The Ring

To even try to begin explaining the emotions this product have created and continually are creating is a challenge in itself. A tiny golden ring with a small pearl that throughout the years of fitting in-between other rings has been shaped into this imperfect perfection. As a fifteen-year-old girl receiving this ring from my grandmother, I felt extremely terrified. She gave me the ring her grandmother had given her and the only thought in my head was what if I lose it? One time I decided to wear it on a chain around my neck, this to show my grandmother that it was still in my possession, and I think I had a stiff neck for like a week after that. Now, this ring has been mine for ten years, and every time I look at it, I fall deeper and deeper in love. I have not worn it since that one time, but when I do, I know that it will fit perfectly.

You might be wondering why I’m telling you this story. Why do you need to know about my grandmother’s ring and me? It’s because it’s basically what my whole project is about, the relationship between you as a user and your product.
ABSTRACT

This project aims to design a lamp which can create an emotional relation between the user and their product and thereby, in the end, create a type of sustainability.

The research focuses on the field emotional design and brings forth six factors which should be considered while designing for emotional sustainability.

To search for the final shape of the product, a workshop was performed, where the goal was to study the participant’s connection to their emotions through shapes, but also came to influence a new way of saving energy that for now is being called The human way. Throughout the whole project, people with specialized knowledge in different fields have been there to open up for this product to become something new and exciting.

The end result called U&I is a lamp which is aimed for a long-term relationship with its user where every part of it exists for a particular reason or purpose, all coming back to the six factors of emotional sustainability.
INTRODUCTION

I believe that in the 20th century, a mass consumption society was initiated. This society and its acceptance of superficial products took something from its human population, something crucial. They lost their ability to develop emotional bonds towards a product. Emotions that give the consumers a chance of a deeper connection to a product or service. Emotional design creates those lost emotions that we, as designers, now have a task to bring back.
"They are the things you snatch when your house is on fire."

Richard Seymour explaining emotional functionality in his TED talk, How beauty feels, in May 2011.
To be the one who has designed that one object that a person grabs when their house is on fire. Is that even possible?

The understanding of emotional design as a process within sustainable design required research of the field. Through own studies, using a computer-based questionnaire, journal reading and observing other designers the goal was to find different factors which make a person receive a deeper connection on an emotional level towards a product.
Sustainable design

As Keitsch explains in her article "Sustainable Design", the concept of sustainable design is not new, it started in the early 70’s when four designers began criticizing modern and unsustainable product developments by suggesting more sustainable alternatives. They wanted to design for the needs of the users and in the end, create products with real benefits.¹

Victor Papanek, one of the designers that questioned this development from the start. Wrote in his book Design for the Real World: "Am I on the side of social good, or will the object that I design, be an addition to the catalogue of unnecessary fetish objects?" saying that every designer should question themselves and their products, this to create a more sustainable product development². Keitsch further explains in her article how Papanek wanted every designer to know what impact the design profession has but also could have.³

But even though the fight against mass-production and mass-consumption started back then, Jonathan Chapman, professor in sustainable design presents a solid point. He explains, in his article “To beat the ‘throwaway’ waste crisis, we must design loveable objects”, that in today’s society it’s still, sort of, acceptable to throw away anything. The products he’s referring to might barley have been used and is far from broken. He follows this up by giving the numbers that we generate 40 tons of waste when we manufacture one ton of electronic products, and we follow this up by discarding 98% of these products within six months after we have purchased them.⁴

⁴ Chapman, J. (March 8, 2016 9.54am). To beat the ‘throwaway’ waste crisis, we must design loveable objects – that last. The conversation.
Chapman argues that one way away from this unsustainable society is to consider the emotional aspect of the relationship between the consumer and their product or service. He describes how the user’s way of throwing away objects is, to a large extent, driven by emotional and experimental factors. We get tired of objects, the objects feels obsolete as soon as a newer one is on the market, and this happens very fast in today’s society. Chapman states that the users now, in comparison to before, basically falls easier out of love with their objects. He then continues with introducing to consider emotions as a natural step in product development. As this could lead to a circular economy where everyone from the consumer, to the producer, to the ecology of our planet, would benefit from.5

This because, as Schifferstein and Zwartkruis-Pelgrim state, in “Consumer-product attachment”, if a person connects to an object on a deeper level, he or she is more likely to take care of the object, repair it when it breaks and even postpone the objects replacement for as long as possible6.

