensor into the right position, that it can collect enough light to start the recorded message to play. To use a visual pattern, holes were drilled in a geometrical array to visualize a hidden speaker. The holes also serve the purpose of letting pass the acoustic sound waves from inside the lid.

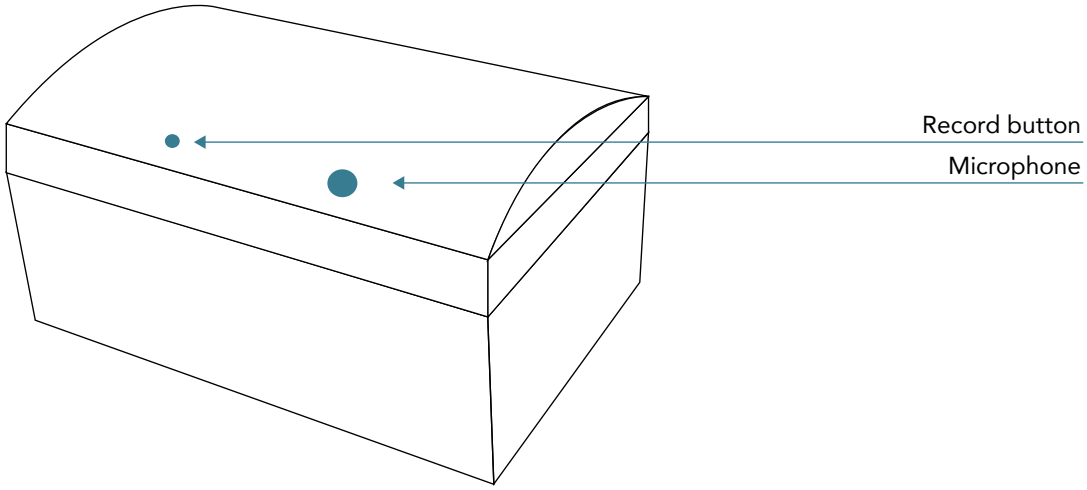


Fig. 40: Illustration of the appreciation box - outside

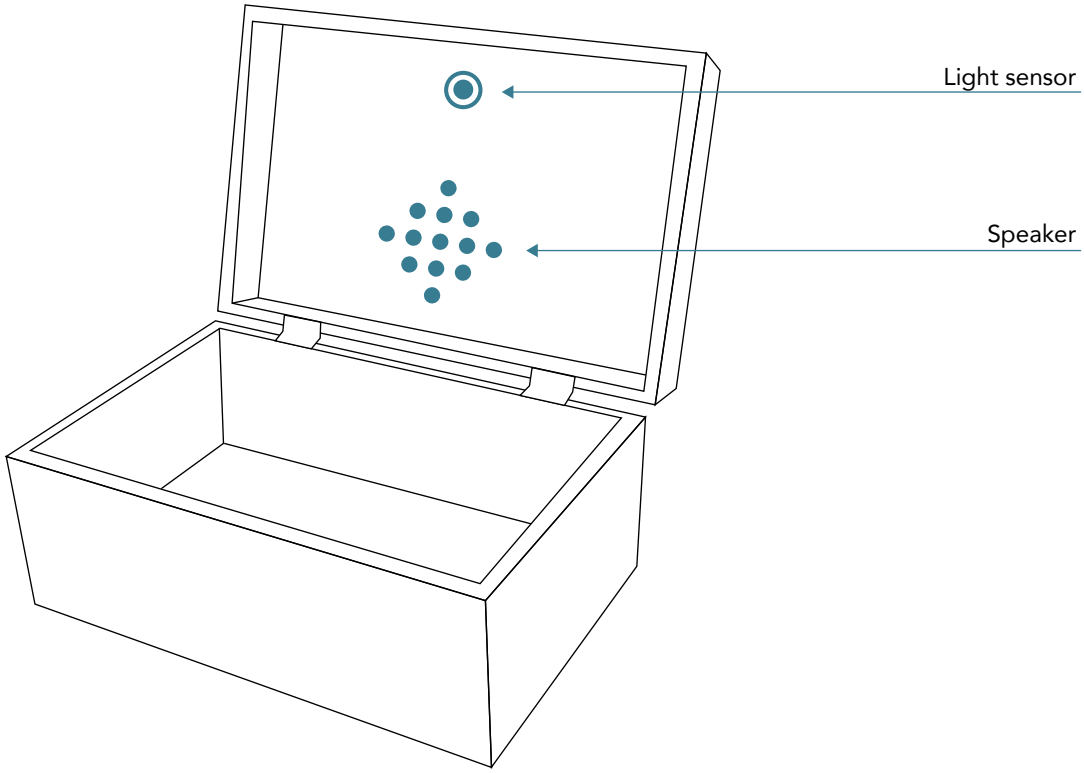


Fig. 41: Illustration of the appreciation box - inside

## 7.2 Appearance

The appearance of the prototype is led by the treasure chest metaphor. Odom et al. (2012) found that "[...] the vintage form factor of the Digital Slide Viewer itself appeared to help set the tone for reminiscing about the past." To translate and incorporate the metaphor of the treasure chest into the appliance, the box had to have a vintage look, as well. The general appearance of the box should support the metaphor as well as the intended use.

The box which is used in the latest prototype is a wooden box with the dimensions of 15,5x10x6,5 cm and beautiful carvings around the whole box. There are also small brass fittings to enhance the general appearance. Since the box carries all the recorded messages of a family event within, it will most likely be treated as a family heirloom or other memorabilia. Therefore the form factor also considers the use case of being a decorative element.

The size of the box seemed perfect since it has a certain size which provides the box with meaning and value. Furthermore the size is big enough be not overlooked but still fits on a table. But the box is also small enough to be carried and handed around at a family event like polaroid cameras.

Fig. 42: The prototype

## 7.3 Gestures

To interact with the prototype, the two intended gestures described above are implemented. To record a message, the record button which is implemented into the lid has to be pushed once. A sound coming from the sound module inside the lid is signifies that the recording has started. Next to the record button the microphone is located. If the record button has been pushed once, the user can start to record his message while speaking into the microphone. If the message is finished, the user has to push the button again. Two short sounds are giving the user the feedback that the recording is now done.

As described above, the play-back of a message is triggered by a light sensor. If the user now opens the lid of the box, the light sensor starts a recorded message. There is no further interaction needed. After listening to a message, the user can close the box again. The concept plans that there will be a storage element which enables the box to store many different messages, which are played randomly every time the user is opening the box.

## 7.4 Drawbacks of the prototype

The most obvious drawback of the current prototype is the small storage element which is merely capable to store around 20 seconds of audio recording. Furthermore with the used sound module it is only possible to record one message. Every new recording erases the previous message. Therefore the prototype would not be able to serve as a testing prototype for all the functions of the concept. Another drawback of this particular prototype is that there is no way to prevent people from listening to the messages. This is admittedly intended for demonstration purposes, but should be changed for testing sessions.

