
Dealing with menstrual pain and difficulties

*holistic experiences using
a heating wearable device
for management of menstrual pain*

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The main purpose of this thesis is to develop an understanding of women’s experiences during menstruation. The research questions are: how to improve the experience of using a wearable device that heats the abdomen and the back to relieve menstrual pain; what should be considered when designing such a product for relieving menstrual period pain.

This thesis is based on the ‘Hottie’ project, which involved conceptually designing a skirt for menstrual pain. The skirt has two heating pads – one for the abdomen and one for the back – which can be heated up to 42 °C. A working prototype was produced for the ‘Wearable Electronics and Fashion’ summer course in 2015, so the main purpose of the research in this thesis is focused on how to make a skirt that can be worn more consistently, on a regular basis in real life.

The thesis includes a study of the literature on menstrual period pain and interviews with women about their perceptions of menstrual periods in order to build a general understanding about what women experience during their periods. It continues with a brief study of wearable devices and period-related products, followed by a multi-staged study of active user involvement. The latter began with user testing of the current prototype. A co-creation workshop and a cultural probe on periods were then carried out. From the research, the ‘Blood pal’ concept and an app related to periods was introduced. User testing of these was then conducted using the inVision prototype. During the research process, a total of seven participants were involved in the qualitative research, and two participated in all the research phases of the process.

As a result, the Hottie app, which controls the Hottie wearable device and functions as a holistic support for women during menstrual periods, was implemented at the prototype level. Hottie predicts the start of the menstruation cycle by measuring body temperature with an everyday sensor located in a Bluetooth earphone or a wearable device, such as Fitbit. The app includes the ‘Blood pal’ function, so women can get support from each other, e.g. sharing tampons and information about the nearest toilets, and finding deals on period-related products – from hygiene products to chocolates. It The ultimate aim to make menstruation a better experience.

Valuable insights were gained throughout the research, and Six Guidelines for designing related to menstrual periods.

Keywords Wearable device, Service design, User experience, Co-creation, Design probe, Design for women

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Terminology

- Dysmenorrhea: Usually called menstrual cramps, pain during menstruation. It usually occurs around the time when menstruation begins. The pain is usually in the pelvic or lower abdominal areas. Sometimes it causes nausea, vomiting, loss of appetite, headaches or diarrhea (Harel 2006).
- Period pain/ menstrual pain: In this paper, the terms “period pain” and “menstrual pain” are used to refer to abdominal and back pain which occur during the period.
- Period/ menstruation: Menstruation, or period, is normal vaginal bleeding that occurs as part (Bethesda 2005) of a woman’s monthly cycle.
- Women, woman: General term ‘women’ or ‘woman’ used in this thesis when referring to someone who (will) experience or had experienced menstruation. However, this paper acknowledges that not all people who have a menstruation cycle identify as women, and not all people who identify as women have a menstruation cycle (Epstein et al. 2017).
- ‘Hottie’ skirt: the skirt with two flexible heating pads that relieve the menstrual pain.

1. Introduction

1.1. Background of the project

1.2. Research questions

1.3. Approach

1.1. Background of the project

This thesis started from the 'Hottie' project that was done during the 'Wearable Electronics and Fashion' summer course in 2015. Hottie is a conceptual design of a skirt for menstrual pain (*Figure 1*). The skirt has two heating pads for the abdomen and back, which can be heated up to 42C. Thin flexible batteries work as a power source and the skirt uses Lilypad as a processor (*Figure 2*). People can control the temperature by rubbing embroideries which are placed on the front part of the skirt (*Figure 3*). The embroideries are made with conductive yarn on the control part. The temperature rises when the wearer rubs the embroideries upward, and lowers when downward. This interactive skirt prototype was presented during an exhibition (<https://www.bozar.be/en/activities/105294-summer-bar-6>) in Bozar, Belgium. Many women who visited the exhibition gave positive feedback about the skirt and asked where they could purchase it. As the Hottie project was focused on implementing the interactive skirt itself, it was a quite conceptual approach so a user research supportive of the project was not conducted. The project was focused on the interactive prototyping (Koskinen 2014) and implementing insights to the working prototype. Since then, I decided to develop the project further; how to make a skirt that can be worn consistently in real life?



Figure 1. 'Hottie' skirt

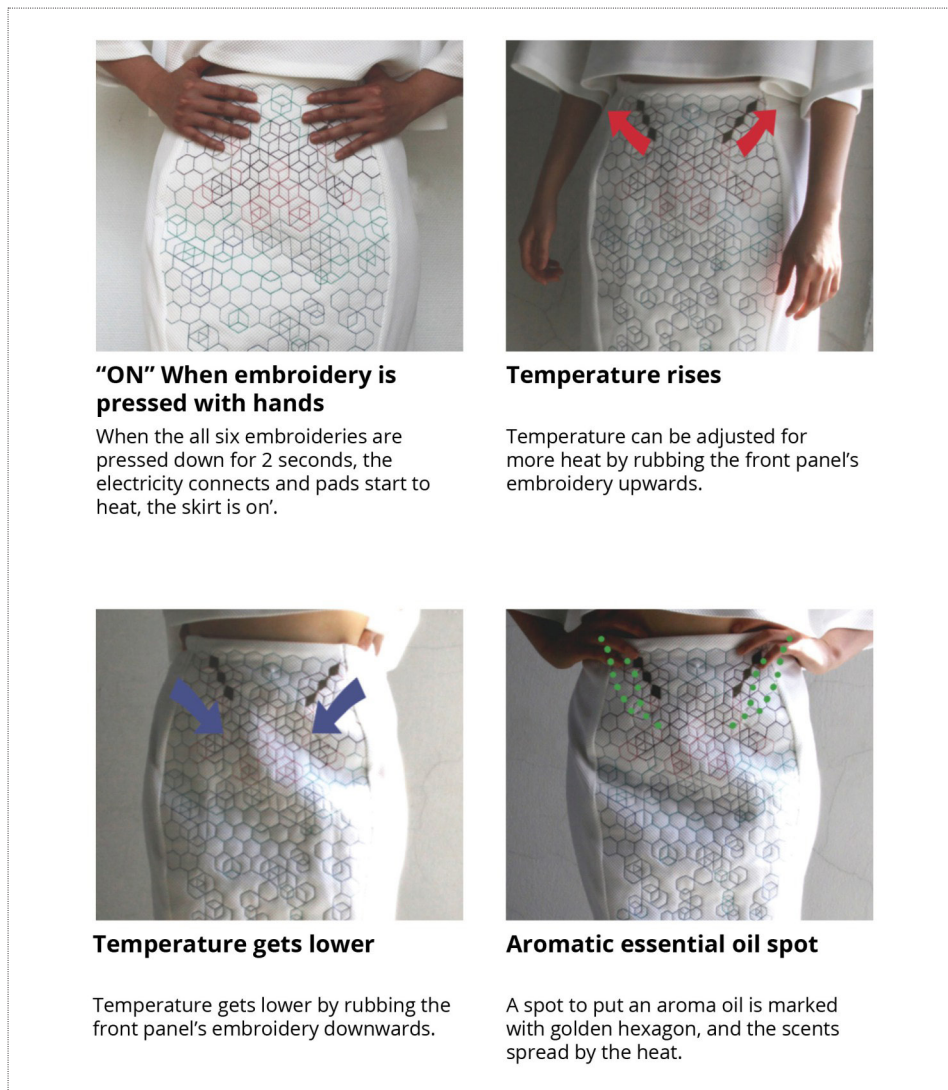


Figure 2. How to control the temperature of ‘Hottie’ skirt

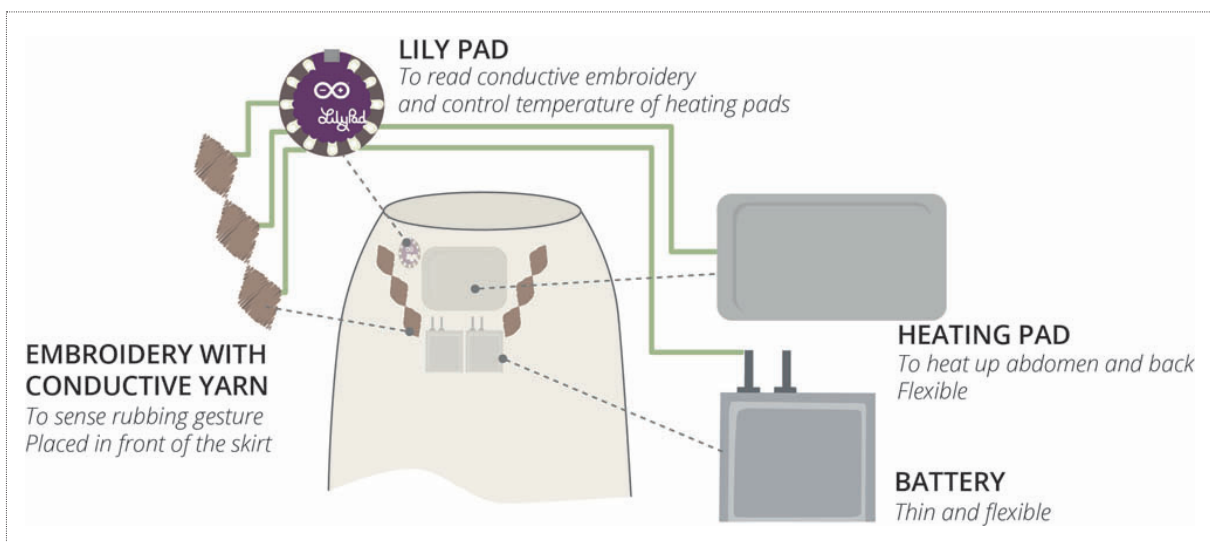


Figure 3. Structure of ‘Hottie’ skirt

1.2. Research questions

Since the wearable device 'Hottie' already exists, the main focus of the thesis is not about making the wearable device from the beginning but improving the already existing device. The goal of this thesis project is to improve Hottie so that it can be consistently used in daily life.

The main research questions are:

- **How can we give a better experience to people while using a wearable device that heats the abdomen and back to relieve the menstrual pain?**
- **What should be considered while designing for relieving the period pain?**

1.3. Approach

Background research has been conducted to understand current research related to menstruation and menstruation pain with a literature review. In addition, literature on design for emotion and cultural probes were studied for research references in each stage. For testing the prototype, a user test was conducted since the prototype was ready and it could be tested immediately to get feedback and suggestions on improvement points (Cohn & Ford 2003) on the ‘Hottie’ skirt.

A co-creation workshop was conducted to understand the problems when women are on periods and they co-created the solution for their pain points. Besides the co-creation workshop, Cultural probes had been distributed to the participants to understand their experiences and wishes of having a period (Mattelmäki et al. 2016). By using cultural probes, more honest feelings from the participants were expected since people express personal contexts and perceptions (Mattelmäki 2006). From the workshop and cultural probe, a design direction was decided and an app idea was introduced. User testing with the app was conducted to figure out if it was working and if anything was missing during the process. (Figure 4) Finally, six guidelines about designing for menstruation period were set.

This thesis takes a co-design approach, so people were involved in most of the research and designing stages. P1 and P2 were involved throughout whole research; first user test with the current prototype, co-creation workshop, cultural probes and second user test for the app prototype. P3 participated in all stages except for the First user test. (Table 1)

	P1	P2	P3	P4	P5	P6	P7
1st user test	○						
Co-creation workshop	○	○	○				
Cultural probes	○	○	○	○	○	○	
2nd user test with App	○	○	○			○	○

Table 1. Participants participation for each stage

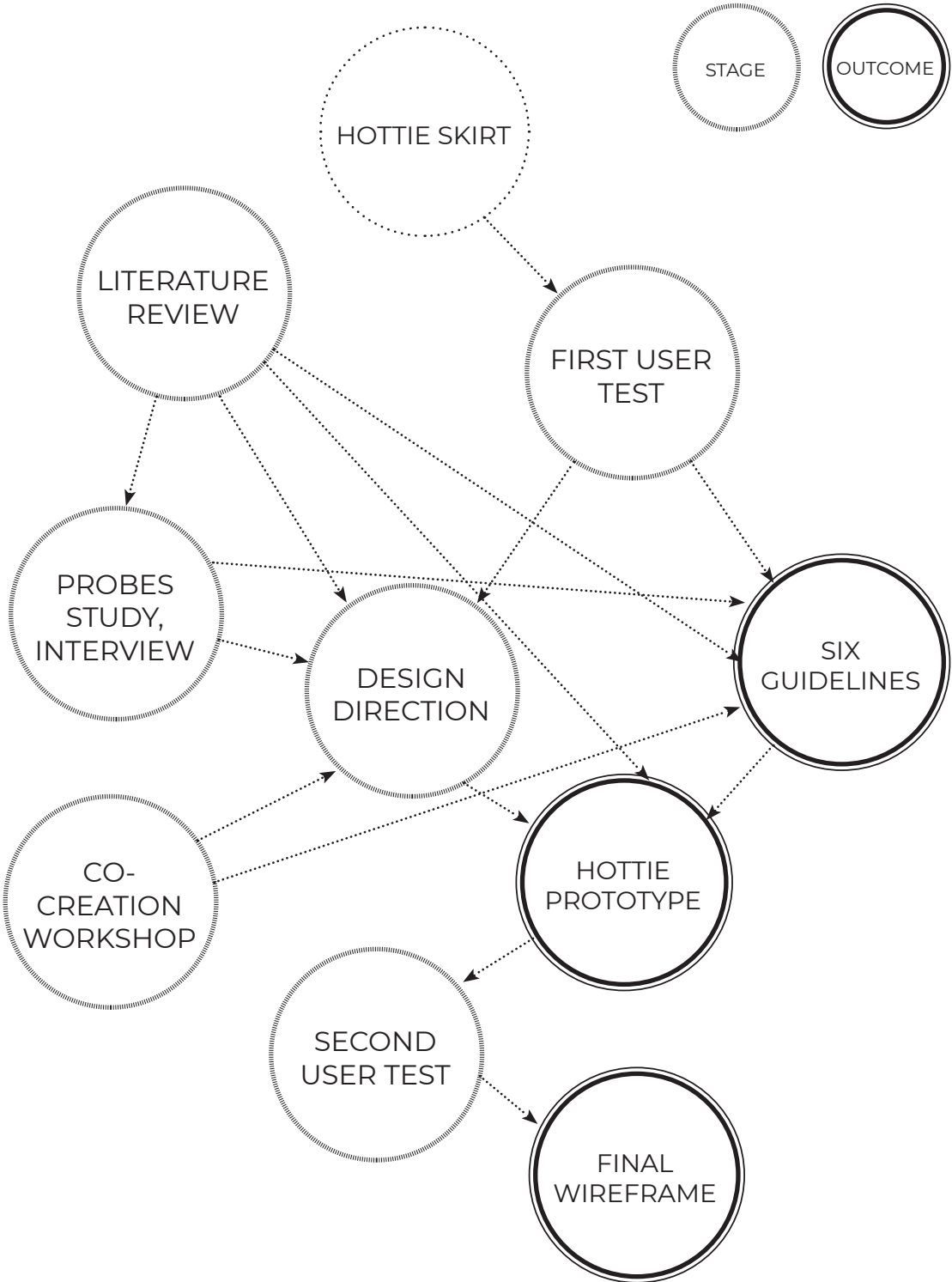


Figure 4. Process of researches and outcomes in this thesis

2. Background research

2.1. A Period and taboo

2.2. Needs of the Hottie skirt during a period

2.3. Wearable devices and a period

2.4. Design for women and a period

2.5. Period related product trend

2.1. A Period and taboo

The womb is one of the organs that exists inside of a female body. It used to be considered mysterious and to cause bad effects to women throughout history. Hippocrates (5th century BC) first used the term hysteria, which implies that the cause of the disease is the movement of uterus- 'hysteron' in latin (Cosmacini 1997). This belief continued until the Victorian age (1837-1901), so most 'ladies' carried a bottle of smelling salts to calm down their wombs from wandering around (Tasca 2012). Consequently, menstruation was perceived as something dirty that should not be mentioned in public for a long time. Ernster (Ernster 1975) researched expressions related to menstruation, and most of them were extremely negative. 'The curse', 'On the rag', 'Weeping womb', 'the red plague' were some of the examples. Lee (Lee 1994) also found that half of Oregon women she interviewed between 18-80, used the word 'curse' to refer to menstruation. The participants thought menstruation as something dirty and disgusting. Costos et al (Costos et al. 2002) conducted a research about why menstruation was perceived as something repulsive and repugnant, and she found that conversations about period happen mostly between mother and daughter, with the information mostly delivered by mother, and often times it is connected with sexuality. Meanwhile, many mothers still consider it as a taboo, so the 'talk' is not happening much in the first place, or merely happening as a roundabout conversation. These factors inhibit the chance of curbing negative perceptions of period being formed.

2.2. Needs of the Hottie skirt during a period

The Hottie project started with simple math. Menstrual pain begins within 6-12 months from menarche, which is the first menstruation in a lifetime (Balbi et al. 2000). If a woman starts to have period from when she is 12 years old and keep having three days of dysmenorrhea every month, then it adds up to 36 days per year. When this woman hits a menopause when she is 50 years old, she will have spent 1368 days of her life menstruating, which is three years and nine months. It occurs in more than half of the population of whole womankind. By Andersch's research (Balbi et al. 2000; Andersch & Milsom 1982), dysmenorrhea occurs in 72% percent of women of the Swedish population who reside in urban areas. It is more severe among adolescents, whereas the majority (98%) of them experience some kind of pain- cramps, nausea, vomiting, loss of appetite, headaches or diarrhea, while they are on periods. This often causes them to skip school or work which leads to absenteeism (Klein & Litt 1982). Noorbakhsh M (Noorbakhsh 2012) argued that many researches prove that between 50 to 90% of the general population have primary dysmenorrhea symptoms.

As Alice J. argued (Dan 1994), treatment for dysmenorrhea is often neglected because the pain usually disappears within 48-72 hours without having any special treatment. Women have often reported about their experiences that could not be analysed by scientific experiments or were not accepted as valid by researchers. However, there are clear changes throughout the menstrual cycles of women and they have influence over their life not only by pain but also by weakened muscle strength and fatigability (Sarwar et al. 1996). They affect the quality of women's life, even causing psychological problems such as loneliness and inactive social activity participation (Amodei et al. 1987).

Dysmenorrhea happens as different symptoms to each person; physical pain, as women suffer from headache, backache, abdomen pain and pain in the breasts(Greene & Dalton 1953), or sometimes it shows as emotional pain, such as emotional instability or depression (Stieglitz & Kimble 1950).

In this thesis, menstrual pain refers mostly to abdomen pain. Other symptoms such as headache or diarrhea will not be covered. In most cases, menstrual cramps happen because of muscle contractions in the uterus, or womb. It can press against nearby blood vessels if the muscle contracts too strongly during a menstrual cycle. This causes the cutting off of the supply of oxygen to the uterus. This constringency causes abdomen pain(Johnson 2017). Since it is a pain caused by muscle shrinkage, Akin et al. (Akin et al. 2001) researched that continuous low-level topical heat therapy is as effective as ibuprofen for the treatment of dysmenorrhea.