Following this up, with Chapman’s arguments, it boils down to consumers not being happy when they have more. So to be able to repair their products would actually give them more satisfaction. This then leads to brand loyalty in the products that they have which then leads to less garbage.7

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5 Chapman, J. (March 8, 2016 9.54am). To beat the ‘throwaway’ waste crisis, we must design loveable objects – that last. The conversation.
7 Chapman, J. (March 8, 2016 9.54am). To beat the ‘throwaway’ waste crisis, we must design loveable objects – that last. The conversation.
Reading and questioning

Taking all of these points in from the reading and after that just jump into designing is impossible. It is a necessity to look into which and what factors that trigger this kind of emotions. Niinimäki and Koskinen bring up a few in their article “I Love this Dress, It Makes Me Feel Beautiful!”.

After reading their text, a computer-based questionnaire was set up and sent out to as many participants as possible within the age of 18-40. The questionnaire was organized in order to receive more factors and/or evidence that supported the journal reading. The research question of the questionnaire became: By questioning peoples, within the age group of 18-40, relationship to their favorite product today, could you determine some points to consider when starting a design process where the end result should be sustainable?
Questionnaire

The questionnaire started off with the participants having to answer some basic questions about themselves. Then they were asked to explain a little bit about a product that they held close to their heart.

Of the 39 answers, it came close to 50/50 men and female in gender, with a majority between the age of 18-30. The occupation that the answerers had differed a lot, but did not seem to affect the given answers in any way. Following these basic questions, the participants were asked to think of a product that they held close to their heart and then answer some question with that certain product in mind. From these questions, the goal was to increase trust in the statements that have been read in the journals.
Most participants chose to describe a product which was in their possession, and the few people that didn’t (6 answers) had either lost their product, due to inability to fix it when it broke, or the product was something that they hoped to receive one day, then as a generation gift.

76% of the answers said they would fix their product if it broke and here you could easily see a connection to not wanting to fix it, and electronic products (mostly smartphones). 62% would pass their product on as a generation gift and also here the “electronic factor” came in. The participants assumed, in some way, that their product, if electronic, would brake before being able to pass it on. Some participant even described how it would feel useless to think of it as some sort of generation gift. This, as the participants described it, the electronic industry, in many ways, has a very fast development, that would make their products outdated. If you then compare the previous number, to the 48% that choose to describe a product which reminded them of someone special, where a majority had received their object as a generation gift. You can in rough numbers say that 50% has gotten their product as a generation gift, and 40% would not like to pass on their product.

As the answers show, it’s a clear connection between electronic products and these numbers. But what is done wrong? Is it the electronics that gets outdated, is it the inability to fix them, are they so cheap that we rather buy a new one? And is this changeable? Following these questions with the participants summarizing a short story about their product gave some answers to those questions. They would rather hold onto their electronic products, fix them and pass them on if the product, in some way, amplified their personality and was adaptable into their desires.

So by questioning peoples, within the age group of 18-40, relationship to their favourite product today, could you determine some points to consider when starting a design process where the end result should be sustainable? Yes, you can, and from this study came two points. The product should have the ability to be fixed, and if having the ability to be personalized, it’s more likely that the user would hold on to the product.

More points might have come out from this questionnaire if performed on a larger scale, with more participants.
Factors to consider when designing for emotional sustainability

- The product have the ability to be repaired.

As Niinimäki and Koskinen states and as the questionnaire also showed, if a product can’t be repaired the user feels it being unnecessary to create a deeper bond towards it. You don’t want to have your heart broken. Therefore you avoid creating this deeper bond towards products that are unable to be repaired. Also for it to become passed on through generations, the user feels this point is critical since they don’t want to pass on something that is broken.9, 10

- The product is one of a kind.

Moving towards a more individualistic society Koren, Shpitalni, Gu and Hu suggest in "Product Design for Mass-individualization" more open platform products since the user craves the feeling of "no one else got exactly this product". With open platform products, the user would be given the option to personalize the product and/or adapt it to their desire. This, as the authors, describes and the test shows would create a deeper bond between the user and their product.11, 12

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10 Computer-based questionnaire shown on page 14-15.
12 Computer-based questionnaire shown on page 14-15.
• The product expresses quality.

Niinimäki and Koskinen describe how important it is that the product is durable and throughout all time expresses quality so that the user feels satisfied when using and/or seeing the product. This might be achieved by using materials that age with grace; it does not have to stay the same but aged plastic has a very different sense than for example aged wood. The right kind of material choice might also give the user that feeling of the perfect fit through the realization, like a worn-in shoe.¹³

• The product is reliable.

