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I Introduction

I.1 Sustainable Development Goal

Although historically, the feminist movements have brought a profound transformation in modern society, today's women are still facing many issues, such as inequality in families, economics, workplaces, and positions of power. This inequality stems from both physical differences and collective consciousness in the context of a patriarchal society. In 2015, all United Nations Member States reached an agreement on the 2030 agenda for substantial development which provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. It is summarised in a framework with 17 substantial development goals (SDGs). Among these goals, SDG 5 intends to achieve better gender equality (United Nations, 2022). Women have been on the weak side in the patriarchal society, so anything we do to help women and care about women's menstruation is a way to help women's equality. Rooted on it, to provide a better experience for female students in the university is the main goal of this project.

I.2 Background

A service related to our vision is to enable feminine to quickly access sanitary products and essential medicines. An astonishing fact is that menstrual pain was reported by 84.1% of women, with 43.1% reporting that pain occurred during every menstruation. (Grandi et al., 2012) The pain can sometimes be severe. Previously, on the campus of the University of Southern California, there were vending machines with essential medicines for students to access at any time, since students may need Advil or condoms late at night. (USC Alfred E. Mann School of Pharmacy and Pharmaceutical Sciences, 2019) This idea was valued and was planned plan to integrate fast access to essential goods as a part of our service. And meanwhile, we notice that there are many applications used to track and predict menstrual cycles in the market. At its core is a tool to meet the basic needs of women, although they may differ in their concrete user interfaces.