2.3. Wearable devices and a period

Staner (Starnier 2001) defined a ‘wearable device’ as something that does not require conscious attentions from users. It is a natural extension of user’s life, ‘similar to riding a bicycle’. It does not need to be held by users, such as wristwatch or shirt. It is still a relatively new field (Thorp 1998). The interest toward wearable devices is growing. Especially the health monitoring area, which deals with patients requiring continuous medical assistance and treatment, is one of wearable device’s biggest growing target areas (Berglin 2013). However, women’s menstruation is often neglected in health monitoring. When Apple introduced their HealthKit in 2014, they excluded menstrual data (Duhaime-Ross 2014). Later they added the feature but this exclusion ignited a discussion about design of personal tracking tools for women (Perez 2015).

Getting period is one of the normal stages of woman’s life. However, the pain often disturbs lives of women, therefore, continuous medical-related assistance and treatment can be helpful. Heating the pain areas can be one of the solutions, as Akin, et al. (Akin et al. 2001) found, given how a continuous lower heat during a period relieved pain as much as taking the ibuprofen.

Hottie skirt is currently using a far-infrared heating pad, in the future it can be replaced with heating yarns. Cork et al.(Cork et al. 2013) researched that textile based heating elements can be knitted into the structure so that the textile itself can work as heating elements.

Wearable devices can provide an intimate form of interaction (Mann 1996), which means that by wearing ‘Hottie’ skirt, users have a prompt heat reaction with their clothing. Moreover, people have worn clothes since they were born (Marculescu et al. 2003). So wearing a garment with a heating function to relieve the period pain can be one of the most approachable solutions for women who are suffering from menstrual pain.

2.4. Design for women and a period

2.4.1. Livia: wearable device to cut the pain off

Livia(<https://mylivia.com/>) is a device that stimulates the nerves and ceases the delivery of pain (cramp) during a period. Two attachable pads for abdomen are connected to a square shaped device, which users can wear with clips. Users can attach pads to their abdomen and adjust the strength of the electrical signal, which cuts off the pain. It is remarkable since it is one of the first wearable devices on the market that is specifically approached to remove the period pain. Reviews of the product are quite positive, most users claim that it reduced the pain. However, there are arguable points since it approached period pain with a medical point of view. Most women prefer the non-pharmacologic methods of over-the-counter medicine since the period status is not illness (Campbell & McGrath 1999). This means that using Livia might look like taking a medical treatment approach, which would come off as an excessive reaction. In addition, there were some concerns about using electrical stimulation, with the pads attached to the body.

2.4.2. Apps to tracking periods

Epstein D et al. (Epstein et al. 2017) did research on women tracking their period with mobile apps. Since menstruation is a periodical event, many women track their period. Majority (47%) of women in this research responded that they use mobile apps to track their period cycle. Women want to be aware of how their body is doing, understand the change of their body by cycle alterations, be prepared, be sometimes pregnant and inform healthcare providers. In this research, he figured out that accurate prediction is important since women want to be well prepared. Tracking the period with other methods, such as recording their moods or other symptoms, was appreciated by users. In addition, it was noted that gendered design, which includes stereotypically feminine attributes such as flower and heart shapes should be avoided in the app design because users sometimes get offended by that.

2.5. Period related product trend

There are existing attempts to meet the needs in the market to make women free during the menstrual cycle. They are approaching the period more freely and are trying to make female customers feel more comfortable while they are having a period. Their endeavor is appreciated by women (Campbell & McGrath 1999).

2.5.1. THINX panties (<https://www.shethinx.com/>)

THINX panties are hygienic panties which can be worn during a period. It has patented technologies for absorbing blood. The underwear is antimicrobial, moisture-wicking, absorbent, and leak-resistant so it can work as a tampon or sanitary pad. They are also popular with their visual identities, which use food images to actively represent periods and vagina. They own a blog which provides information about women and sex-related issues.

THINX panties can be interpreted as empowerment of women, presenting periods with humour instead of making it a serious and secretive matter. They don't represent themselves as an underwear company but work hard on breaking taboos regarding a period.

2.5.2. Mooncup (<https://www.mooncup.co.uk/>)

Mooncup produces medical-grade silicone cups which can be used during a period, and are alternative to pads or tampons. It is safe for the body since it uses medical grade silicon and there is no threat of TSS (Toxic shock syndrome) which can be caused by wearing tampons. It approaches the period with a different point of view, by not staying with current solutions; which are tampons or pads. It makes the period more sustainable and saves money since hygiene items related to period tend to be more expensive because people have to buy them continuously.

3. First user test with a current prototype

3.1. Background

3.2. Structure

3.3. Participants

3.4. Findings

3.5. Conclusion

3.6. Discussion

3.1. Background

The first user test has been conducted with two people (P1, P2) to figure out the improvement point of a current prototype. Since there was a functioning prototype and it was approachable to actual users, it was possible to test it in a real situation. By testing it with the actual users, it was possible to immerse it into the real situation and set myself apart from the design (Koskinen 2014).

3.2. Structure

Participants were asked to wear the ‘Hottie’ skirt for 20 minutes (*Figure 5*) and be interviewed afterward. Questionnaires were mainly about usability and interface of the skirt, heating functions, style and design of the skirt. One of the participants took part in the user test while she (P1) was having menstruation and she was asked to wear it for one more day. The Prototype they used for this first user test was the Hottie skirt, which was described above with a heating pad.

3.3. Participants

Participants were 25 and 31 year old females. Nationalities of participants were Serbian and South Korean. They were all masters students who had resided in Helsinki for three years. They described their period pain as 3-5 and 4. One of them was having a period while she was in the user test. Both of them participated later stage of user involved researches. Both had similar sizes due to the prototype size. (size 36-38)

3.4. Findings

There were several main findings from the first user test. In general, they enjoyed trying the skirt and understood the concept of the skirt. Full text can be checked in the Appendix 1. First of all, they pointed out the practicality of the ‘Hottie’ skirt. They wanted to wear it under the clothes. Even though they liked the style of the skirt, they would prefer to have a freedom to choose clothes during the menstruation. -*“The patterns on the skirt are cute and modern. But it doesn’t go well with my shoes. It is hard to fit to my style.” (P1) “I like it, but it would be better if I can change the clothes during periods.” (P2)* They suggested a tank top or belt type underwear. By having an underwear form, not only it gives the availability to change outfits but it also makes the heat source closer to the body. *“I like wearing tight clothes, that way I feel like everything is on its own spot.”(P1)*



Figure 5. First user test

Secondly, the skirt-controlling app was suggested. Even though they liked the current interaction with the skirt, *“I like it, it is interesting to touch it” (P1)*, they implied that it would be a little bit uncomfortable to rub the skirt in front of people. *“It will be a bit awkward to touch it in front of guys.”(P1)*, The easy and intuitive control of the current physical interface was considered to be positive. It was good to have immediate feedback of the product but they wanted to get more information about the skirt and its use.

In addition to the skirt-controlling app idea, they wanted to see the current status of the ‘Hottie’ skirt. Currently, the skirt has an LED to show the status of the skirt. It blinks when it is on lower temperature, on when it is on high temperature. Participants did not have positive opinion about the LED on the skirt. *“Lighting is bit strange to have it on clothes!” (P2)* They rather wanted to have an app, in which they could check current temperature, recommended temperature, optimized usage and how others were wearing it. *“I would like to know how others use it too” (P1)* *“It would be nice if I can check the status of heating with an app” (P2)*

3.5. Conclusion

From the first user test, I figured out that implementation of the app was needed. Even though it is possible to control the skirt with ‘Rubbing’ interaction, participants wanted to control it in a more detailed fashion, see the current status and get some advice of other people’s usage. (Figure 6)

3.6. Discussion

The number of participants was only two, so there was a chance that some other shortcomings that I could not find during the user test could occur. In addition, the age group was a bit limited since both of them were in a similar age group, which is mid-20s to early-30s.



Figure 6. Insights from first user test

4. Co-creation workshop

4.1. Background

4.2. Structure of the workshop

4.3. Participants

4.4. First part of Co-creation workshop

4.5. Second part of Co-creation workshop

4.6. Findings

4.7. Conclusion

4.8. Discussion

4.1. Background

A co-creation workshop was held to understand the current journey of women when they have periods. Since the control app idea was suggested from the first user test, the focus was on finding what they would want from the control app.

4.2. Structure of the workshop

The workshop consisted of two parts. They started the workshop with introducing themselves to each other and the purpose of the workshop was explained. In the first part, participants were asked to make a current user experience when they are on a period based timeline for 30 minutes. Three participants (P1, P2, P3) used post-its and markers on a big paper to visualize the timeline. They were encouraged to talk about their own ideas and add up to other opinions.

After 10 minutes of break, they made future-desirable- journey in the second part of workshop. The skirt was explained with the working prototype and the app idea was introduced. Participants wrote their ideas about an app on different colored post-its and put them on the first part of the workshop result.

The workshop was recorded with a voice recorder, scripted, and analyzed with ‘Statement card’ methods. A facilitator (Elizabeth 2014) participated at some point when the participants got stuck with creating ideas.

4.3. Participants

Participants were 25, 27 and 31 years old females. Nationalities of participants were Serbian, South Korean and from USA. They were all Masters students, who reside in Helsinki for three years. Most of them experience period pain, and described the severity as 3-5,5,4. Two of them (P1, P2) participated in the first user test.

4.4. First part of Co-creation workshop

Participants immediately started to draw the base of the map as the circle shape because the period is something that repeats all the time. They shared ideas by writing on post-its and putting them on the map (*Figure 7*). They presented their idea without any hassle, so help from the facilitator was not needed.



Figure 7. Co-creation workshop

4.5. Second part of Co-creation workshop

Participants understood the concept easily since two of the participants already knew about the Hottie skirt and tested it by wearing it. The other participant who did not try the skirt also understood the concept easily, too. They added ideas on top of the result from first part of the workshop, figuring out what they need for each stage. They were a bit stuck with generating ideas at one point so the facilitator joined to make the process going. After a while, participants came up with a 'Blood pal' idea and were excited about it, adding ideas to each others. (Figure 8)

4.6. Findings

Statements cards are created based on the co-creation workshop. Statement cards are used in data analysis and show connections between quotes (Elizabeth 2014). Data from the workshop itself does not show what people want, it needs interpretation for their wishes to clarify the purpose (Ackoff 1999). By making statement cards, participants' phrases are categorized and analysed, so that they can be used as a meaningful source. Some of the participants' statements were directly related to the design ideas, others are more related to general status when they are on periods. The full contents of statement cards and participants created timeline contents can be found in the Appendix 2.

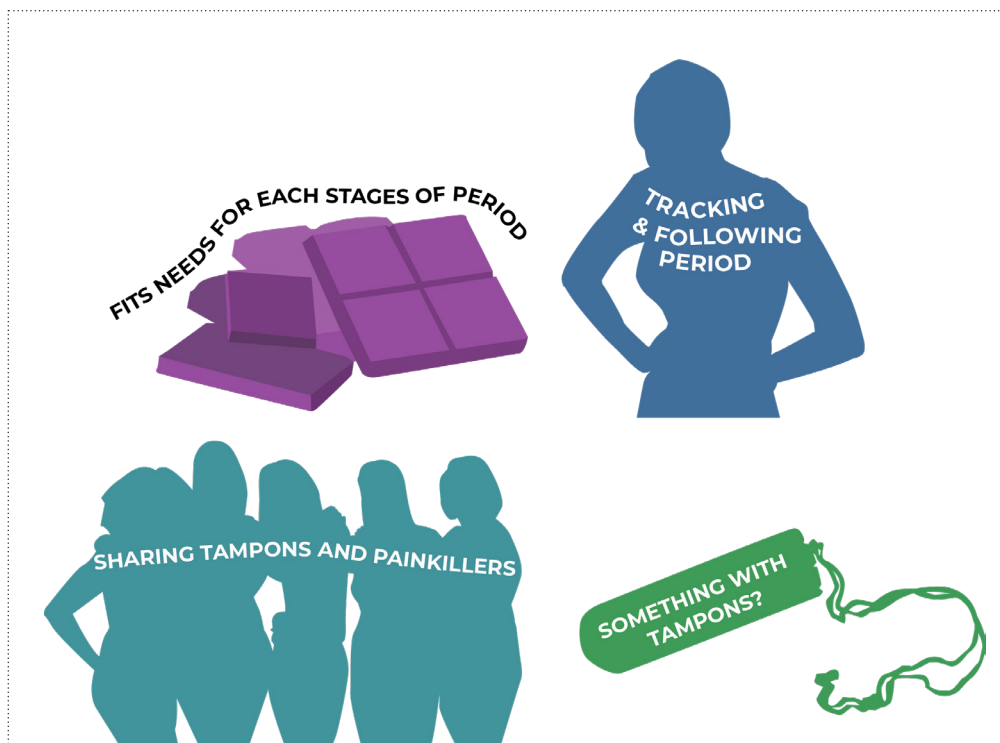


Figure 8. Co-creation workshop Insights

4.6.1. A period as a part of life

First of all, participants wanted to continue daily life while they are on the period. The pain is one of the biggest burden for doing that. It burdens participants when they have to keep normal daily activities. Especially when they have to stay outside of home, it bothers them more since they cannot relax. *“Because at home I can just lie down on the bed and relax but at the office I kind of to be active, and working.”* (P2) However, the period can be a good excuse to escape from the daily restriction. *“But then also I have this feeling of this is excuse. Okay, this is my first day of the period, I will lay on bed a bit longer...and I will eat chocolate, and stuff like that”* (P2)

In addition, the period is not only one part of the month, but also something that happens throughout the whole month since women experience different things even former stage of periods. Participants wanted to have predictions about the period since it does not occur regularly.

Sometimes start of period can be random, which adds mental pain to them. This disturbs them from continuing their daily routine. They often realize the period is approaching by signals from their body – eating more, craving chocolate, tiring, emotional changes. This anticipation makes them anxious. *“..Yeah, cause discharge will stop, and my breast will hurt, and I am like , okay, know. so I think the period has a lot of things to do. like other things. In a way, it is part of periods, too.”* (P3)

However, tracking the period cycle is difficult. They said that sometimes they forget when the last period was and some of them do not know how to calculate the cycle. *“For me, it is kind of like in the morning, I started to feel little bit of pain, and then I realize that it is coming.”* (P2) They wanted to know exactly when the bleeding starts, and to be prepared. They especially must have tampons and painkillers ready.

4.6.2. Hygiene products, painkillers, chocolate and toilet

They mentioned many related things that they are looking for. Before the period, they are mostly looking for chocolate, candies or other snacks. *“I think the sugar craving starts even before it starts.” (P1)* The toilet is another factor that matters when they are on the period. They mentioned that since they change tampons regularly, they sometimes have difficulties finding a toilet, especially when they are outside. There was one user of Mooncup: for her it was more difficult since she needed to empty and was a Mooncup while using it so she needed a sink inside of toilet room.

4.6.3. Tampon, tampon, tampon.

Tampon was one of the biggest concern when it comes to a period. They were afraid to get TSS (Toxic shock syndrome, it often caused by wearing tampon for a long time (Low 2013)) by wearing it for too long. On the other hand, they do not want to change it too often since it is often a financial burden to purchase tampons. *“How much you spent or something, at least for me it is financial burden. I feel like I am spending extra money” (P3)*

Changing the tampon is another annoyance. They complained that sometimes they forgot the last time they changed the tampon. They often calculate the time to change the tampon. *“When I go to the bed, I have to think I change it as late as I can. So it can last forever, until the morning.” (P1)* Sometimes, they were worried about leakage of the tampon.

4.6.4. Different individual rituals and preferences

Participants shared some emotions and symptoms, but there are also different factors among individuals when it comes to how they behave during the periods. For instance, they use different kinds of hygiene products such as tampons, Mooncups or pads. The types of clothes they felt comfortable wearing during the periods were different, one of them preferred tight clothes and the others preferred loose clothes.

4.7. Conclusion

Statements cards are created based on the co-creation workshop. Statement cards are used in data analysis and show connections between quotes (Elizabeth 2014). Data from the workshop itself does not show what people want, it needs interpretation for their wishes to clarify the purpose (Ackoff 1999). By making statement cards, participants' phrases are categorized and analysed, so that they can be used as a meaningful source. Some of the participants' statements were directly related to the design ideas, others are more related to general status when they are on periods. The full contents of statement cards and participants created timeline contents can be found in the Appendix 2.

4.7.1. App ideas

Participants suggested ideas about the app. They were positive towards having an app for controlling Hottie and added additional ideas which can be useful for them related to the period.

Supporting Hotties' usage: Controlling and adjusting temperature through the app was suggested by participants. They also wanted to know if there were any suggestions about the wearable device. In addition, they suggested that an app could provide some health information related to the period.

Tracking and following periods: Participants wanted to have a tracking function with the app. They mentioned that since some of them are already using apps for tracking the period, Hottie app should have most functions related to the period. *"I think it is logical to have an app. first of all, there is already existing app of periods, and I don't want to have two different sources. I want to have an app to remember all these kind of details, because I forget."* (P1) A reminder function related to tracking the period was suggested. Since they want to be prepared for the period, a reminder based on cycle idea was positive in the workshop. *"Because the situation when you screwed, is when you are missing those kind of stuff. like when you are outside and you don't have your painkillers. you don't have tampons, then you are screwed so.."* (P2)

Blood pal: sharing is caring : They came up with the 'Blood pal' idea, which is getting some points by sharing tampons, and painkillers with other people who are using the app. They can also share information and tips related to the period. *"Blood pal, secret girl power!"* (P1) They said they liked the name since it gave a connected feeling to them.





Tampon related issues: There were ideas related to tampons. Firstly, A deal from supermarket or discount coupon was suggested. Only people who are on the period can see or personalized deals. For instance, tampon deals appear when they are on the period, and chocolate deals appear few days before a period. In addition, an alarming tampon change time function was suggested.

4.7.2. User journey

Based on insights from the workshop the user journey (*Figure 9*) has been built. It shows what is happening during the days of the period by showing what they do, think, and want. It shows other factors that are related to the period (e.g. want to have some chocolate, need to purchase tampon) so that there can be business possibilities.

4.8. Discussion

The workshop was conducted towards 23-30 year old individuals. None of them are married, and none have children. Most of them are students and some of them are working. The research target group was somehow limited. Teenager groups and 30-50 years old groups were not included.