The ability to rely on the functionality of a product is a necessity when designing for emotional sustainability argues Niinimäki and Koskinen. If a product shows being incapable of doing the tasks for which it’s aimed to do, the user will most certainly consider it’s replacement. A product should, therefore, fit to the users need and do the tasks for which it’s aimed for.¹⁴ This also is a factor considering inclusive design. The ability, for everyone, to trust the product and it’s functions. As a second point under this factor of reliability might also be the product’s way of adapting to change. Maybe the users need changes, and then as Kasardaa, Terpenny, Inmana, Precodad, Jeleskoe, Sahinc, and Park argue in their text “Design for adaptability”, it becomes useful that the product is adaptable with the user in this change. If a product works with you, in moments of change, instead of against you, it’s more likely to be kept.¹⁵

¹⁴ Ibid.
• The product expresses that someone has made an effort.

The design, style, and beauty of a product are important when designing for emotional sustainability. If a product takes a "long time" to make, it symbolizes effort and love. Niinimäki and Koskinen give this as a factor for why we buy and hold onto products which are hand or tailor-made. They also put it into the context of the design process, where you as a consumer can see where someone has made an effort. These designers take their time into creating a subtle design which conveys its purpose or message, this in contrast to the sort of loud visual messages that otherwise might be seen.\(^{16}\)

• The product is connected to memories.

Niinimäki and Koskinen describe this as one of the strongest factor but also as the one which might be the hardest to achieve when designing: To design for someone's memories. You can work hard in the design process, to put something out there which is good enough to hold on to or even be passed on through generations, by understanding the rest of the factors.\(^{17}\)


\(^{17}\) Ibid.
"Humans, naturally, are drawn to materials."

The task of finding the correct material was the first step away from the computer. As a design student living in Sundsvall, Sweden knowing and having an awareness of the importance of the wood and paper industry has always been a necessity. The second, an industry which by many is considered to be walking towards its death as Alterman describes in “The death and life of the American newspaper” how “web reading” takes over and the amount of newspaper published declines. But as Michael B. Hardt says: “It’s a lot of things that are dead, but death is not the end, it’s just a transition between lives.” This transition for the paper industry might start by challenging the material through research and after implement this material, based on paper, through design.

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19 Written down and consented quote from time of tournal, February 2017.
Falling in love with a material, is it possible?
To open up a possibility of even having a chance to fall in love with a material you first have to step away from pictures. You need to see it, feel it, smell it and hear it.

The possibility to meet new and exciting materials presented itself when being introduced to researcher, Ran Duan at Miun University through Biobusiness Arena. He showed the materials he was working on, and there it was. The material that created emotions. The material that had the beauty of an old person skin gave emotions, emotions like love, at first sight, touch, and sound. The researcher described the material as part of a group called plasticized cellulosic composite which is being developed for packaging applications. The process that the paper is put through makes it more formable and stronger than other paper. In the end, the research hopes to replace long life fossil-based plastics.

To put this paper into words, would become something like: It, after treatment, is very stiff and could be described having sort of the same feeling as rice paper but with higher breakage point.

Only a few minor tests had been performed, by the researchers, using the material where focus was laid on trying to flatten it after treatment. This since the process of treatment gives it a very irregular structure/surface. The tools that had been used was heat and pressure, from rolling/flatting. Since there was a lack of knowledge regarding this paper, it felt important that a study was performed using the guidelines of heat and pressure from the researcher. The study aimed to answer the question: What technique, when choosing between heat or pressure, better shape the material, before and after treatment, into a preferred shape? And as a second question which came up alongside the test of the first research question was: How does the use of water in both processes make the material behave?

Description written down and consented with researcher Ran Duan, April 2017.
Result of study on paper

The study, presented as Appendix B, shows how both heat and pressure enables some shaping of the material. If the shape is very complex the choice to prefer is pressure, since the heating process has more of a tendency of going back towards its original state and shape. If the preferred shape is simple, like a cylinder, the choice of heat is preferred. This since its hard to make a mold, that receives uniformed pressure all around, for this shape to be used in the hydraulic press. One thing to think about is also: what kind of structure do I want my paper to have in the end? The hydraulic press flattens the paper to a very great extent while the heat, if wetted before, gives it that irregular structure.