# 8. Delimitations

The outcome of this work is a proof-of-concept prototype, which demonstrates the basic functionality of the product. In regards of appearance and material, this prototype is already quite elaborated. However technical components are only serving the purpose of basic demonstration. For further development the technical set up has to be elaborated.

Furthermore it should be stated that this work is just a conceptional and partly prototyped project and ends after at the prototyping phase of the Design Thinking process. Prototypes can be used to evaluate solutions but also gain empathy. Although the whole concept went through many iterations, no realistic evaluations has been carried out, which would provide more and also new insights. Therefore the prototype should be tested according to acceptance, suitability and performance in a real use-case environment. Since evaluation and reiteration is an important part of the design thinking process the next necessary step would be to test the prototype at actual family events.

# 9. Conclusion

A lot of research has been done, from the psychology point of view as well as from the interaction design and user experience design field, to study subjective well-being and human flourishing. There are results which proof that certain actions and behaviors have impact on human condition. Some of these results were used in this work to transfer and connect them into the realm of family events. Frameworks like the positive design framework, presented by Desmet & Pohlmeyer (2013) were used as guidelines to develop a concept for a product which can enhance the experience of a family event while and after the actual event. Theoretical approaches like the concept of slow technology have been used to increase the effect of the enhanced experience and connect people over time through momentum and memories.

The underlying approach was led by the possibility-driven design by Desmet & Hassenzahl (2012) which argue, that there should be a change of thinking in developing products and services. There is a need to overcome the prevailing mindset of problem-driven design and think about possibilities rather than problems as starting point. This approach was used to come up with ideas to enhance the experience of family events.

The outcome of this work is a proof-of-concept prototype which should be used during and after family events. The design and concept enables people to express anticipation, gratitude, enjoyment and other positive feelings spontaneously during a family event. The treasure chest metaphor points out that these precious feelings and moments are stored safely inside the box. With the slow technology approach pace and time are incorporated into the concept and enable people to trigger memories after an event is already over.

Since the prototype has not been tested yet, there are no results about acceptance and performance. But the prototype is building an inciting foundation and further research should be pursued.

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