	Period D - 7	Period D - 5	Period D -1	Period day 1
STATUS	Wondering when will the period start	Feels bit depressed	Craving for chocolate Breast pain Difficult to sleep	Starts bleeding Cramp Back pain
USER THOUGHTS	Hmm, isn't it soon period? Not sure when was the last one and when it was planned to start... whatever.	Why do I feel like this? Maybe my life really sucks. Am I getting a depression?	Oh, I really need a chocolate!! It feels bit difficult to sleep ann my breast hurts. Seems like I am going to have a period soon. WHEN?	Shit, it has started. I need a painkiller. Did I bring my tampon? Always painful, uncomfortable. Super annoying.
WHAT IS NEEDED	Checking the current stage	Get noticed why she feel like this	Provide some chocolate or something soothe uncomfortable feeling	Tampon (pads) Painkiller
APP	Checking the current stage	Tell her it is just because of some hormone changes. She experienced this last time too.		Notify her to prepare tampon Possibility to get tampon& pills from Bloodpal Advices from Bloodpals about painkiller & tampon choices (e.g. have you ever used Mooncup?)
OPPORTUNITIES			Some chocolate deals?	Business connection to pharmacy ot medicine company? Tampon deals with supermarkets
		 Emotional support part	 Business possibilities	 Business possibilities  Emotion support
SKIRT		<div style="border: 1px solid black; padding: 5px; text-align: center;">CHARGING</div>	<div style="border: 1px solid black; padding: 5px; text-align: center;">READY TO USE</div>	
RELATED ELEMENTS			<div style="border: 1px solid black; padding: 5px; text-align: center;">CHOCOLATE</div>	<div style="border: 1px solid black; padding: 5px; text-align: center;">PAINKI</div>
				<div style="border: 1px solid black; padding: 5px; text-align: center;">COMFORT</div>

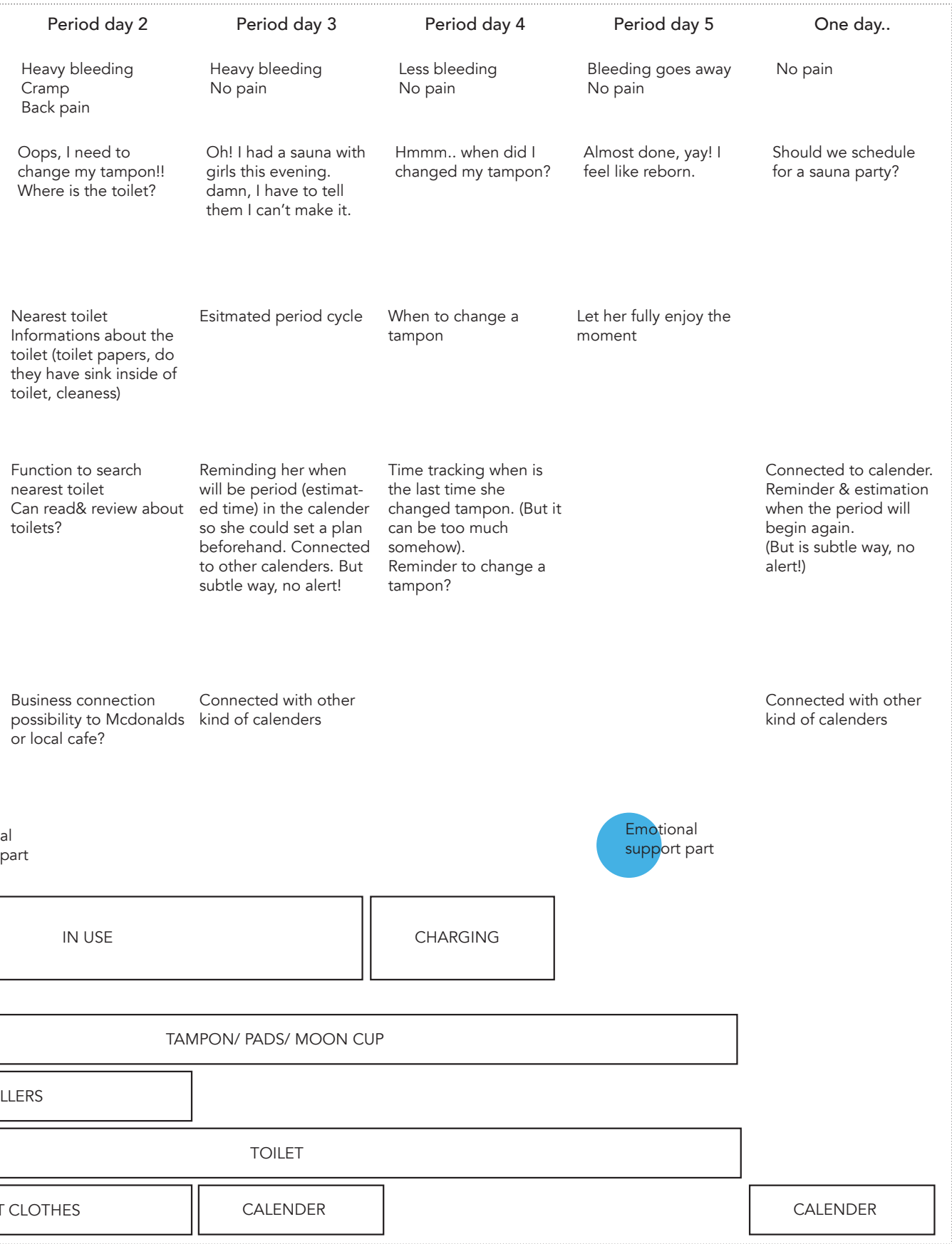


Figure 9. User journey

5. Cultural probe

5.1. Background

5.2. Probe questions

5.3. Findings

5.4. Conclusion

5.5. Discussion

5.1. Background

Cultural probes were distributed to six participants (P1, P2, P3, P4, P5, P6) to understand what they feel and experience during the period. As Jääskö V and Mattelmäki T (Jääskö & Mattelmäki 2003) researched in 2003, probes make it possible to get interpretable materials such as drawing or graphics. By their user experience framework, researchers explore user personality and product meaning more than observing. Since there are many related products interacting during the period, it was expected that the cultural probe brought a better understanding of them. The Booklet had ten pages to fill, to understand how they feel and what they want while they are on the periods. Participants got chocolates with the probes to make them encourage to fill them out more carefully. They asked to answer the probes preferably while they are on the period.

5.2. Probe questions

On the cover page, the purpose of the research was described and clarified that the filled contents from participants would be only used for my master thesis. Since they were private questions, it was important to mention that on the first page so that participants can answer more honestly. Full Probe book and result can be found in Appendix 3.

First of all, basic information about the participants was asked such as the age, level of pain and period cycle. And then, participants were asked how they felt while they were on their period. To make a clear description of their emotion, several words which can represent various categories of emotions were chosen based on Desmets' 'the circumplex of product relevant emotions', (Desmet 2002) which he made based on Russells' 'circumplex of emotions' (Russell 1980). (*Figure 10*) Each emotion is categorized based on 'pleasantness' (horizontal) and 'activation' (vertical), into total 8 categories. Two representative emotions from each category were chosen based on relativity to the period. It is often said that women get emotional while they are on period (or 'get moody'). In addition, people tend to feel certain emotions through interactions with products or in the situation (Desmet 2002). A purpose of this activity is to see if people feel similar emotions from the period, and is somehow possible to change that emotion. Participants were asked to choose words that represent their emotion and asked to make a sentence with them.

Additionally, three most annoying things when they are on the period were asked. By this question, the source of their stress could be found out. In case there are participants who would have difficulties answering questions, they were asked to describe the worst and best memory of the period to reflect their own experiences. 'Angel of the period' was asked to figure out their wishes about the period, so they can describe what they really want if there is no limitation. Participants were asked to illustrate their current situation while they are on the period, and also the ideal situation while they are on the period. They would describe the factors except pain which are closely related to their period experience.

Lastly, participants were asked to draw current timeline when they are on period, and choose the best and the worst moments. The intention of this activity was to figure out what the biggest hassle is during the period, and if there is any good moment during the period. In addition, they were asked to write freely if they have any additional opinions or thoughts at the end of the booklet.

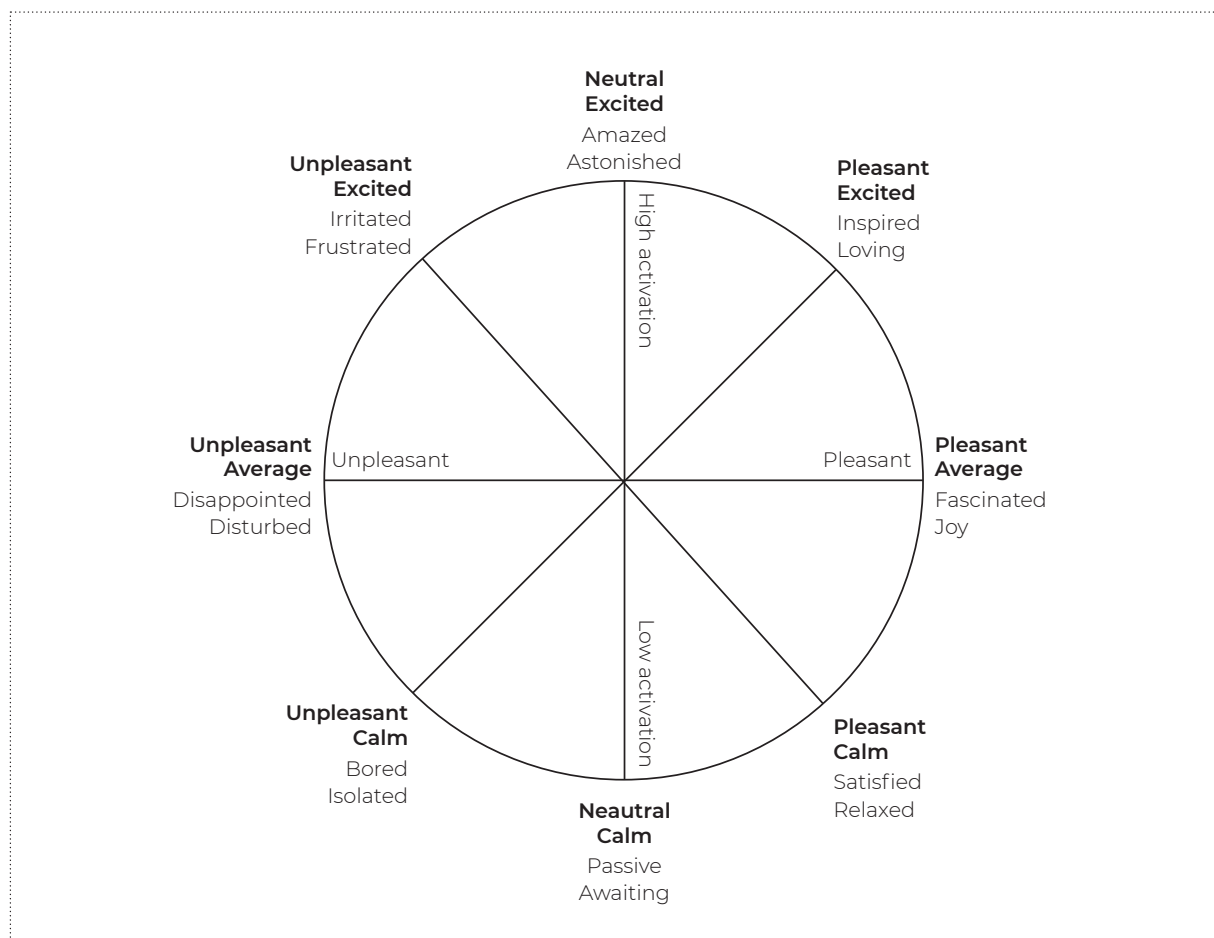


Figure 10. Circumplex of emotions

5.3. Findings

Pain and cycle: Most of the participants said they have pain (All of them marked their pain more than 3, except one person who did not mark her answer) while they are on period. About a cycle, four of the participants were not sure about their cycle “*I don’t know*” (P1), “*Not sure how to calculate*” (P3).

Emotions: The most frequent emotion was ‘Irritated’, which showed up 5 times. ‘Disturbed’ and ‘Frustrated’ followed with 4 and 3 times, respectively. People mostly felt ‘unpleasant surprise’ related to the period based on Desmet’s argument and ‘circumplex of product relevant emotions’ (Desmet 2002). There are other emotions (Figure 11) with most of them being negative except ‘relaxed’, which was marked by one participants: “*I feel relaxed, because having a period means (anyway) I am alright as a female, having a proper function and possibility of delivery a new life.*” (P4)

Most annoying things: Except the physical pain, participants mentioned hassles with continuing daily activities during the period “*When I have to go back to work after taking painkillers*” (P2), “*When I need to go hiking or swim in nature*” (P5), “*I got bunch of stuff to do*” (P1). Tampon-toilet related issues followed, “*Changing tampon is annoying*” (P6), “*Have to use a toilet so often*” (P2).

Unexpectedness was another problem: “*Irregular periods so it is hard to predict*” (P6), “*No more pads (Not being ready)*” (P4)

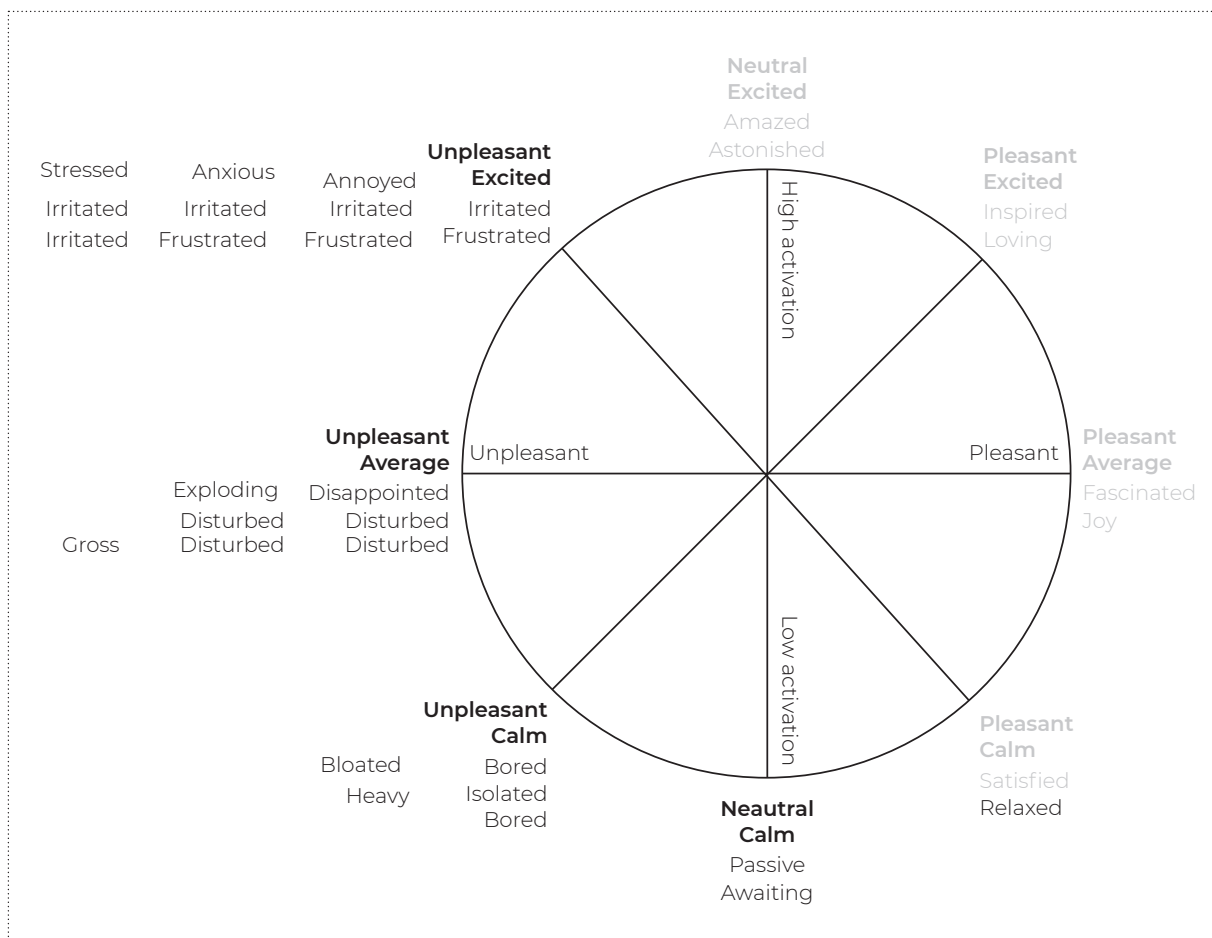


Figure 11. Emotioned showed up in the probe research result

For the wishes, most participants want to remove the pain. One participants wrote “Regular period like other girls” (P6)

For the day, they mentioned how too many things need to be considered while they are on the period: “Men and women are not equal, so many things to care about like tampon, toilet, money, pills..” (P6)

“Work: suffer from pain, left office middle of the day, took painkiller but it didn’t work. In metro: in pain, sleepy, annoyed by crowd. But chocolate, Home: relieved, change to comfy clothes, eat chocolate, feel better” (P2) Emotional pain was mentioned: “So nervous. Feeling instability and insecurity.” (P4) Despite their pain points being represented differently, their ideal situation was similar. They want to have everything ready, and things going smoothly like in any day of life. “I am free to do what I want, when I want.” (P4) “Everything is ready in my bag!” (P6), “Want to be normal, I mean just like as usual” (P5)

Best and worst moments: All of them pointed that first and second days of the period as the most difficult days. It is because the pain is severe during those days, and it often starts randomly. Last days of the period was the good moments, as it is ending soon.

Worst memory: Most of the worst memories were from when they were teenagers; severe pain, ill-prepared period. It is because most teenagers had the period only for several times, so they are kind of ‘newbies’, hence they are less prepared. Another worst memory was from when they did not have a period for a long time, they started worrying about the possibilities of having any problems with their body.

5.4. Conclusion

First of all, ‘unexpectedness’ should be considered with the ‘Hottie’. The purpose of this wearable device is to make the pain less. Unexpected period adds more pain to women’s life. ‘unexpected inconvenience’ was the biggest emotion from the probe study and it showed up as the worst memories: *“When I got my period for the first time ever, I was so disturbed”* (P3) *“It was last year, because of the stress the period started accidentally earlier than the expected date...That was speechless moment ever.”* (P4) People should be able to be more prepared for the period by using ‘Hottie’.

In addition, People felt disturbed to continue daily life because of the period pain and the associated uncomfortable feelings. Something that could help them feel less disturbed should be included, as they mentioned in the workshop. (e.g. toilet near you/ tampon near you) Since women go through changes in emotions (‘mood swings’) before the period, some kind of notification could appear before the period on the app to make them realize such changes are happening because of the period, and feel more relaxed about it.

There was one participant who mentioned that she felt uncomfortable when people make jokes about the period. This shows that the approach to the period should be not too light, instead be more like ‘caring’. It does not have to be super secretive since having a period is not illness of medical condition, nevertheless they still want some privacy when you approach the issue.

Finally, there are few positivity on the period. They pointed out that the ‘last days’ of the period are ‘relaxing’. The app could somehow emphasize this phase and give the users anticipation that the period and pain will end soon. On top of that, there was a positive feeling found that *“I am still functioning as woman”* (P4). So this factor could be also emphasized by making them a support group.