The usage of water gave completely different results than the one without. The water made it possible to shape in the hydraulic press without receiving cracks in the paper. Using water when heating the material gave the paper that irregular structure back when being dried. In both tests, it also gave the shape a more of a stable feeling after being dried.

The result of this study was used when creating the final design.

Read Appendix B for a more thorough description of the study.
"Light is the first element of design; without it there is no color, form, or texture."

Thomas E. Farin, educator, lighting consultant and entrepreneur.
The choice of light

Choosing to work with light in combination with the paper came from seeing how the light amplified its structure while photographing it. To combine these two might create awareness for the paper industry as is, but also show people the paper’s abilities to change.

A study called "Incandescent affect" done by Jing Xua and Labroob, shows that light has a way of working as a tool for enhancing peoples emotions. Their study shows how the participants think spicy food is spicier, positive words are more positive and negative words are more negative when exposed to bright light. The researchers argue that people who are put under bright light might approach everyday problems with their hot emotional system triggered.

The task with the project after this became to look for a way to design a lamp which can create an emotional relation between the user and the product.

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As the master thesis requires a collaboration company, a search began trying to find a local (Sundsvall or Västernorrland) based company. This felt important as the work aimed towards creating awareness for a material being developed here.

A lighting company called K-FAB Scandinavia is, just as the material, based in Sundsvall. They are a company which for many years have produced and imported parts for other designs but has in the later years also started up their own design line. Their three value words are awareness, simplicity, and comfort\textsuperscript{22}. When discussing the idea of the project, these three words was the thing that made it interesting, creative and successful. K-FAB, just as the project, does not just want to create light in people’s homes they also want to create feelings in people’s heart.

\textsuperscript{22} Value words collected from company webpage http://kfab.eu/K-FAB. April 2017.
Figure 1 & 2: Stockholm Furniture and Light Fair 2017 (source: www.stockholmfurniturelightfair.se)
A trip was organized since it felt important to see some of the products that K-FAB Scandinavia works with and it just so happened that they held their customer meeting a stone throw away from Stockholm furniture and light fair 2017. The visit to the fair became a visit of walking around, questioning, smiling until the cheeks couldn’t take it anymore. Observing, watching the techniques, ideas, and projects that other designers have been working with, as displayed in the figures 1 to 3, all designs is with light, but none of them have done the same way as the next one. It came to be so much more than just seeking inspiration; it came to be a search for emotions. What happens when we look at something? What draws our attention? So, in the end, a huge part of this project became to let yourself get lost in this emotional voyage that we call The Design Process.

Figure 3: Stockholm Furniture and Light Fair 2017 (source: own photo at fair)

The fair

A trip was organized since it felt important to see some of the products that K-FAB Scandinavia works with and it just so happened that they held their customer meeting a stone throw away from Stockholm furniture and light fair 2017. The visit to the fair became a visit of walking around, questioning, smiling until the cheeks couldn’t take it anymore. Observing, watching the techniques, ideas, and projects that other designers have been working with, as displayed in the figures 1 to 3, all designs is with light, but none of them have done the same way as the next one. It came to be so much more than just seeking inspiration; it came to be a search for emotions. What happens when we look at something? What draws our attention? So, in the end, a huge part of this project became to let yourself get lost in this emotional voyage that we call The Design Process.
THE WORKSHOP

As explained before the goal with the project was, to look for a way to design a lamp which can create an emotional relation between the user and the product. Since this field of emotional sustainability still is young, not a lot of research have been done regarding the subject. So to get inspiration from and knowledge about people's emotions and the shapes in connection to them, a workshop was organized.

The dream, with the workshop, was to put the participants in a state where they felt one or more emotion and then created a shape that represented that feeling or emotion. The importance here was to make them actually feel an emotion and not just work from a word that was called out or written.

To be able to do this workshop, a smaller research was performed, this on how to put people into different emotional states. The earlier research had shown that light enhances people's emotions but is there something that could make them shift between emotions and do so quite efficiently? The research lead to Mohana's article "Music & How It Impacts Your Brain" where she argues that when people listen to music, the music, in fact, has the ability to stir up feelings and bring up images for the listener. These might not even, necessarily, be in direct reflection to their memory.23

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The tools

For the workshop, the participant should be placed at a table each, and the table should be equipped with:

1. Cardboard box (photo booth)
2. Lightbulb (amplify their shape inside the booth.)
3. White clay with tools (for shapes.)
4. A3 paper (for shapes.)
5. Emotional wheel by Dr. Gloria Willcox (source: Feelings: Converting Negatives to Positives, Morris Publishing (2001))

Further, the one leading the workshop should have a list of songs with emotional variety and a speaker to play the songs through. The choice of songs used in this workshop was based on emotional variety. These songs were then put inside a playlist, using Spotify, where each song hopefully would create some emotional reaction for the participants. The leader should be aware that not one of the participants might react the same, this since every person reacts differently towards different songs due to different factors such as taste.