5.5. Discussion

One of the participants mentioned that filling out the booklet was a good experience during the period. *“The pleasant part is filling this book. I had a feeling that someone will help...I have companion that understand and cares that I have stupid problem..”* (P1) It shows the effect that writing the cultural probe could be already helping people to think that their concerns and problems are cared by someone.

Several participants mentioned that ‘worst memory’ happened when they were teenagers. Further studies with teenagers would help me to get better insights and understanding of women in different situations.

Three participants from the workshop filled out the booklet, so continuous user involvement was secured. They answered mostly the same as they said in the workshop.

6. Design direction

6.1. Service design point of view

6.2. Design direction for the App

6.1. Service design point of view

I could figure out that improving Hottie skirt is not the only way to improve the experience. There are many things that should be considered outside of the product-human interaction. (from the first user test with the current prototype). People immediately became curious about how high is the temperature, how they are controlling it, how to monitor it.

The idea of 'Blood pal' came from the workshop. It got me interested since it is changing the current view of the period. And probe-research results can also be applied to implementing the app. So I decided to make the app prototype and test it with people.

6.2. Design direction for the App

Based on research, a design direction of the app was set. I divided them by function and emotional point of view.

6.2.1. What to achieve: Function

The purpose of the app is basically to control 'Hottie'. It should be able to check the current and recommended temperature and battery status.

The app should be able to track a period cycle and make it synced for daily life. Precise prediction is needed to continue daily life without any hassles.

'Blood pal' is to support people when they are on period. Users are able to borrow hygiene products and tampons, and find closest bathrooms. Sharing their opinions could add credibility to the information. It keeps the users from going through embarrassing situations even when they are not prepared for the period.

Financial support can be achieved by promoting them deals about the period related products. It could also lead the users to check the app constantly. In addition, there could be more business opportunities involved by including other stakeholders such as supermarkets, tampon companies, pharmacies and medicine companies.

6.2.2. What to achieve: Emotional calm

The app should have the right tone of voice(<https://gathercontent.com/blog/a-simple-tool-to-guide-tone-of-voice>) for helping the users feel relaxed and have less tension during the period. Since the most emotion they felt during the period was 'unpleasant excitement' based on the probes study, the app should not approach the users as 'alert' or 'alarming'.

Based on the design direction, I made a wireframe prototype of the app.

7. Design

7.1. 'Hottie' app

7.2. Predicting the period by utilizing Bluetooth earphone

7.1. 'Hottie' app

The 'Hottie' app works as a support when they are having a period, to make them less flustered while they are on period. It also works as a controller of the 'Hottie' skirt. Controlling 'Hottie' exists on the Toolbar, so users can approach it easily. When the user puts the 'Hottie' skirt on, the notification shows up so that the user can go to Control screen immediately. On the Control screen, battery status is presented with percentage and time. Ideal temperature for the period day is also suggested on the control screen. Users can set to get a notification when the 'Hottie' is connected (on), and set automatically to the ideal temperature. *(Figure 12)*

On the Home screen, D-day to the period is presented with the description of what is usually happening on that stage. The tone of the voice is friendly and caring. Behind the D-day, 'Blood pad' and 'Deal' menus are presented. *(Figure 13)*

When the user chooses D-day to the period, it shows cycle of the user as a circle shape. The hexagon on the circle shows where the current stage is. Users can move the hexagon and check when they will have a period. Estimated cycle is presented behind, to check further schedule. 'Sync the Calendar' toggle button exists on the right side of the screen so that users can sync their cycle to the external calendar apps. When the period comes closer, the app will send notification to users so that they can be prepared. *(Figure 14)*

'Blood pal' menu shows 'toilets around you' as the main image. It automatically shows toilets near the user, and she can set the distance of the viewing area on the setting. Users can check how long the toilet opens, read reviews from other users and leave reviews of the place when they click the name of the toilet on the map. *(Figure 15)* From the main screen of the 'Blood pal', users can choose to share tampon or painkiller. It is based on the location, so they will get messages from other users if they allow to get message from other users. Users can talk to other users who are around their area. *(Figure 16)*

On the 'Deals', user can check the period related deals. Hygiene products, chocolate and chips will be presented as the image with prices. They can get this deal on a specific day, for instance few days before the period starts. *(Figure 17)*

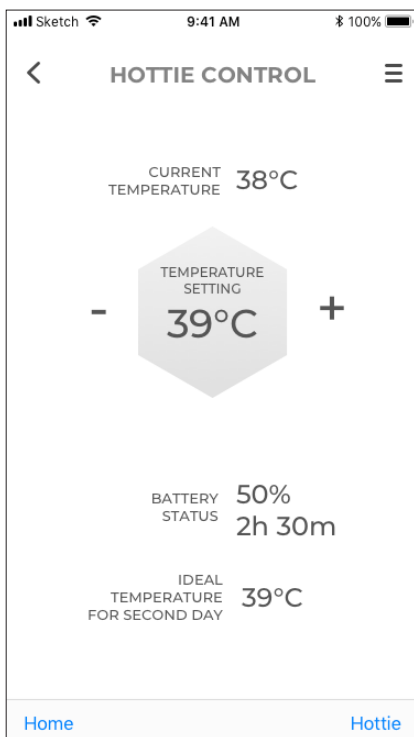


Figure 12. Temperature control

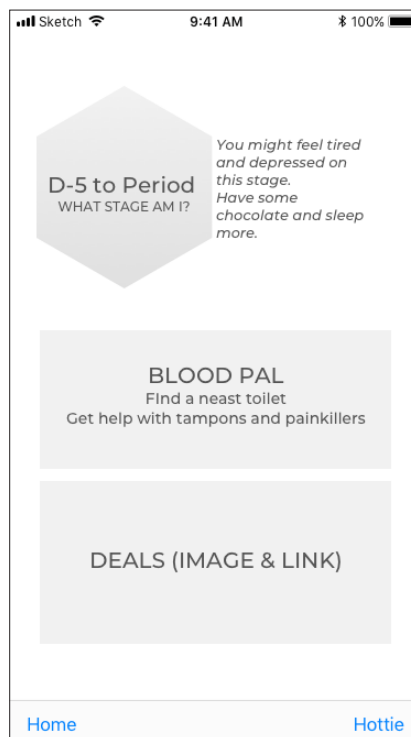


Figure 13. Home screen

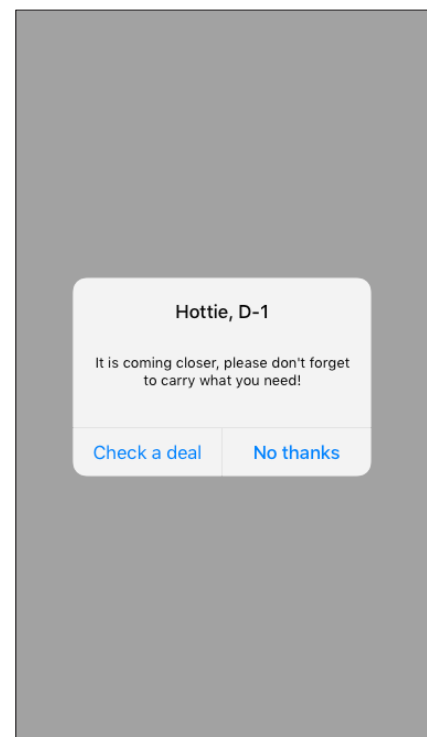


Figure 14. Notification

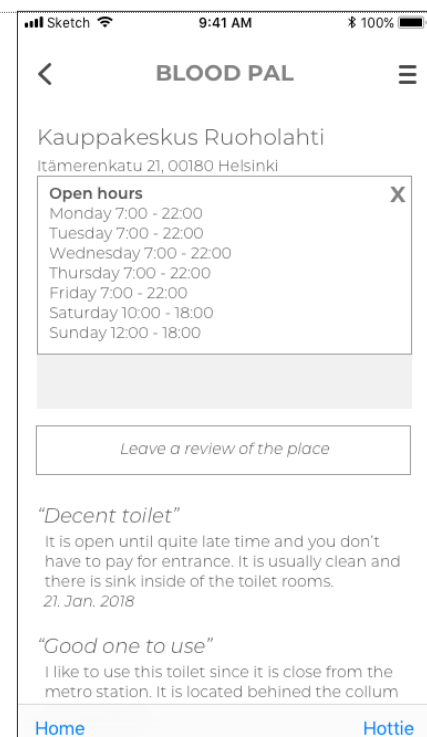
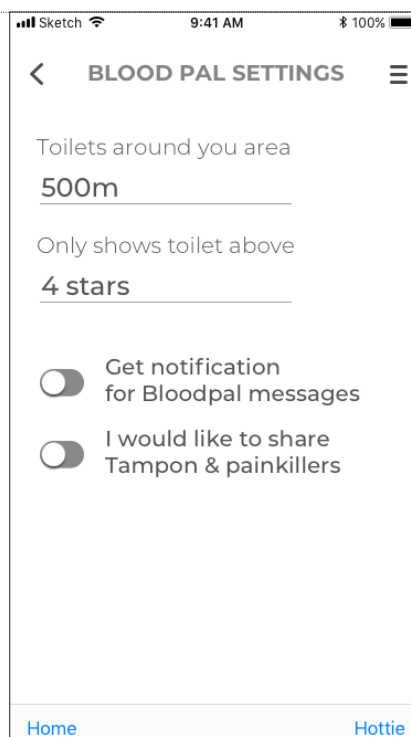
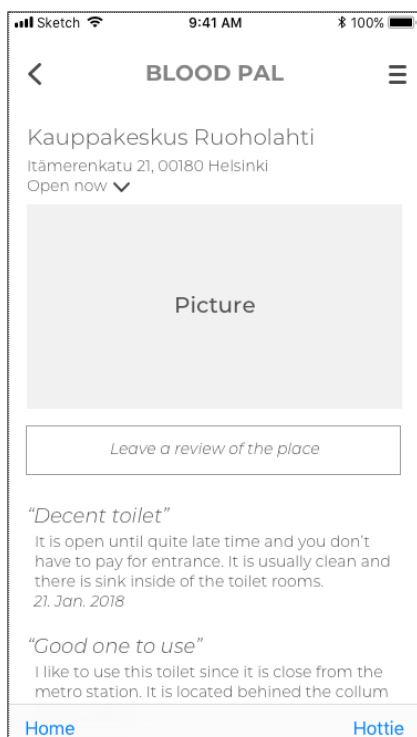


Figure 15. Finding toilets

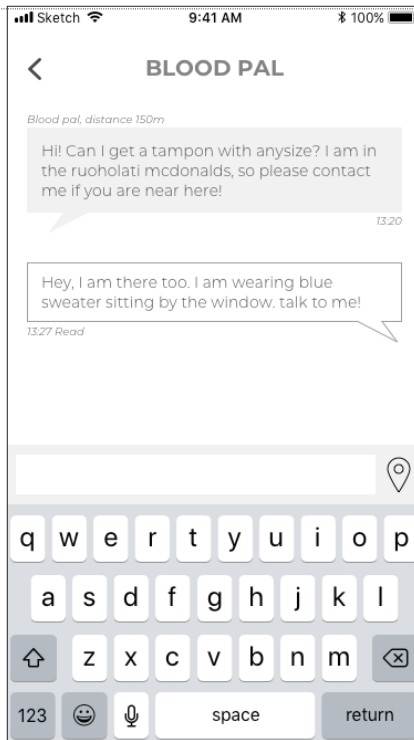
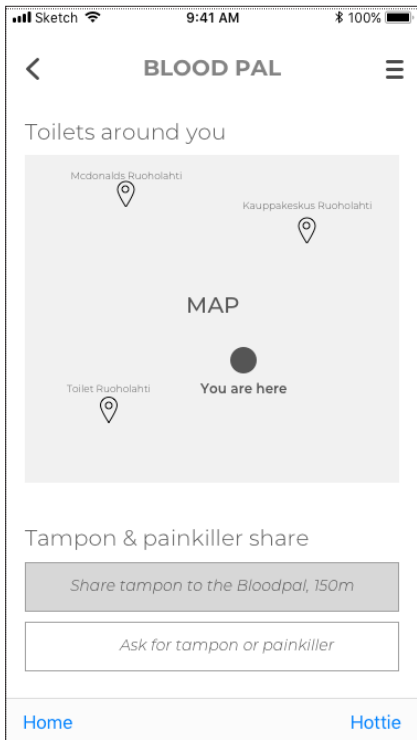


Figure 16. Blood pal concept

Figure 17. Deals

7.2. Predicting the period by utilizing Bluetooth earphone

Since the hassle caused by randomness and unpreparedness of the period was pointed out as one of the biggest pains caused from the period, ‘prediction of the period’ idea has been added to the ‘Hottie’. Women’s body temperature changes up to the cycle of the menstruation (Bauman 1981). By adding a temperature sensor to the existing wearable device such as Bluetooth earphones or smart watch, making precise prediction of the menstruation cycle is possible. Tung (Tung 2005) already implemented his idea of putting temperature sensor to the Bluetooth earphone to measure body temperature. (Figure 18) When the temperature change is detected by the sensor, users get the notification from the app and they can choose if it was because of the period. Continuous measurement of body temperature via everyday wearable device can build database of users, and the prediction can be more precise. In addition, the app could suggest charging the ‘Hottie’ by analysing how long the ‘Hottie’ skirt was turned on during the last period.

Based on this idea, the storyboard (Figure 19) was created. It shows the user uses the earphone with temperature measurement function in her daily life. When the period approaches, she gets the notification from the app, so she wears the ‘Hottie’ wearable device to be prepared. Few days before the period, she gets notifications about deals for hygiene products, she remembers that she does not have enough tampons at home so she visits a store to buy them. While she is on the period, she can continue her daily life without hassles. She is using ‘Toilet around You’ when she is outside, so she does not have to worry about finding clean toilet when she is outside.

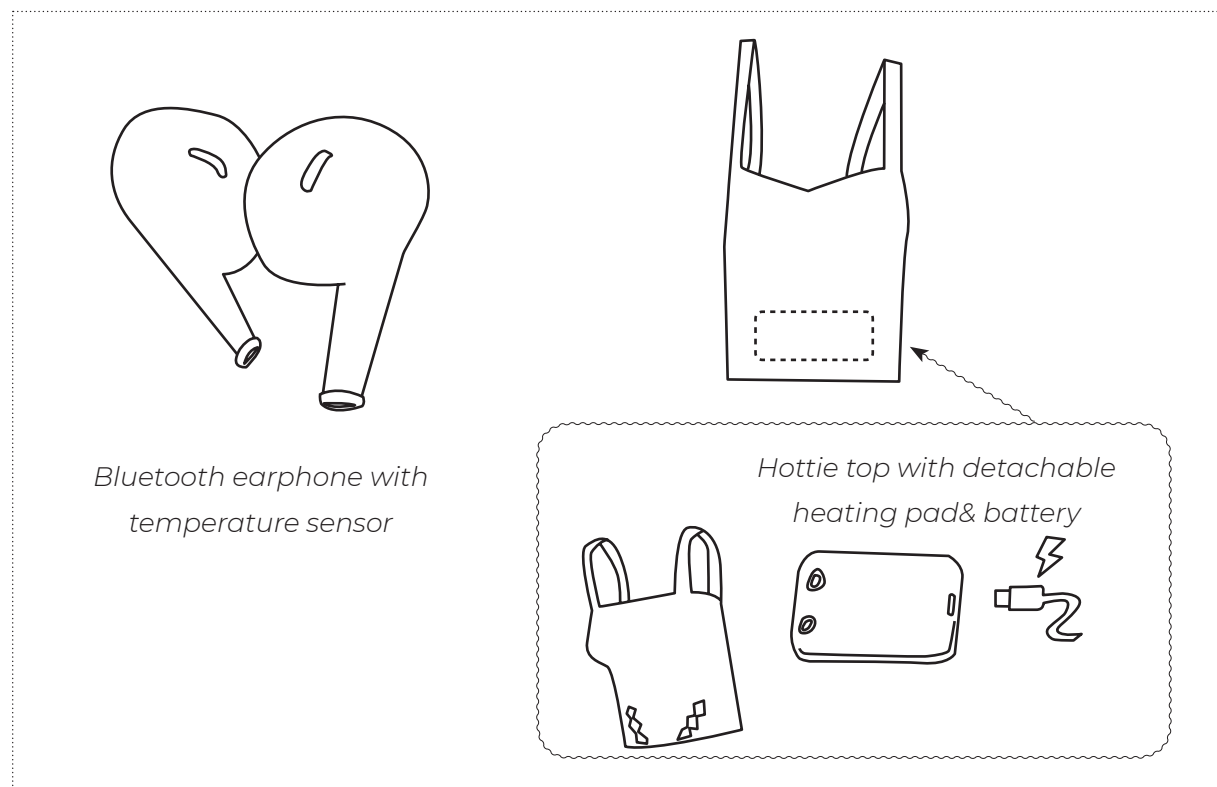


Figure 18. Hottie and Bluetooth earphone Concept



Figure 19. Storyboard about concept

8. Second user test with ‘Hottie’ app

8.1. Goal of the second user test

8.2. Structure of the test

8.3. Participants

8.4. Findings

8.5. Conclusion

8.6. Discussion

8.1. Goal of the second user test

With the wireframe prototype and the storyboard, second user test was conducted. Goal of the second user test is to figure out whether design direction was successfully presented through the concept, especially with the app. Four test criteria were set to make the research more specified.

First of all, are participants able to understand the function of the app? The structure and information flow should be understandable on the app.

Secondly, how do participants conceive the tone of the voice of the app? Do they feel relaxed and cared so that their unpleasant excitement can be soothed?

Third, how do participants imagine themselves using 'Hottie', a wearable device, the app and the Bluetooth earphone to predict the periods? Do they think it will be helpful?

Lastly, are there any improvement points or critical usability problems of the app?

8.2. Structure of the test

Interview and speak out loud method was used for the second user test. Speak out loud method (Elizabeth B 2014) is to find usability issues, and to understand how they feel while they are using the app.

Firstly, the storyboard was presented to the participants to help them understand the whole concept. With the storyboard, current prototype of 'Hottie' was presented for easier understanding if the participants were not involved in the former research procedures. Buchenau (Bunchenau & Suuri 2000) pointed out storyboard helps participant to understand the concept and context of the design. It describes the concept with a series of images, showing the user, the environment and design (Curtis & Vertelney n.d. 1990).

Then the wireframe prototype was given to them on their mobile phones, so they can be in the actual setting. Two tasks were given to the participants, which were checking and changing the temperature of the 'Hottie', and syncing their period cycle to the calendar. After each task, they were asked how they felt while using the app and if there were any difficulties. Then the participants had time to explore the app, especially 'Blood pal' concept and Deals section.

Questions based on four criteria were asked for the last step of the user research. Questions were, 'How did you understand the whole concept?', 'How would you imagine yourself using this app during the period?', 'How do you think of the concept?' and 'How about the prediction?'.

8.3. Participants

Four participants were selected for the second user test. Two of them (P1, P2) were involved through the whole process from the First user test. They conducted the cultural probe and participated in the co-creation workshop. The other two (P6, P7) were not involved in the co-creation workshop, so they did not know about 'Hottie' concept or Blood pal concept. P6 was asked to fill in the Cultural probes, P7 was not involved in any of the process, so they heard about the concept for the first time in the second user test. Both are between 25 and 30 years old.

8.4. Findings

The participants were positive about the period prediction idea. They said implementing a temperature sensor to Bluetooth earphone would be a good idea since they listen to music every day. One participant was very positive toward the idea, since she dislikes filling her data manually. *"I can finally check my period cycle, since I always forget to put the period dates."* (P1)

For the Blood pal concept, participants who were involved in the co-creation workshop had very positive reactions towards sharing tampons. *"it is cool, feels like there are human behind"* (P1), *"This is awesome, I can talk to others?"* (P2) As Sangiorgi D (Sangiorgi & Prendiville 2014) argued, active user involvement helps building trusted relationships for change, and made people to be immersed in concept. On the contrary, participants who were not involved in the co-creation workshop were not interested in the sharing tampon concept as much as the others did. They said they might hesitate to ask others, or they would just try to find closest stores from them. Finding the nearest toilet idea received good feedback from all participants. *"Oh, they have opening time too? And here is review from others? This is great"* (P6)

Participants were positive about Deals. They suggested that there are tags or categories, so that they can search what they want in a glance. One of the participants suggested that there is an ordering function, so users can get tampons delivered to their house.

In the usability point of view, participants easily conducted most tasks, syncing calendar and controlling the temperature of 'Hottie'. The placement of 'Hottie' was a bit difficult to find for some participants, so it could be better if it is placed not on the toolbar but on the main menu.

Participants mentioned that the voice tone used in the Hottie app made them feel cared. (D-5 to the period, "You might feel tired and depressed on this stage. Have some chocolate and sleep more") They said that the tone makes them more relaxed, feel like they are more prepared.

8.5. Conclusion

Overall, the app received positive feedback from participants. There were minor usability issues related to the placement of the 'Hottie' button and it was pointed out every menu needed more description, not only 'Blood pal', 'Deals'. However, the information structure and flow were understandable for the participants.

The app delivered positive emotions to the participants. One participant said that it felt like a meditation app, the other participant mentioned that she felt like being cared. *"It feels like I am keeping the control of the period, taking care of my body, since it did not exist normally, so I feel more dedicated"* (P1) Reactions from the participants proved that the app successfully lowered the stress coming from the period. It will make the users feel less like they are having an 'unexpected surprise'.

Overall experience with the wearable device 'Hottie', the app, and the Bluetooth earphone idea were easily understandable and perceived as beneficial to the participants.

8.6. Discussion

Since the app was presented as a wireframe, the look and feel of the app was not included in the user test. It could have influenced the experience of the participants.

9. Final Results

9.1. Final wireframe of the app

9.2. Guidelines for designing related the period

9.1. Final wireframe of the app

The final wireframe of the app reflected the second user test results. (Figure 20) It is similar to former prototype, reflecting Hottie icon placement and cycles.

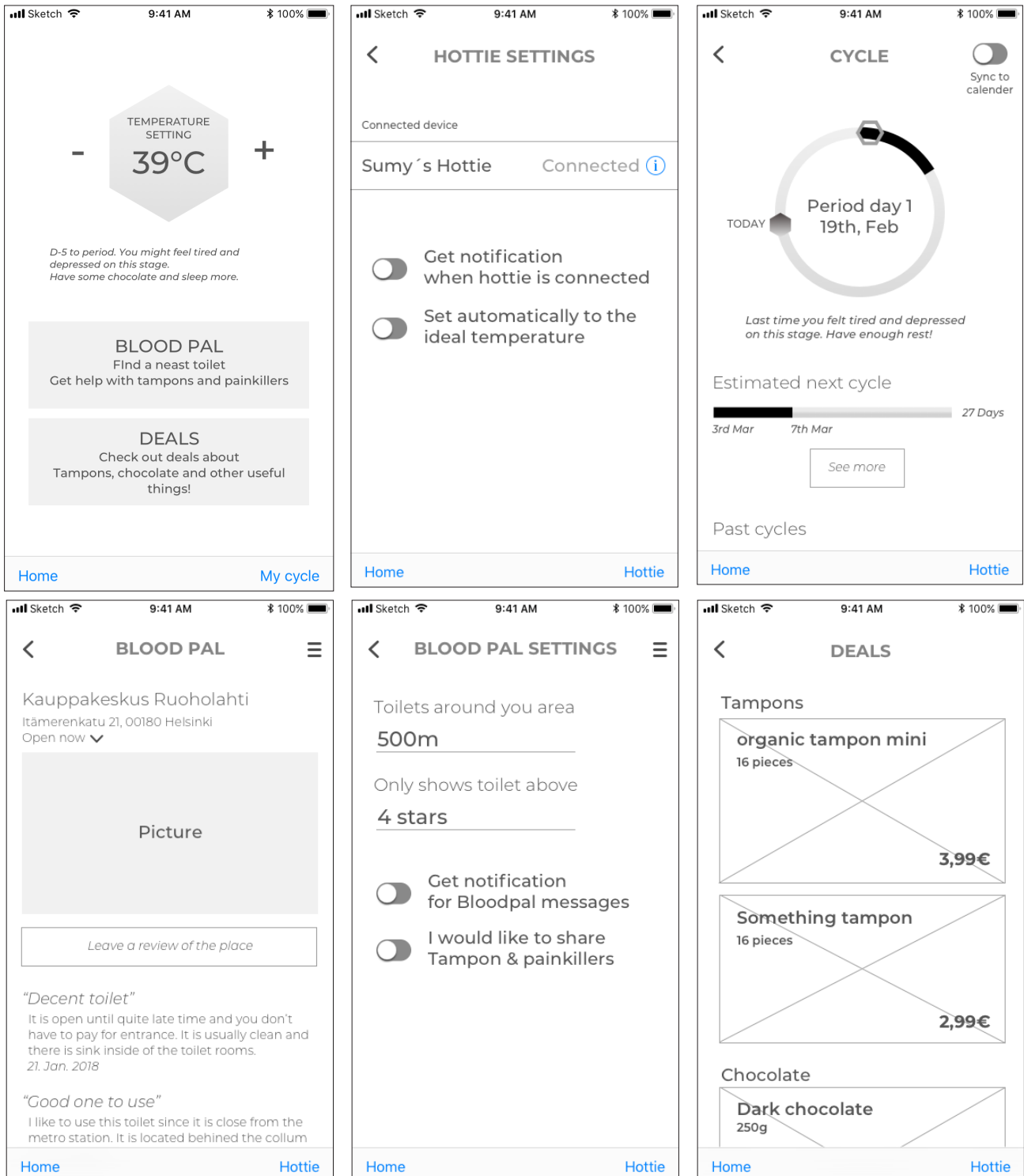


Figure 20. Final prototype wireframe

9.2. Guidelines for designing related the period

Based on the workshops and probes studies, six guidelines and the user journey related to the period were made. On an A4 paper, six guidelines were placed on the front side. On the back side of the paper, there is a timeline based on the user journey with ‘what I feel/think’, ‘What I do’, ‘What is happening’ during the period. (Figure 21) The purpose of this booklet is to help designers while they are designing for the period, getting insights and finding real voices and experiences from the period. ‘We’ form of saying was used to deliver stronger voice and put the representative quotes from the people to bring out empathy. Six guidelines are,

First, The period as the part of the daily life: We want to continue normal daily activities during the period without pain and hassles. Menstruation is not just one part of the month, but also happening throughout the whole month with different effects on the former stages of the period.
“I cannot be comfortable in my skin..usually I will skip the daily activities due to the period” (P3)

Second, Anticipation and predicting the period: We want to predict the period and keep track of it. Randomness of the period adds pain to us. We would like to be prepared with painkillers, tampons and other necessary things.
“I don’t like such moments when my period just begins out of the blue and I don’t have any tampon or painkiller” (P6)

Third, the period as a calming phase: We would like to feel relaxed and calm during the period. We would like to avoid unpleasant excitement during the period.
“But then also I have this feeling of excuse. Okay, this is my first day of the period, I will lay on bed a bit longer...kind of escape from daily restriction” (P2)

Forth, Knowing what is happening to the body: We would like to know what is happening to our body, associated with what influences we get from what we use or wear during the period.
“Having a period means (anyway) I am alright as a woman, having a proper function and possibility of delivering new life” (P4)

Fifth, Tampons, painkillers and toilets, other related things to the period: Many other factors have influence over the experiences during the period. Such as financial burden of purchasing hygiene products and annoyance of finding the closest toilet.
“I always think of my periods as financial burden, cause I always to spend money on tampons and stuff” (P3)

Sixth, Sensitivity to deal with it: the period does not need to be considered as sacred or secret activity, but it is still private matter of our body. We want some privacy.
“I feel annoyed when people make jokes about the periods. the period is not something sexual” (P5)

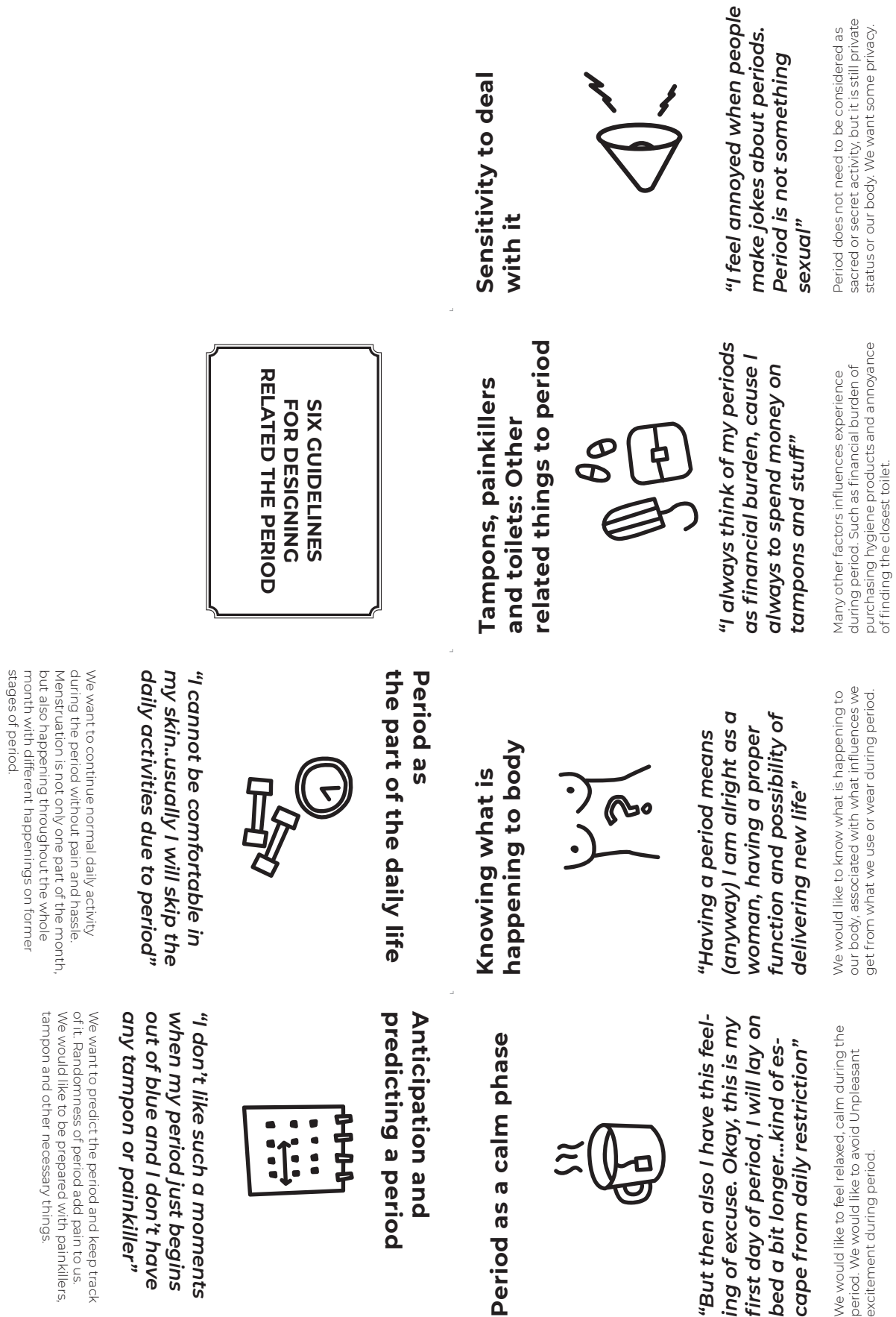


Figure 21. What people Think, Want, do and what is happening related to period

10.Conclusion

10.1. Expected impacts of this thesis

10.2. Influence of active involvement of participants

10.3. Limitation of the project

10.4. Recommendation for the future

10.1. Expected impacts of this thesis

This thesis has started to improve the ‘Hottie’ skirt. For the final result, ‘Hottie’ skirt transformed into the ‘Hottie’ top, which can be worn as an underwear. ‘Hottie’ app was implemented to control temperature of the wearable device. In addition, the app supports women while they are on period by providing info of closest toilets, sharing tampons and offering deals of the period-related products. An additional wearable device concept which measures body temperature from daily activities was added to enhance overall experience. Accurate prediction of the period would improve quality of women’s life much more.

The project’s focus was reframed from a wearable device design to a service design throughout the process. To answer the first research question - How can we give better experience to users while using wearable device that heats abdomen and back to relieve menstrual pain- reframing was necessary. From the first user research, people answered that they wanted to have the app and their answer led to designing comprehensive system around the ‘Hottie’ wearable device. During the whole research, they suggested many other ideas about the system about the ‘Hottie’ wearable device. This process infers that a holistic consideration of user experience is mandatory for the wearable device design.

Coming up with the six guidelines for designing related to the period is another achievement of this thesis. It can be used for future studies when anyone designs for the period. Since they were created based on researches with active involvements, they could help designers understand the period in the real life contexts. The user journey -what happens, what they feel and need during the period could be also helpful for designers to understand the period in the bigger frame. It is not only about bleeding and having pain, but there are many other factors that influence the experience. So the research question ‘What should be considered while designing for the period pain?’ would be answered with the guidelines.

A period is considered something not that important and false status (Bart et al. 1979). So studies about the period took a medical approach or were done as social studies in most cases. This thesis is an effort to make the period perceived as a part of daily life and as a normal routine of going through an average day. It could be said that dealing with the topic of period and bringing it to the designing field is one of the achievements of this thesis.

10.2. Influence of active involvement of participants

This thesis included two participants (P1, P2) throughout the whole research, from the first user test to the co-creation workshop, cultural probes and second user testing with the concepts. There were other people who were involved in the process partially, however their feedback towards the final concept were less enthusiastic compare to the ones who were involved throughout the whole process. The biggest difference came from whether they participated in the Co-design workshop. In the workshop, they suggested the idea of 'Blood pal' and it was implemented in the design. So they were not only sharing their experiences as users, but also became Co-designers. (Sanders & Stappers n.d.) Because of this, they were more positive towards the final concept. They said that they would definitely use it, and the concept was awesome.

In addition, the participants who participated throughout the whole research process understood the concept better. For other participants, they needed to have a detailed description to understand the concept. In some cases, they asked again and only after the additional explanation they said they actually would like to use the app. Since it is not only a simple tangible product but a comprehensive experience which consisted of many different connected concepts (e.g. Deals, Sharing Tampons, Predicting Periods, Hottie skirt), participants needed time to understand why it is needed and how it could work in real life.

Last, participants who were involved in the whole process valued the ideas more. It is not only because they are the ones who initiated the ideas, but also because they thought about and shared their problems more during the process (Visser et al. 2005). During this process, they recognised problems clearly and wanted them to be solved. This might have made them value the concept more as the solution of such problems.

10.3. Limitation of the project

Since this thesis is dealing with the period, study about feminism would be useful to the thesis. The current researches are more based on design for emotion, co-creation and user centred design. Literature research has been limited to the menstruation not covering the whole discussion about discrimination of women on scientific research or women's social participation. Since the 'Hottie' app and the wearable device can support women to continue their daily life while they are on period, it would be interesting to do research on the women's social participation point of view. Participants who were involved during the research process are limited as they are all between 24- 33 years old and they all had college degree while none had children. Furthermore, they all live in Finland, and where they came from are all so-called developed countries: the USA, South Korea, New Zealand and Finland. More diversity of their ages and backgrounds could have led to more insights. Especially the age, as the most severe menstrual pain is expressed from teenagers (Harel 2006). Teenagers also have more smartphone-friendly lifestyle, so it would be fruitful to co-create with them.

The final redesigned 'Hottie' wearable device was presented as an illustration and a storyboard due to limitation of time and resources. It still received positive feedback from the interviewees even with the current materials, however it could have given the participants more lifelike feeling and experience had the prototype been implemented at the current 'Hottie' skirt level.

Several more iteration and testing rounds of the 'Hottie' app could have improved it more since it has only been tested once with the wireframe prototype. Participants from the second user test often commented about the look and the style of the app. They mentioned about the use of icons, font size and colors. Even it is a minor concern, it would be interesting to implement the app to the high-fidelity prototype and test it.

10.4. Recommendation for the future

Studying about the relations with physical products and apps could be done in future studies. Since the 'Hottie' has a physical product which is a wearable device and the 'Hottie' app, they should share the same design language. It could be another project to create a digital and a physical product under the same brand.

Implementation of the final prototype will be the next stage of the project. Since the underwear top concept has been introduced, designing it comfortably and fitting it to different sizes to individuals would be needed for the continuing work. This could be done with the collaboration with fashion design.

Validating the six guidelines could be one step to take for designers in the future. The guidelines were made based on the user research, and it has not been used for projects other than the 'Hottie' project. It would be interesting to see how it is utilized and be evaluated how it fully reflects the users' needs.

Last but not least, I hope there are many other projects that deal with the period as a design topic. Menstruation is something that half of population are experiencing, but we are still using primitive tools such as hot water bottles or sanitary pads to suffer it. There are plenty of women that were very happy to participate in this research- "No one cares about the period. It is just it. Just endure that" – so user-centric design is imperative for this topic.

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Appendices

Appendix 1. Usertest 1 Script

USER TEST RESULT

METHODS: Interview

- Users wear the skirt for 20 minutes, and answered questions
- After answering questions, she freely described how they felt, what need to be improved
- Since there was no far-infrared working pad, one-time use heating pad was used to test it

USER 1

1. How do you recognize that if it is working? How do you feel about the controller?

- Lighting could be inside
- Possibility to adjust the temperature is good. Sometimes it gets too warm.

- The controller/ feedback will depends how fast the temperature adjust. If it is like instant & less than 2 seconds takes to get the feedback (e.g. the pad immediately turns off) then it will be easy to understand.