The choice of giving the participants just two materials to work with came from not wanting to complicate the situation with an endless supply of materials and only give them options enough to actually create something.

Figure 4: Music list, created on Spotify, used for the workshop. (source: https://open.spotify.com/user/lisejohansson/playlist/5mOc6C5oNNAMR66EcjKDC)

Figure 4: Emotional wheel by Dr. Gloria Willcox, to be used as guide for what they are feeling, for the participants (source: Feelings: Converting Negatives to Positives, Morris Publishing (2001)).
The participants

The persons participating in the workshop were chosen in order to hopefully get as much of a difference in emotional reaction between them as possible.

The participants where:
1. Male, 35, from Iran
2. Female, 24, from Moldova
3. Female, 34, from Iran
4. Male, 27, from Norway
5. Female, 33, from Sweden
6. Female, 24, from Sweden
7. Male, 44, from Sweden
   - Burnt-out syndrome, anti depressive
8. Female, 50, from Britain
   - Multiple sclerosis
9. Male, 73, from Sweden
   - Blind in both eyes.

The participants had differences when looking into native countries, and some persons were also chosen because of their difference in physical and mental abilities, like the one suffering from burnt-out syndrome and currently taking anti-depressive pills. This person was selected to hopefully see some difference in what he was making in comparison to the other ones. Similar to the symptoms of him, being burnt out, one participant had MS which can express itself in emotional depression\(^2\). The one participant who was blind were chosen to see if physical differences in ability might change how he worked with his emotions.

The steps

The participants should listen to the song being played for them, by the workshop leader, and while doing this they let themselves move into the emotional state that the song put them in.

When finding their emotion they start to shape based on this emotion using the clay and/or the paper; this can be anything from symbolic shapes to abstract, it all depends on the participant and how they want to express what they are feeling.

When they are done with their shape they place it in the photo booth, this being black gives contrast to the white clay and/or paper. After they use the lightbulb to further amplify the shape. At this stage, a photo is taken, capturing the shape and emotion, by the leader who also opens up for the participant’s stories in connection to their creation. This step is important because the feeling towards the same song might differ a lot between the participants, as Mohana stated in her article\(^2\). The stories might also contain more information that works as observation material in the result.

These steps are repeated while listening to a variety of song to require as many different emotions and shapes out of the participants.

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The workshop result

The workshop resulted in around 130 different shapes, based on the nine participants' emotions. These 130 different shapes showed that shapes and emotions in connection to them is very personal. You can not create a shape and expect that everyone will feel the same way towards it.

Through listening to the participant’s explanations, after each song, they seemed to have been experiencing a wide variety of emotions throughout the workshop. Even though Mohana’s description of people possibly reacting differently emotionally towards the same song, you could clearly see a similarity in some shapes created by different participants after the same song. This might come from, as Mohana also writes, the musician being very talented in composing the song but might also come from it being connected to a certain era of time or genre.27

The differences in the participants' mental and physical abilities did not show itself to much in what they were creating; it showed more in the fact that the three participants, with a different ability, had a hard time finding the shape they wanted to make during some songs. They also explained their creations with a lot more words than the other participants. This might come from them having a hard time understanding what they were feeling themselves and therefore felt the need to explain it even more.

The shapes being displayed were both abstract and symbolic, but one thing that you could see in all of them was simplicity. The simplicity might come from the pressure of time since they had a certain amount of it per song, to complete their shape or that they had a choice of just two materials. But might also have some root in that the participants wanted to show what they felt as clear as possible and do so using simplicity in the shapes.

Following images are examples of the results of objects and emotions appearing throughout the workshop. The fact that the participants emotional reaction to shapes is very personal and differs a lot came to used as a part of the end result.