2. How do you think about touch-rubbing interface?

- It will be bit awkward to touch it in front of guys.
- About App, it would be better for the case when I am with guys. But maybe it is more complicated to control. But I would like to have an App for exact temperature, how long can I keep it warm, which the with which temperature. like, "Is it too high temperature? Am I wearing too long?"
- App might be annoying to take it out/ put them in again. Maybe it is good if I am already holding a phone.

- "I like it"

- "It is interesting to touch it"

- "It feels like some how touching warm rocks"

3. How did you feel with the heating pad?

- Heating pad is not totally touching my body. "I am pulling my hands to make it warmer." "yeah, this looks cool. actually when I put my hands here, I look like model"

4. About the style & Design

- The patterns on the skirt is cute and modern. But it doesn't go well with my shoes.. It is hard to fit to my style. "This is not totally my style. It is not like I don't like this. It is elegant, but it is just not my style"
- White color make me insecure, these days specially.

5. About the skirt shape

- This skirt is too nice, I wouldn't be able to wear it at sleep
- Even though I wear skirt, I will feel cold in this skirt form.

6. Personal preference

- "I like wearing tight clothes, that way I feel like everything is on it is own spot."
- "maybe something with the Big data? I would like to know how others use it too"

USER 2

1. How do you recognize that if it is working? How do you feel about the controller?

- Lighting is bit strange to have it on clothes
- Maybe something more intuitive, like some button that is clear to see if it is on/off
- It would be nice if I can check the status of heating with something like App

2. How do you think about touch-rubbing interface?

- Controlling temperature by rubbing it is fine

3. How did you feel with the heating pad?

- It is okay, bit getting to warm sometimes
- Is there any possibility to change the position of heating pad?

4. About the style & Design

- It would be nicer if it is underwear or something I can wear it under my other clothes

5. About the skirt shape

- I like it, but it would be better if I can change the clothes during periods.

6. Personal preference

- I might wear it for other occasion. Like when it is super cold!

Appendix 2. Statement cards

para-phrase

Period is not only one part of the month, but also something happens throughout the whole month

quote

A: well, there is couple of days before the period start, you know, the period will start.
A; yeah, cause discharge will stop, and my breast will hurt, and I am like, okay, know. so I think the period has a lot of things to do. like other things. In a way, it is part of periods, too.

para-phrase

There are other pains and difficulties during/before periods

quote

T: Usually the day before, the night before the period, I cannot sleep very well. I think because of hormone changes. and then I often get depressions.
A: I can anticipate, when I started to feel pain. My boobs hurt, and. I get anticipate, certain things are happening. and then I think like Okay, I will get it today.

para-phrase

People want to know when exactly bleeding starts, to be prepared.

quote

A: yeah. it is. but then I know. because I really hate wasting tampons. like, I really want to get prepared, I don't want to get stain. or something... you know? I hate to be unprepared, and wasting tampons. that kind of things.
J: So you want to be prepared, or not?
A: I want to be prepared, but I don't want to waste tampons.

para-phrase

People usually realize that period will start soon with some other symptoms

quote

T: for me it is kind of like in the morning, I started to feel little bit of pain, and then I realize that it is coming. I don't know how does it call, this...
A: I can anticipate, when I started to feel pain. My boobs hurt, and. I get anticipate, certain things are happening. and then I think like Okay, I will get it today.

para-phrase

They are cautious about when to change tampons, because it could have bad influence to body.

quote

A: I become kind of paranoid about... TSS.

para-phrase

They are cautious about when to change tampons, because they don't want it to leak

quote

J: And then I forget that I have tampon inside. Because I have no pain at all, and I have no idea when to change a tampon. I cannot see inside or something. I heard it is for four hours, and then it is super small.
... but I have to think about, when I use tampon, when I go to the bed, I have to think I change it as late as I can. So it can last forever, until the morning. I don't want to wake up in the morning.



para-phrase

Pain is less when they lay down or relax

quote

T; Me too. If I am in the office. so that I don't get bothered from pain. but when I am home, I don't take.
S: yeah? why not?
T: because at home I can jut lie down on the bed and relax but at the office I kind of to be active, and working.

para-phrase

Pain is burden when you have to keep a normal daily activities

quote

T; Me too. If I am in the office. so that I don't get bothered from pain. but when I am home, I don't take.
S: yeah? why not?
T: because at home I can jut lie down on the bed and relax but at the office I kind of to be active, and working.

para-phrase

Appetite changes before period, mostly sugar craving.

quote

J: chocolate and chocolate milk
T: oh, true, lot of sugar. I think the sugar thriving starts even before it starts.
J: I think sugar craving doesn't stop
T: yeah, true. haha. And not only sugar, but also salty stuff and a lot of crappy foods.

para-phrase

Type of clothes they feel comfortable to wear during the periods are various

quote

J: I usually like to wear tight clothes
T: tight?
J: Yes
T: why? don't you feel more uncomfortable?
J: I feel more comfortable when it is tight
A: cause it is more compacted. it does not going anywhere.
J: yeah, when it is relaxing it is everywhere. it is more about feeling I guess. but that is good, you have different idea.

para-phrase

Sometimes period feels like good excuse to escape from daily restrictions

quote

S: but then also I have this feeling of this is excuse. Okay, this is my first day of period, I will lay on bed a bit longer...and I will eat chocolate, and stuff like that
T: yeah, kind of escape from daily restriction.

para-phrase

Period can be financial burden, especially for tampons

quote

A: Let's see, what else. I always think of my periods as financial burden. cause I always have to spend money on tampons and stuff.
S: I yeah, true.
A: yeah, espcially, I think tampons are more expensive in here than states.
S: yeah?
A: yeah, so, when I came back to US I brought this bag of tampons. Also, I cannot find any of organic cotton tampons here, unless they are really crazy expensive
T: you are trying to find something organic, because it is for lady

para-phrase

Tracking period cycle is difficult, sometimes forget when was last period

quote

A: mine always seems to be like 2 days further, like this month it is 20th, next month it is 22th...

J: ah yeah, that is so annoying.

S: Mine, I always thought it id bit irregular, but then when I started to track it I figured it out that it has patterns like 25days, 40days, 25days, 40days.

A: I never understood that. how do you count? do you count the days between when you don't have periods?

para-phrase

Easy charging of the Hottie should be considered

quote

T: ah I have to charge it right?

S: yeas

T: how long does it take?

S: uhm... 2 hours? I think you can charge it for 2 hours and use it for 8 hours or something.

T: Okay. how do you charge it? with USB port?

para-phrase

User could be cautious about side effect since it is using electricity

quote

S: yeah, and then if you boil it again then you can use it again... but that is the thing that you have to always boil it. but does this mean that you would prefer something without electricity?

A: maybe, but I don't know.... cause there is this electric blanket

para-phrase

The App can inform users to carry tampons, painkillers before periods

quote

S: yeah true, maybe for me carry the painkiller with you, before.

T: yeah true, carry tampons and painkillers. that kind of stuff.

T: That is true. because the situation when you screwed, is when you are missing those kind of stuff. like when you are outside and you don't have your painkillers. you don't have tampons, then you are screwed so...

para-phrase

App could do something more than just reminders

quote

A; you guys are thinking of some kind of reminders? from gathering some kind of data... it remind you what to do... charge... those kind of things. mostly reminders and adjustments. is there anything else?

para-phrase

App should have most of functions related to period

quote

J: I think it is logical to have an App. first of all, there is already existing App of periods, and I don;t want to have two different sources. I want to have an App to remember all these kind of details, because I forget. So I like the App for periods.
T: but, what will be the biggest problem when you have the periods?

para-phrase

App could have some "community" characteristic, sharing tampon or painkillers

quote

S: yes, because when I am in school, I can borrow it from my friend, but if I am outside, then... shit. but then I am sure maybe somebody have it. but how can I know? haha
A; hey, actually that is a good idea! because let's say many women in the city have the App, that you can be like, okay which of women has the App and something. And these women who has this App working probably carry a tampon. It is like a code. quite cute idea
T: Oh, true!
S: yeah, you should write it down. it is like community. secret girl power!

para-phrase

Hottie can do something with cooling, since sweat is one of annoying thing during period

quote

A; so if you think about settings, then like icy hot setting, maybe cooling or something?
J: good point. for the back or when you are sweating, like in the summer. because I don't like it my back sweating

para-phrase

Hottie can be a module so that people use it in other occasions than period

quote

T: I was thinking about daily application of this, you can wear it when it is cold outside? if it is freezing outside
J: ah yeah, true.
T: socks, for example.
J: so the stuff you have to do with a temperature
S: so maybe it is a kind of small piece or modular thing that you can use it for other parts, for example inside of shoes

para-phrase

Hottie App can be connected to other schedule Apps, so that users can consider period in daily life more easily

quote

T: also they can remind me for me on that period that you should not put a sauna for that period or swimming hall or something.
S: ah true, so somehow connect with the other calendar app
J: other activities
T: yeah
S: because if it is a separate calendar then I have to check all the time, but then if it is connected with for example Google calendar then I can immediately see that 'oh, I shouldn't this appointment this day'.

para-phrase

Financial support of business point of view can be implemented to the App

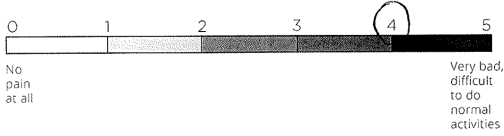
quote

A: yeah, how much you spent or something, at least for me it is financial burden.
T: oh, also for the app reminder. the discount, if there are any tampon discount somewhere, I don't know if there are many, but well, there is this offer. Actually, the supermarket can sponsor this application and they can give offer this tampon discount, like tow day before actual period.
J: ah, for them only
T: yeah, so somebody who gonna have period soon
S: that is cool

Appendix 3. Cultural probes

P1

How old are you?
32 years old

How heavy is your menstrual pain?


How many days do you have periods in general?
6 days

How long is your cycle of periods?
I don't know I think 30 days

Choose word(s) that can represent your emotion about period!
 Also, you can write some extra words on your own.

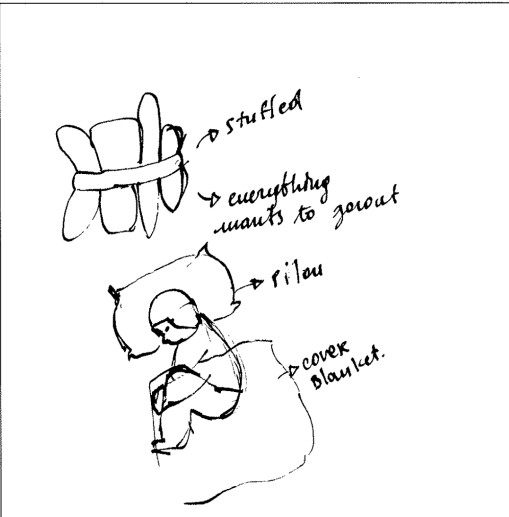
Frustrated Joyful Disturbed
 Irritated Satisfied Amazed Inspired
 Astonished Fascinated Loving
 Passive **Bored** Disappointed
Awaiting exploding Relaxed
Bloated Isolated

Please choose 2 words from what you have chosen, and make sentences with those words!

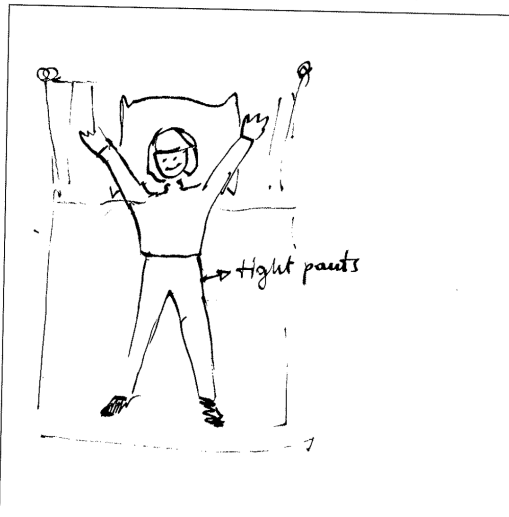
- I feel bored, Because now I have to feel like I will explode all day every day.
- I feel bloated, Because i feel liquids wanting to go out from me... so I'm awaiting for it to happen.

00000000
10

Please draw your current situation when you have periods



Please draw your ideal situation when you have periods



Too many things wants to get out of me and I want to avoid it. Im not sure if it is toilen no1 or no2 or period. stuff so it is better to stay at home.

I am free to do what i want, when i want. But I still want to stay in bed its warm for once, and soft. I can wear clothes that is easy to take off.

Could you tell me 3 most annoying things when you are on periods? It could be your feeling, product, social stress or anything!

1. I just hate the moment when bunch of stuff (blood) has to go out. I am waiting for it to happen...
2. Back & butt & stomach pain at the same time & just can't wait to shower and go to bed
3. Changing tampons

Could you tell me the WORST or BEST memory of periods? You can choose one and tell me about it.

It was... when I was 13 y.o. I didn't have too much pain or too much blood, so I could workout during period. ^{GOOD}
 Morning, just got up. Too much stuff ^{BAD} wanted to get out of me, I can feel it eew. Gross feeling.

Imagine that "Angel of periods" shows up and give you one present about periods. What would you ask?



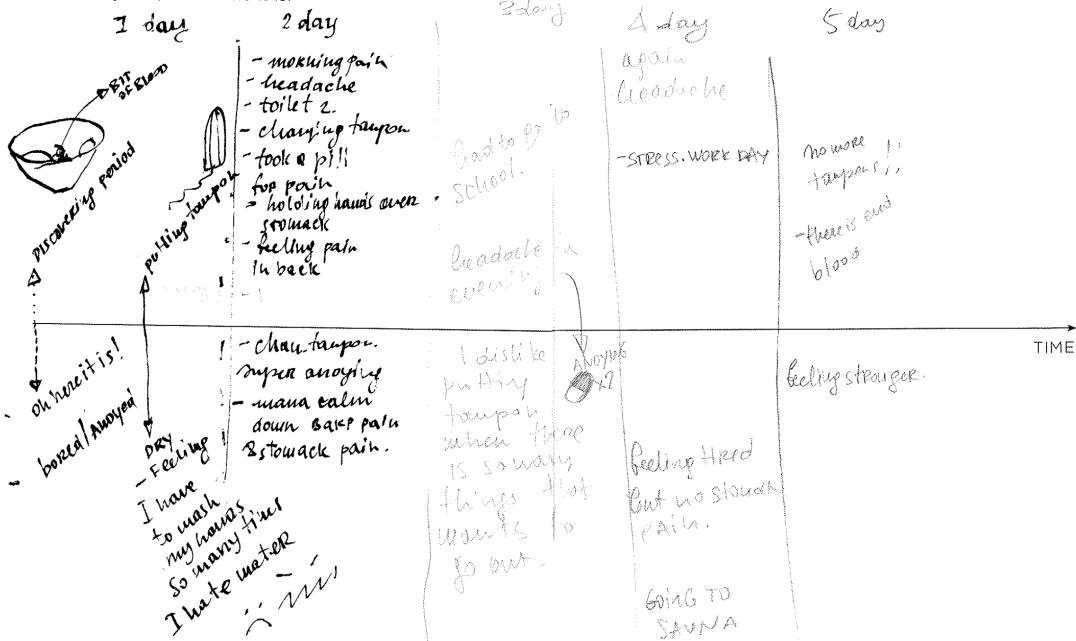
So, what do you want?

I want him to tell me when should I take painkiller and when I can actually hold the pain.

Because I can feel too unrealistic about how I am in pain ... or maybe I just feel shitty so I wanna make myself better with pills.

This is timeline when you have periods. Please write or draw your action and feeling based on time. You can mention which day it is, what time it is.

(it does not have to be very precise :))



Please put stickers on two least pleasant moments and describe the reason.

1. Pain on 3 different places, head, stomach & spine. ★
Having to drink pills...

2. Being additionally emotional & sensitive for everyday challenges. So I always think I am getting too stressed because of period. ★

Please put stickers on two most pleasant moments and describe the reason.

1. The pleasant part was filling this book. I had feeling someone will help. I read this, I have @companion that understand and cares that I have stupid little problems. ★

2.

Is there anything I missed? Feel free to write anything about periods, any suggestions, what you have thought after filling this booklet, or anything you want to tell me! :)

Regarding your project Hattie!

- I am cold always. ★
- Afraid to get bladder inflammation as I do, cold and sick.
- So I have to wear warm clothes.
- No skirts, and I LOVE skirts.
- Once I was warming myself in office with thermos with hot water, it opened and burned my but, it was painful and left a mark.
- In my country women are officially avoidin sitting on cold surfaces & trying to keep their womansparts warm. Lower stomach & back especially.

Good Luck
Love you :)
Jouana

P2

How old are you?
_____ 26 _____ years old

How heavy is your menstrual pain?

0 1 2 3 4 5
No pain at all Very bad, difficult to do normal activities

How many days do you have periods in general?
_____ 4 _____ days

How long is your cycle of periods?
_____ 30 _____ days

Choose word(s) that can represent your emotion about period!
Also, you can write some extra words on your own.

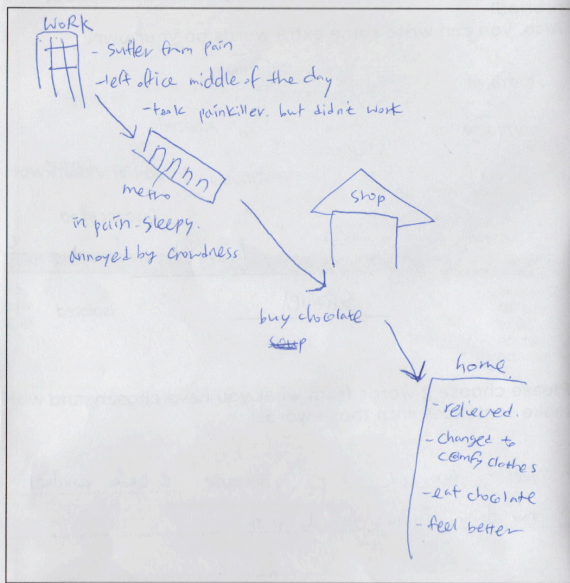
Frustrated Joyful Disturbed Inspired
Irritated Satisfied Amazed Loving
Astonished Fascinated Disappointed
Passive Bored Annoyed Relaxed
Awaiting Stressed Isolated

Please choose 2 words from what you have chosen, and make sentences with those words!