Workshop observation

Although the result of 130 different shapes was more than expected, an observation was made throughout the workshop and laid within the stories that some participants told to describe their shape. These stories, though the shapes differed, all included one thing, and that was people. People, whether it was themselves or a person in connection with them. This observation, therefore, gave one thing and that is the fact that people, to a great extent, are, and probably always will be connecting their emotions to their relationship towards other people. So why not use this? Why not create a lamp that behaves, in some way, like a person to person relationship?
IDEATION

The human way

How does a, person to person, relationship behave? How does it work, how does it end and how does it start? A thought occurred when thinking about these questions. It was a thought of how that in a relationship between two people we might start off by showing a little piece of yourself but the closer we get to each other the more we show. This until we decide to be apart then we show each other less again. Put into terms of light, the closer we are the more we shine and when further apart the less we shine. A lamp which feels how close the user are and shine according to this distance. It shines more the closer you get and less the further away.

This would also be a way of creating a sustainable source of light. Since when not being used or activated through closeness it shines less and therefore uses less energy.

When researching if there is something like this on the market nothing came up. There are lamps which turns on by motion detectors, or that starts by the sun going down but none that measure the distance between the source of light and an object, like a person, and after uses this information to shine more or less. It needed to be built from scratch and to understand how to do this a contact with a computer engineer was set up.
The electronics

A choice of starting to build, program and test the electronics before going into the sketching process was made because of having to see how much space each component would need. It began with researching how a dimmer works. Easily explained the way it works today is that it shuts on and off many times per second. The time where it is on in relation to the time, of it being off gives you the visual of it shining less vs. more. The light source does this many times per second, so it doesn’t look like it’s blinking.28

The second was to find out how to be able to connect a source of light and a tool that measures the distance between objects. Through discussions with the computer engineer the choice of using a Raspberry pi, which basically is a small computer, would create this opportunity. When deciding this, a search began to find a light source and a tool for measurement that would work together with the Raspberry pi and could be programmed.

The importance when finding an instrument for measurement of distances laid in it being something that generates data. This data should then be read and after transformed into signals for the light. The usage of an Ultrasonic Sensor would enable this. It uses signals on a specific frequency which it sends out; the sound then bounces off an object. The sensor picks up the echo and measure the time it took for the sound to travel and transforms this time into a distance.29

The light source would have to be diodes since other light sources have electronics inside that could break when trying to dimmer it in this way. After discussions with persons with knowledge in the field, a first test was performed using three 3W power-LEDs. These diodes would have to be powered by a secondary energy source since the Raspberry pi only gives away 5V, and they needed more. Because of this, they had to be switched on and off using a relay module. Unfortunately, this test failed because the relay module, being mechanical, could not do the switch fast enough.

A choice became to use ten smaller diodes as they could be powered with the Raspberry pi and therefore weren’t in need of a relay module. This gave a more positive result considering they, after being connected to resistors and programmed, did everything needed. Shining less when the Ultrasonic Sensor measured an object far away and more when sensing a closer object.

28 Information retrieved from http://home.howstuffworks.com/dimmer-switch2.htm 27 April 2017. Written by Harris, T.

29 Information retrieved from http://education.rec.ri.cmu.edu/content/electronics/boe/ultrasonic_sensor/1.html 27 April 2017
The main inspiration for the lamp, of course, came from people and their emotions. As described before the technology were completely inspired by a human to human interaction. This as well as the way we humans feel different kind of emotions which all could be put into a shape made it important to create something that could be discovered in many ways.

The inspiration of course also came from the new and improved paper based material that through research had been developed and now was going to be used inside the lamp. Since the fact of this material being developed in a laboratory environment inspiration also came from this. The memory paper, as most paper, comes from wood which also came to be a big part of the end product.

Figure 4: Picture of laboratory equipment
(http://takeovertime.co/post/41093206142, 27 April 2017)
Figure 5: Picture of person in mountain crack
(http://borzui.tumblr.com/, 27 April 2017)
Starting of sketching it’s easy to move into a pattern of what you have seen before. Therefore to create something different it was a necessity to work systematic through the sketching process as well.

A decision was made to sketch using the categories of wall, floor, ceiling and table. These gave a certain variety to the sketches which could then be looked over and put into context of the different parts that were going to be applied to the lamp, such as the Ultrasonic Sensor, the source of light, the Raspberry Pi and the memory paper.
Looking through the first sketches, trying to apply the parts inside an idea came up. Is it important or even necessary to have the source of light and the paper in “direct” contact with each other (just as a lamp and a lampshade)? Or might it be possible to place them another way maybe in completely different places?