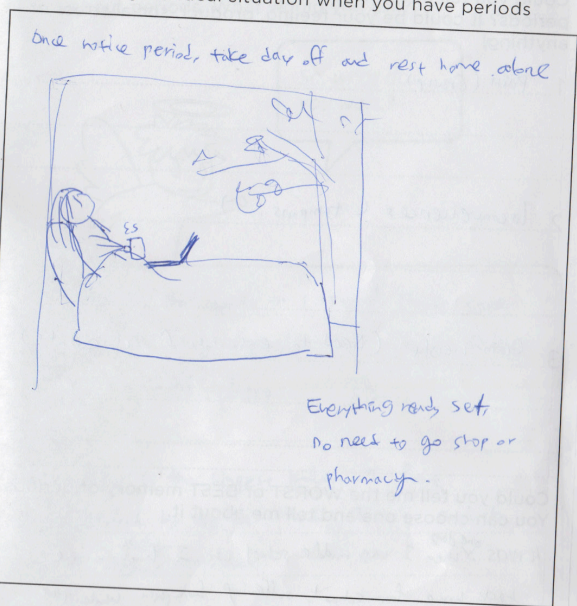
• I feel annoyed, because I can't conduct my daily activities due to pain.

• I feel irritated, because of 8 inconveniences that I have to go through due to period (changing tampons pads, taking painkillers...)

Please draw your current situation when you have periods



Please draw your ideal situation when you have periods



Could you tell me 3 most annoying things when you are on periods? It could be your feeling, product, social stress or anything!

1. Pain (Cramp)
2. Inconveniences (tampons...)
3. Crain weislat (Need to eat lots of chocolate)

Could you tell me the WORST or BEST memory of periods? You can choose one and tell me about it.

It WAS... ^{one day} when I was middle school when I had to come back home from school, suffering from pain whole time. Also, that age I had ~~that~~ ⁱⁿ stronger, longer pain.

Imagine that "Angel of periods" shows up and give you one present about periods. What would you ask?



So, what do you want?

I want painkiller that works in 1 second. Maybe some other ~~more~~ drug component that makes me feel energetic and happy.

Because pain is the biggest problem I have, I'm annoyed by the fact that I can't conduct normal ~~the~~ ^{daily} activities.

This is timeline when you have periods. Please write or draw your action and feeling based on time. You can mention which day it is, what time it is.

(it does not have to be very precise :))

ACTION (HAPPENING)

FEELING

-3
start to wonder when it starts

-2
feel like breast got bigger, want to eat lot. consistently

-1
bit anxious, Depressed, Tired

Start date

12pm

2nd date

TIME

- start to have cramp from early morning

- Have diarea

- Prepare tampon.

in the evening, when painkiller start to work

feel much better

Capable to small exercise.

- need to take painkiller.

- x capable of conducting daily activities

- Need to rest

Please put stickers on two least pleasant moments and describe the reason.

1. Diarea, don't feel like eating / doing anything. Already start to think about unfortunate destiny of today.

2. Biggest pain. Usually have to stop whatever I was doing. I fall into deep sleep if I'm in the situation where I can't take painkiller or rest.

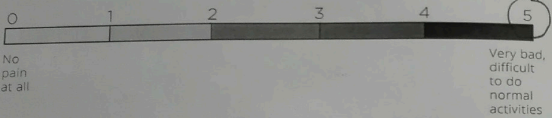
Please put stickers on two most pleasant moments and describe the reason.

1. Got out of ^{huge} pain, ^{suffering} ~~some~~.
Feel like I've climbed high mountain.

2. ~~Get~~ Observe that amount of blood is decreasing. ~~Thinking~~ think that I don't need to have this for a month at least.

Is there anything I missed? Feel free to write anything about periods, any suggestions, what you have thought after filling this booklet, or anything you want to tell me! :)

How old are you?
25 years old

How heavy is your menstrual pain?


How many days do you have periods in general?
5 days

How long is your cycle of periods?
not sure how to calculate days

Choose word(s) that can represent your emotion about period!
 Also, you can write some extra words on your own.

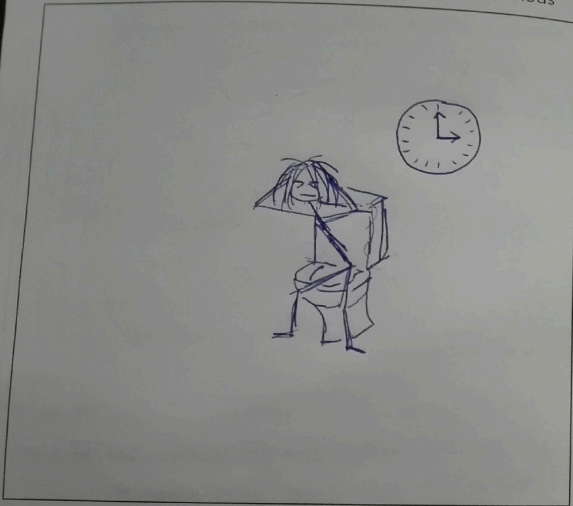
Frustrated Joyful
 Irritated Satisfied
 Astonished
 Passive
 Awaiting
 Disurbed Amazed
 Fascinated
 Bored Loving
 Disappointed Relaxed
 Isolated

gross
Heavy

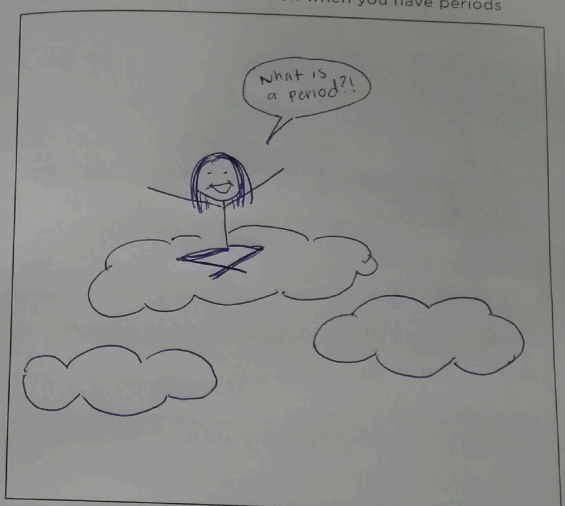
Please choose 2 words from what you have chosen, and make sentences with those words!

- I feel gross, Because I have to be careful about how I move or I can easily disturb my dispense.
- I feel irritated, Because I have to use the toilet often to change my tampon as well as because I am usually in pain.

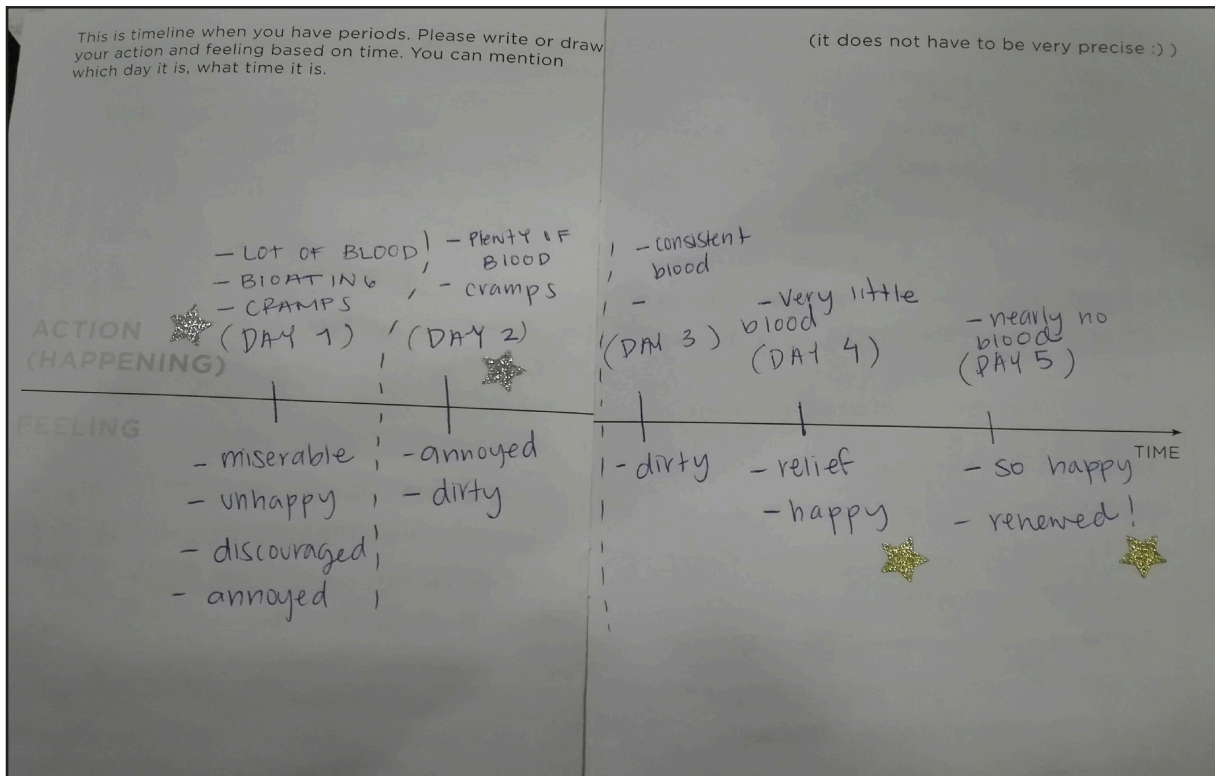
Please draw your current situation when you have periods



Please draw your ideal situation when you have periods



(A pen is visible at the bottom of the page.)



Could you tell me 3 most annoying things when you are on periods? It could be your feeling, product, social stress or anything!

1. I feel heavy, dirty, smelly, as if having just rolled around in mud.
2. I hate having to use the toilet so often to change my tampon.
3. I hate spending money on tampons and cleaning products associated with my period.

Imagine that "Angel of periods" shows up and give you one present about periods. What would you ask?

So, what do you want?

I want to never feel bloated, gassy or gross during my period ever again.

Because when I do feel this way, I can not be comfortable in my skin. Usually I will skip the days activities due to this feeling.

Could you tell me the WORST or BEST memory of periods? You can choose one and tell me about it.

It was...

When I got my period for the first time ever, I was so disturbed, because I was only 10 years old and hadn't learned about what a period was. My summer shorts were soiled in blood, so I wrapped my sweater around my waste until I had the guts to tell my mom about it.

Please put stickers on two least pleasant moments and describe the reason.

1. FIRST DAY: THIS IS THE WORST MOMENT because I realize I have to go through it all over again. It's agony!

2. SECOND DAY: THIS IS THE 2ND WORST MOMENT, BECAUSE I realize that it is still just the ~~begin~~ beginning.

Please put stickers on two most pleasant moments and describe the reason.

1. FOURTH DAY: ON THIS DAY, I feel like I can start to relax, it's nearly gone and past for the month.

2. FIFTH DAY: ON THIS DAY, I feel like a new woman! My period is pretty much gone, thank goodness!

Is there anything I missed? Feel free to write anything about periods, any suggestions, what you have thought after filling this booklet, or anything you want to tell me! :)

I think Finland would be a good place to promote the use of the "diva cup". For many reasons! It's sustainable: economically + environmentally. Also, in Finland toilets usually have small sinks in the stalls where women would be able to privately rinse their diva cups.

P4

How heavy is your menstrual pain?

30 years old

0 1 2 3 4 5
No pain at all Very bad, difficult to do normal activities

How many days do you have periods in general?

6 days

How long is your cycle of periods?

29 days

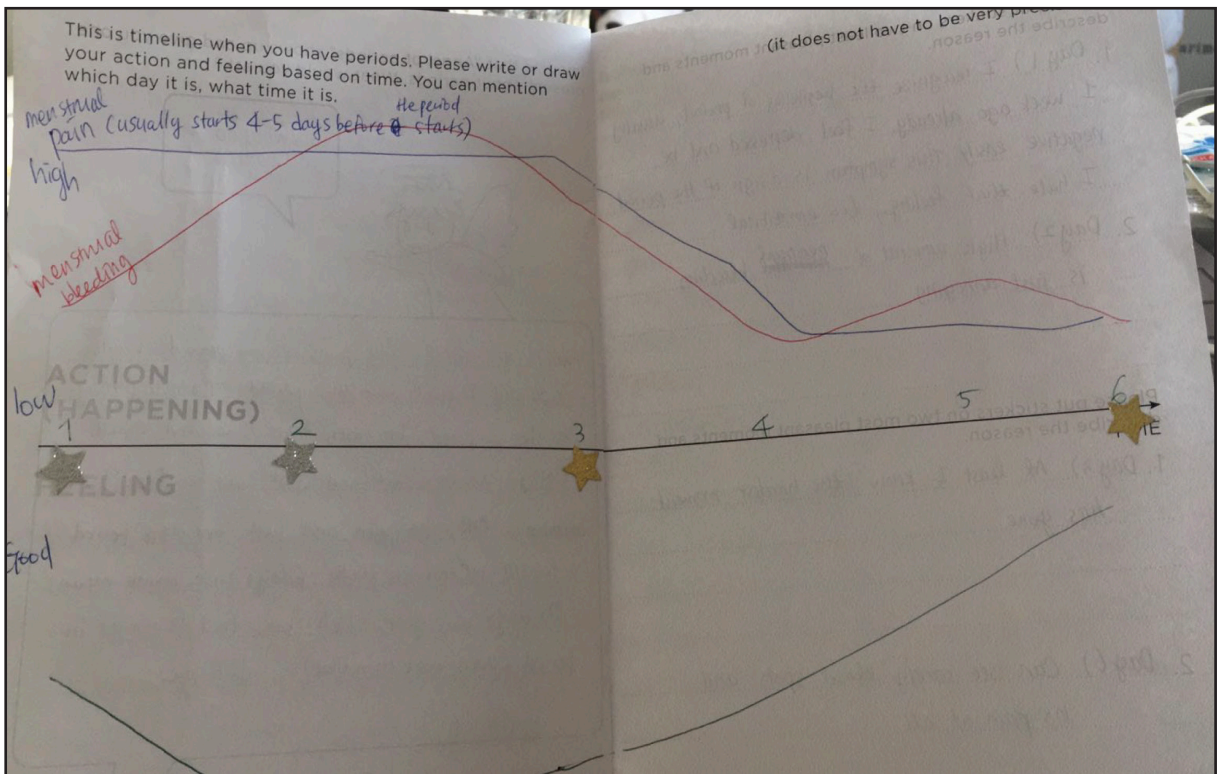
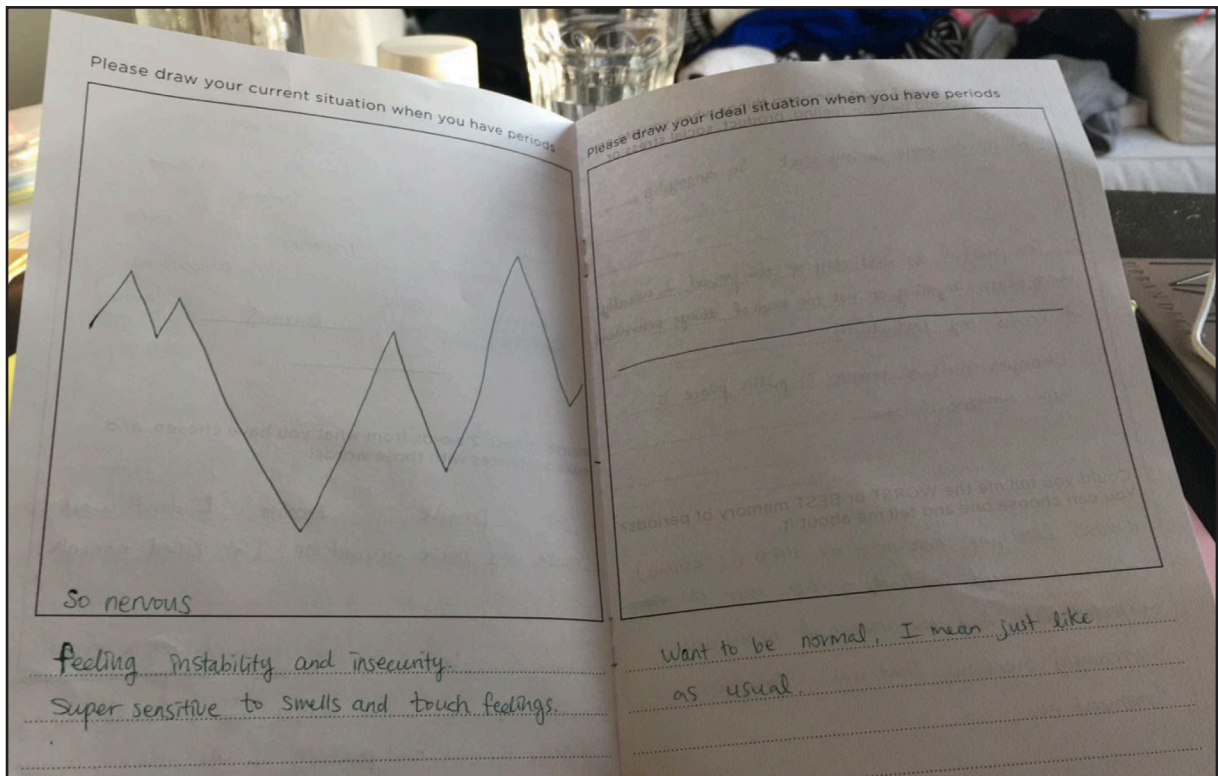
Choose word(s) that can represent your emotion about period!
Also, you can write some extra words on your own.

Frustrated Joyful Amazed Inspired
Irritated Satisfied Fascinated Loving
Astonished Bored Disappointed
Passive Awaiting anxious Relaxed
Isolated

Please choose 2 words from what you have chosen, and make sentences with those words!

I feel passive, because I don't want to make any noise around me. I'm tired enough.

I feel relaxed, because having a period means (anyway) I am alright as a female, having a proper function and possibility of the delivery a new life.
(Someday or ...)



Please put stickers on two least pleasant moments and describe the reason.

1. Day 1) I recognize the beginning of period, usually 1 week ago already. I feel depressed and be negative easily. This symptom is a sign of the period. I hate that feeling, too emotional.
2. Day 2) High amount of ~~menstrual~~ menstrual bleeding is just annoying.

Please put stickers on two most pleasant moments and describe the reason.

1. Day 3) At least I know the hardest moment has gone.
2. Day 6) Can see rarely blood spots and no pain at all.

Is there anything I missed? Feel free to write anything about periods, any suggestions, what you have thought after filling this booklet, or anything you want to tell me! :)

About the period! Lots of things I want to say, just with the only reason of being a female, this physical function makes millions of girls feel panic and annoying!! It's not fair. Look at the price of the pads and tampons. There should be ^{financial} support for the menstrual related products (at least to not everyone but young students). In addition, I'm curious other people also feel emotional ^{1 week} or several days before the period starts. For me, 5-7 days before its beginning, already can feel pain and emotional change, plus tiredness. Please share the result with me! Thanks and Good luck with your thesis Sunny.♡

Please put stickers on two least pleasant moments and describe the reason.

1. Day 1) I recognize the beginning of period, usually 1 week ago already. I feel depressed and be negative easily. This symptom is a sign of the period. I hate that feeling, too emotional.
2. Day 2) High amount of ~~menstrual~~ menstrual bleeding is just annoying.

Please put stickers on two most pleasant moments and describe the reason.