When thinking about this, it gave some new ideas where the paper would act as some sort of reflective surface for the light as it is being projected onto it. This idea gives more options where to place the Ultrasonic Sensor which in many of the first sketches would be, more or less, poorly placed either for the aesthetics or it’s own functionality.

The choice of the final design came from many factors being considered. A floor lamp because of the ability to bring people close to it, not being stopped by a table it’s sitting on or hanging above. The shape of the stand, with inspiration from the tools used in research, would enable to work in the essential electronics in a subtle way. The whole shape would give the user a way of transforming the lamp to what they feel is necessary for the situation or emotion they are in.

Sketches second phase
BUILDING THE MODEL

The process of building the model started off by assembling the electronics in the most space efficient way possible. This to understand the amount of space necessary for the different objects. The final programming was performed so that when in interaction with the user it would act the desired way, see Appendix C for Phyton code.

Moving over to the exterior of the lamp the choice was made to use wood and combine it with metal pipes. The usage of wood, first of all, came from it being a play with the paper and how it comes from wood. Because of this, the choice became to use pinewood which, to a large extent, is being used in the paper industry in Sweden. Also, pinewood, when worked with in the correct way, expresses quality and sustainability. The metal pipes would give it a stable structure and also enable changeability when sliding the different parts.

Information consented with researcher Ran Duan, April 2017.

*Figure 6: Circuit diagram of the electronics.*
The final product, called U&I, is a diverse interactive lamp which by using the factors of emotional design becomes a product for a long-term relation between the user and the product. It uses its new sustainable technology to connect with the user, and its many changeable parts builds a bridge for further User Interaction. The closer the user gets and the more they interact, the more the product will show.

U&I consists of 15 different parts put into three categories, all there for one specific reason or purpose all coming back to the six factors of emotional sustainability displayed on page 16-18.
The heart

In the heart lies the Ultrasonic sensor which is looking out the back to detect objects approaching. The diodes are placed in opposite direction, this to project the light onto the memory paper which then bounces off the white surface giving a soft light to the room. As described before, this combination of the sensor and the light source makes the light shine less if nothing is closer than two meters and gives away the strongest light if something comes as close as half a meter. The purpose of this is to engage interaction between the user and the product and from the very start create something to remember, a memory. From the heart goes a pipe both back and forth. The front is equipped with a gadget that makes it possible for the paper to be attached in different ways to the lamp. In the back, you can find a handle which creates symmetry to the lamp and also enables movement of this metal pipe.

The heart has moveable parts which give the user a possibility of adapting it to their desire. The light, as well as the metal pipe, can be directed in different directions around the stable center. The metal pipe can also move the paper closer and further away from the source of light. To see photos of this change turn to page 64.
The memory paper

The gadget that holds the paper consist of two wooden parts connecting to each other using magnets. This device gives the user the possibility to create their preferred shape of the paper, which in comparison to other materials will keep its shape due to its specific qualities. This option, to give the possibility of creating, to the user came from the workshop result of a 130 different shapes, displayed on pages 38-39, as well as the factors of emotional sustainability, displayed on pages 16-18. The result of the workshop showed that every emotion gave a different shape and so instead of trying to create something that should fit every occasion and feeling this gives the user a way of creating something unique that fits to their emotions and needs. As Appendix B also showed they might use heat or pressure to shape their personal light reflector.
The foot

When taking a closer look at the base, the user will experience some of the factors. The stable and reliable base made entirely from end grain expresses that someone has made an effort. The annual growth rings of every piece are carefully placed in a different direction to amplify the characteristic of each wooden piece. This also gives the user a sense of a one of a kind product since, if produced in a larger quantity they will all look different from each other. Underneath the base, the user can find three small feet made of the same metal pipe as the rest of the product and also the small computer hidden, who’s cords move up inside the metal pipe. The small computer also works as a function to develop the relationship even further. This since if the user finds it interesting, he or she might go as far as to program the lamp to do other preferred tasks.
U&I
- The interactive lamp for a long-term relationship
Special thanks

K-FAB Scandinavia, Researcher Ran Duan, Computer Engineer Morten Bugge, Design coach Michael B. Hardt, Semra Sahin, Biobusiness Arena and all of my classmates.

Thanks to every one of you, taking your time and trusting in this project, I have been able to design my own product, which together with the ring will have an impact and change my life forever.
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