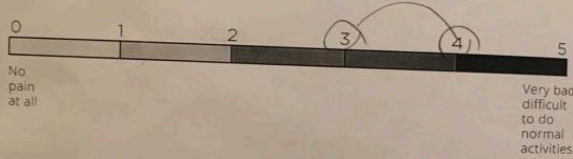
1. Day 3) At least I know the hardest moment has gone.
2. Day 6) Can see rarely blood spots and no pain at all.

Is there anything I missed? Feel free to write anything about periods, any suggestions, what you have thought after filling this booklet, or anything you want to tell me! :)

About the period! Lots of things I want to say, just with the only reason of being a female, this physical function makes millions of girls feel panic and annoying!! It's not fair. Look at the price of the pads and tampons. There should be ^{financial} support for the menstrual related products (at least to not everyone but young students). In addition, I'm curious other people also feel emotional ^{1 week} or several days before the period starts. For me, 5-7 days before its beginning, already can feel pain and emotional change, plus tiredness. Please share the result with me! Thanks and Good luck with your thesis Sunny.♡

P5

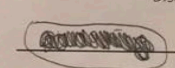
How old are you?
29 years old

How heavy is your menstrual pain?


How many days do you have periods in general?
1 days

How long is your cycle of periods?
5 days

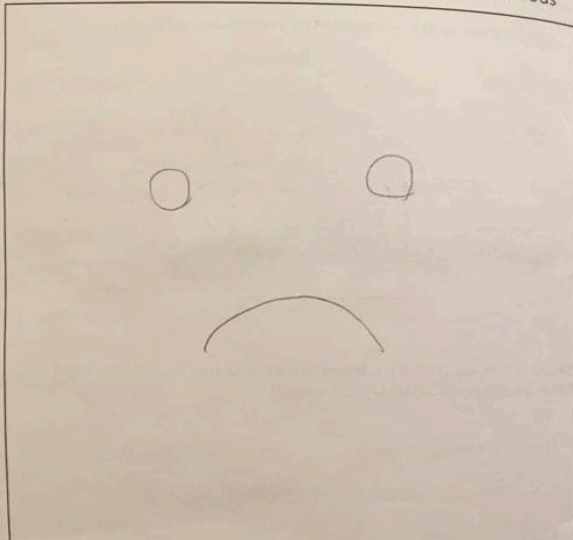
Choose word(s) that can represent your emotion about period!
 Also, you can write some extra words on your own.

Frustrated Joyful Disturbed
Irritated Satisfied Amazed Inspired
 Astonished Fascinated Loving
 Passive Bored Disappointed
 Awaiting  Relaxed
 Isolated

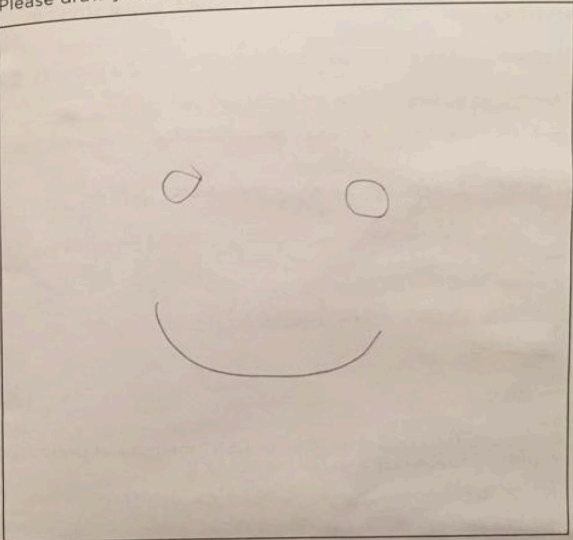
Please choose 2 words from what you have chosen, and make sentences with those words!

- I feel Frustrated, because i am not able to work or whatever without painkiller.
- I feel Irritated, because all the time when I am in my periods, I care about the smell and ~~my~~ feeling emotional changes that might have an effect on people.

Please draw your current situation when you have periods



Please draw your ideal situation when you have periods



I don't remember my exact current situation. I only remember my ~~emotional~~ feelings and pain when I was in my period, that's why I drew this simple face on this page.

Could you tell me 3 most annoying things when you are on periods? It could be your feeling, product, social stress or anything!

1. When I have to go to hiking or swimming to nature and there are a few toilets or no toilets.
→ inconvenience and ~~insecurity~~ insecure feeling
2. When I need to go back to work after taking pain killer
→ Social stress
3. When people make (sexual) jokes about ~~periods~~ periods.
→ feeling

Could you tell me the WORST or BEST memory of periods? You can choose one and tell me about it.

It was... Seven years ago, I went to ^{the} emergency room because of the pain. Then, doctors and assistants came to me and probed me with a device and there were seven people discussing about my body while staring at me. That was the ~~best~~ worst experience ever.

Imagine that "Angel of periods" shows up and give you one present about periods. What would you ask?



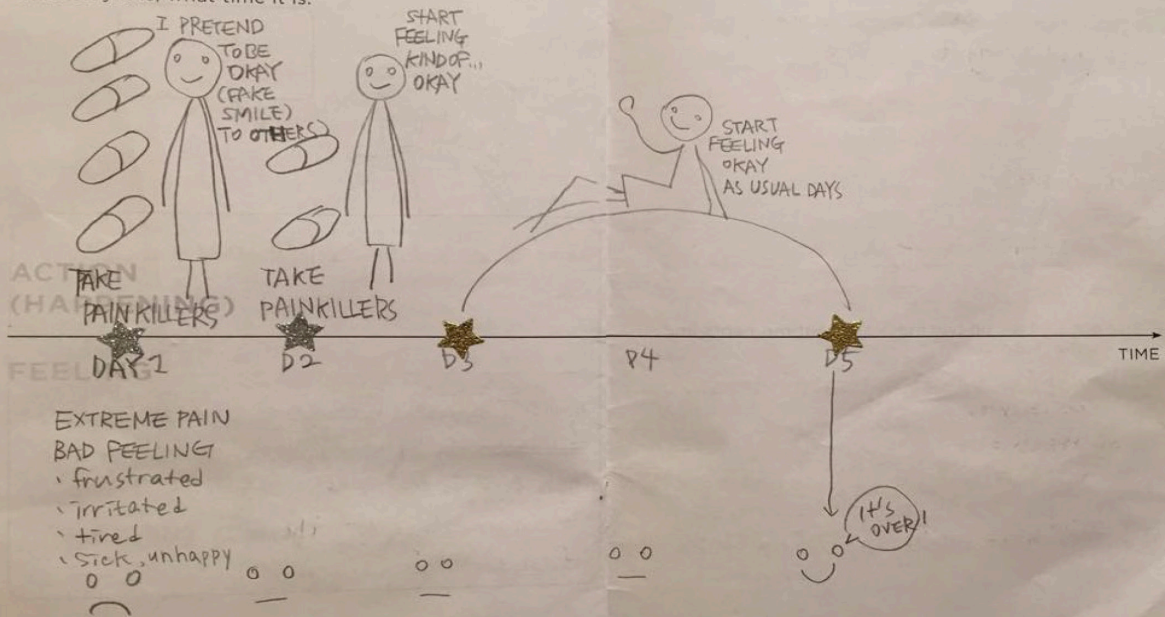
So, what do you want?

I want to get rid of my pain forever.

Because I am ~~okay~~ with being in my period, ~~however~~ ^{it's} because of my ability to ~~prevent~~ get kids and I feel good about that I could be a mom. However the pain ruins it for me.

This is timeline when you have periods. Please write or draw your action and feeling based on time. You can mention which day it is, what time it is.

(it does not have to be very precise :))



Please put stickers on two least pleasant moments and describe the reason.

1. I feel bad about taking dose (painkiller) and pretending to be okay.

2. (See above)

Please put stickers on two most pleasant moments and describe the reason.

1. I feel good when my pain stops.

2. I feel good when my period stops.

Is there anything I missed? Feel free to write anything about periods, any suggestions, what you have thought after filling this booklet, or anything you want to tell me! :)

P6

How old are you?

27 years old

How heavy is your menstrual pain?

0 1 2 3 4 5

No pain at all

Very bad, difficult to do normal activities

How many days do you have periods in general?

5 days

How long is your cycle of periods?

50 days

Choose word(s) that can represent your emotion about period!
Also, you can write some extra words on your own.

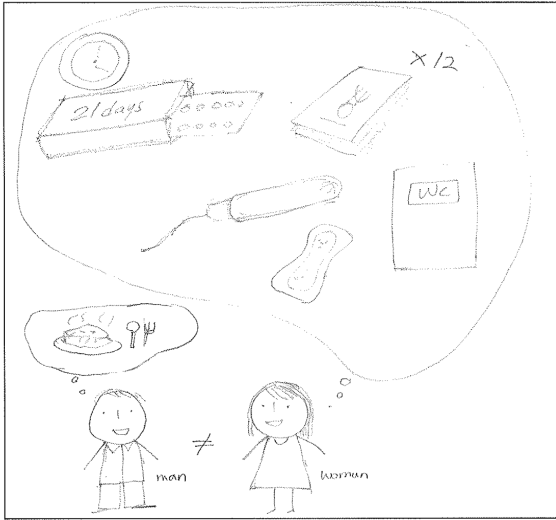
Frustrated Joyful Disturbed Inspired
Irritated Satisfied Amazed Loving
Astonished Fascinated Disappointed
Passive Bored Relaxed
Awaiting Isolated

Please choose 2 words from what you have chosen, and make sentences with those words!

I feel irritated, because I should check time to remove and change tampons every three hours.

I feel disturbed, because my period is usually irregular so if it doesn't start for more than one month, I often feel anxious by worrying about the pregnancy.

Please draw your current situation when you have periods

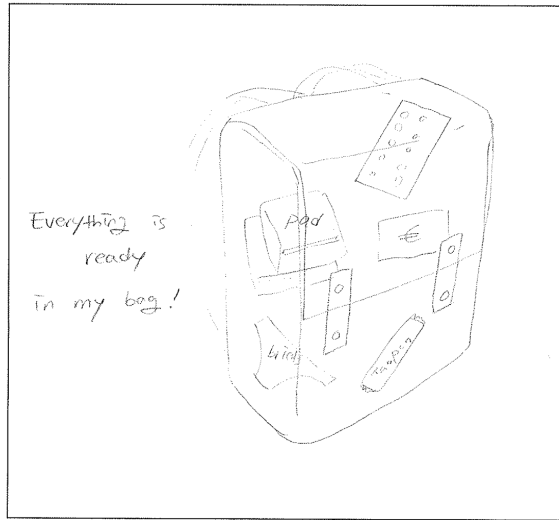


.....

.....

.....

Please draw your ideal situation when you have periods



.....

.....

.....

Could you tell me 3 most annoying things when you are on periods? It could be your feeling, product, social stress or anything!

1. Menstrual pain during my period. I should take a painkiller before it begins.
2. checking time every three hours to change tampons.
3. I have irregular periods so it is hard to prepare since I don't know when it exactly begins.

Could you tell me the WORST or BEST memory of periods? You can choose one and tell me about it.

It was... when I was 19 years old. I didn't have a period for 9 months at that time since I got a lot of stress because of college entrance exams. During that 9 months, overall my health broke down, so I visited a maternity clinic and got an injection for periods there. As a result, I started my period again. It is my worst memory of periods.

Imagine that "Angel of periods" shows up and give you one present about periods. What would you ask?



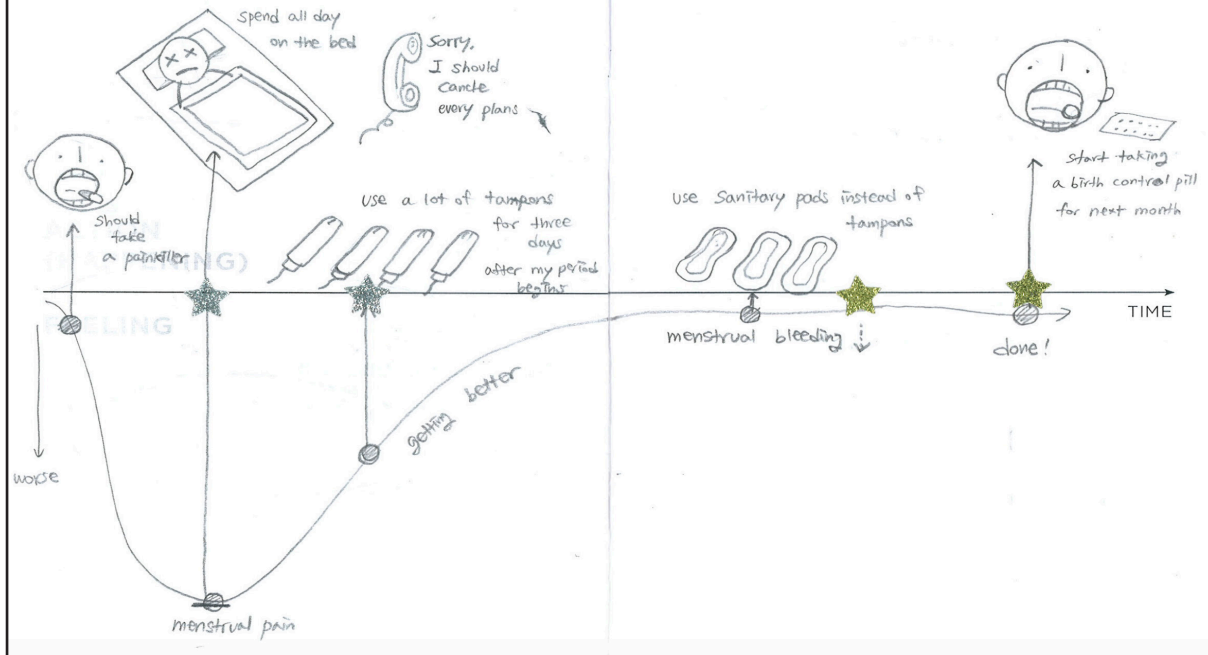
So, what do you want?

I want to have a regular period like other girls.

Because I don't like such moments when my period just begins out of blue although I don't have any tampons or painkillers.

This is timeline when you have periods. Please write or draw your action and feeling based on time. You can mention which day it is, what time it is.

(it does not have to be very precise :))



Please put stickers on two least pleasant moments and describe the reason.

1. I have the biggest cramps on the first day or second day.

2. I should check the time for changing tampons all day long.

Please put stickers on two most pleasant moments and describe the reason.

1. I do not feel the cramps anymore.

2. I can get freedom from a period.

Is there anything I missed? Feel free to write anything about periods, any suggestions, what you have thought after filling this booklet, or anything you want to tell me! :)

I think if there is a question about what kind of products people use for their periods, it would be interesting. For example, there is a big difference between Europe and Asia. European women usually use tampons. On the other hand, Asian women usually use sanitary pads. According to the products, personal experiences about periods could be changed a lot.

Aalto university
School of Arts, Design and Architecture
Collaborative and Industrial Design
Master's Thesis

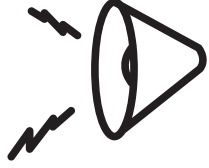
Su Myeong Choi
sumychoi@gmail.com
<http://sumychoi.com/>



Aalto University

"I feel annoyed when people make jokes about periods. Period is not something sexual"

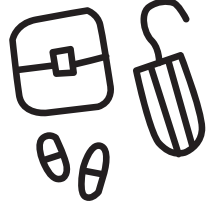
Period does not need to be considered as sacred or secret activity, but it is still private status or our body. We want some privacy.



Sensitivity to deal with it

"I always think of my periods as financial burden, cause I always to spend money on tampons and stuff"

Many other factors influences experience during period. Such as financial burden of purchasing hygiene products and annoyance of finding the closest toilet.



Tampons, painkillers and toilets: Other related things to period

SIX GUIDELINES FOR DESIGNING RELATED THE PERIOD

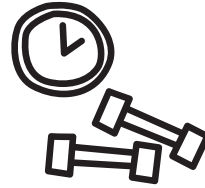
"Having a period means (anyway) I am alright as a woman, having a proper function and possibility of delivering new life"

We would like to know what is happening to our body, associated with what influences we get from what we use or wear during period.



Knowing what is happening to body

Period as the part of the daily life



"I cannot be comfortable in my skin..usually I will skip the daily activities due to period"

We want to continue normal daily activity during the period without pain and hassle. Menstruation is not only one part of the month, but also happening throughout the whole month with different happenings on former stages of period.

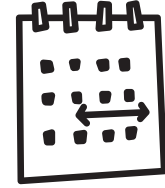
"But then also I have this feeling of excuse. Okay, this is my first day of period, I will lay on bed a bit longer..kind of escape from daily restriction"

We would like to feel relaxed, calm during the period. We would like to avoid unpleasant excitement during period.



Period as a calm phase

Anticipation and predicting a period



"I don't like such a moments when my period just begins out of blue and I don't have any tampon or painkiller"

We want to predict the period and keep track of it. Randomness of period add pain to us. We would like to be prepared with painkillers, tampon and other necessary things.

What happens during, before and after a period?

	DAY 1	DAY 2	DAY 3	DAY 4, 5, 6
What I feel /think	<ul style="list-style-type: none"> · I wanna be sick. · Take care of me · Need to be prepared, · Don't want to waste tampons · Start to realize that I will have a periods 	<ul style="list-style-type: none"> · I need christmas lights, chocolate milk. · Worried about leakage 	<ul style="list-style-type: none"> · Sometimes using pads. but I like tampon more. · Forget about period · Used to it. Oh yeah, I am a woman. 	<ul style="list-style-type: none"> · Thank God. relief. · Annoyed by gynecologist that asked me. how long is your period?? what to count? does this count? · Can I have sex already? · Feeling much better
What I Do	<ul style="list-style-type: none"> · Take painkiller (weekday) · Rest, try to restrict outdoor activity (weekend) · Wear comfy clothes without too much pressure · Have to go to toilet, Sometimes ugergent · Change to the pad before going to bed 	<ul style="list-style-type: none"> · Set alarm to change tampon at night, for 1,2,3 day · Need to change tampons often 	<ul style="list-style-type: none"> · Wear more tight clothes, especially outside · How to put tampon before I go to bed, as late as I can. 	<ul style="list-style-type: none"> · Forgetting I have tampon, When do I have to change it? · How much is in the box. How long can I use this?
What is happening	<ul style="list-style-type: none"> · Cramp begins · Pain on whole utrus · Back spine pain · Less blood circulation · Physically restricted 	<ul style="list-style-type: none"> · Still pain, but less. · More blood! · Physically restricted 	<ul style="list-style-type: none"> · Getting less blood · No pain 	<ul style="list-style-type: none"> · A bit of blood

- Couple of days before, breast get bigger
- 1 day before
- -can't sleep well
- -depressed
- Let's have sex before it starts

- Start to think I should have the period soon
- Start to crave sugar and crappy snacks
- super anxious, more mentally. carppy feeling

- Start to think about next period
- It feels like last period was centuries ago
- Buying tampon is financial burden

OTHER DAYS..