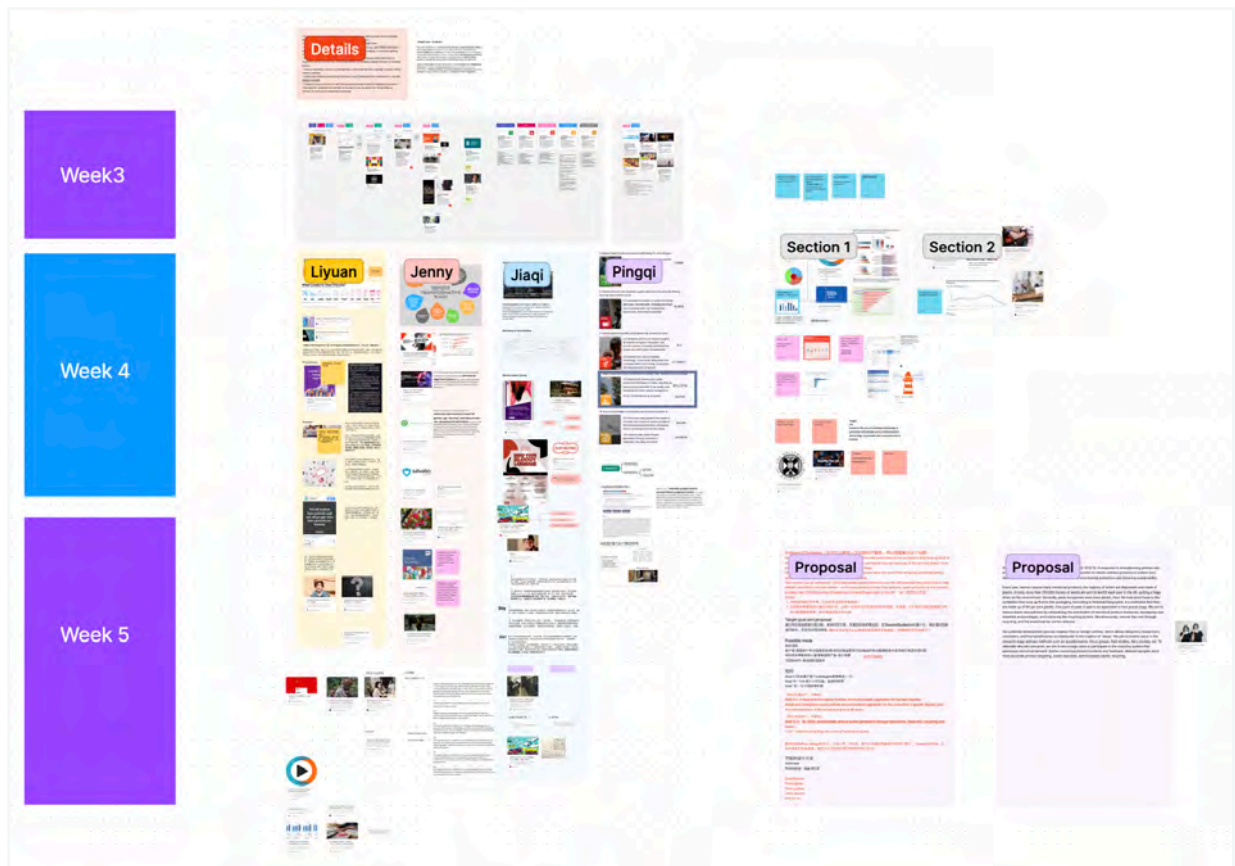


Figure I. Evidence of background research

1.3 Design Insight

Based on these observations, the aim of delivering a small-scale experimental campus service that can provide a better experience for female students during menstruation formed.

This project provides a service system based around an entertaining App, which enables accurate prediction of menstruations, facilitates menstrual material needs and gives users emotional care during their menstruations.

2 Design Process

2.1 User Research

In order to better understand user needs, three design methods were applied to explore user behaviour, feelings and thoughts. According to multiple design methods (referring to reference [5] and [6]), interview and cultural probe are used to exploring the positioning and main functions of the product, while co-design was used as a user test and to better develop user-centred design.

2.1.1 Interview

A. User Interview

In order to address the women's rights issues faced by SDG5 (mentioned in the 1.1 SDG), both male and female perceptions, opinions and feelings about menstruation should be taken into account in the discovery of user needs. Therefore, separate versions were created for male respondents (4) and female respondents (5). In the interview, menstrual shame, the impact of menstruation on life and what is urgently needed in menstruation (not limited to menstrual products) were the main concerns.

According to the summary and analysis of the interview, menstrual prediction Apps were mentioned by most of the interviewees. Therefore, market research on multiple menstrual prediction Apps was processed to gain functions and defects (Figure 2).

Interview Summary						
Name	Opinion on period tracking App		Needs when period comes	Points on the period	Opinion on males	Other things needed during period
	Used or not	Opinion				
Bian Xinyang	<input checked="" type="checkbox"/>	It is not reliable. Always forget to record.	Would like employers and universities to provide one day of menstrual leave per month.	Feels that pain killer might be harmful to body.	-	Hot milk, dessert
Miao Yu	<input checked="" type="checkbox"/>	The notification of the App is helpful.	Hope males learn more knowledge about the period, pregnancy, and so on.	Feels relaxed when menstruating because sometimes the period comes not very regularly.	Males need to learn more and it will be helpful for the society.	Some mental comfort
Yanan Zhang	<input checked="" type="checkbox"/>	It is helpful to record the period, but it is not accurate many times.	Just hope the period can come more regularly.	The period is pleasing because you will be worried about it if it does not come. But it is also troublesome since you have to change the region frequently.	Males need to understand females' feeling.	Foot bath
Laura Hutchison	<input checked="" type="checkbox"/>	No need to use the App because usually, the period comes very regularly.	Hope to take fewer medicines in future and feel less pain when the period comes. Also, I want my schedule of life and study to be more flexible.	I come from a very conservative area in the US. So, I would like to talk with others on this topic generally.	I would not like to mention the period when talking with men. Compared to my hometown, the United States, Scotland males are more friendly concerning the topic of the period.	Want to stay in a familiar place
Isla Harper	<input checked="" type="checkbox"/>	Previously thinking of the App was not accurate. And now does not need to use the App because of the period control prescription.	May need a subscription service for cheaper sanitary products. Hopefully, the products could be delivered to my home directly.	I Would not like to mention the period directly with others.	I'm not willing to talk about the topic with males except for my father.	Movies used to distract me
Ice Jiang	<input checked="" type="checkbox"/>	The App could help to record. Its prediction function is not accurate.	A product like a cloth with heated belt would be helpful. And I want to do sports as usual when the period comes.	It is just a normal physiological phenomenon.	Males need to learn more about the knowledge of menstruation.	Heat pad with scents

Figure 2.

B. Persona and User Journey

Based on the events and physical and psychological problems that girls would have around their menstruations as shown in the interview results, two personas were created to represent female users with most of the major menstruation problems. (Figure 3/4) At the same time, user journey was created to simulate the formation and feelings of users during their menstruations. (Figure 5) Thus, the user need the product would satisfy was obtained, which is the desire to be

prepared for the onset of menstruation in advance, as user does not have the energy to go out and buy what is needed during menstrual cramps.



Figure 3.



Figure 4.

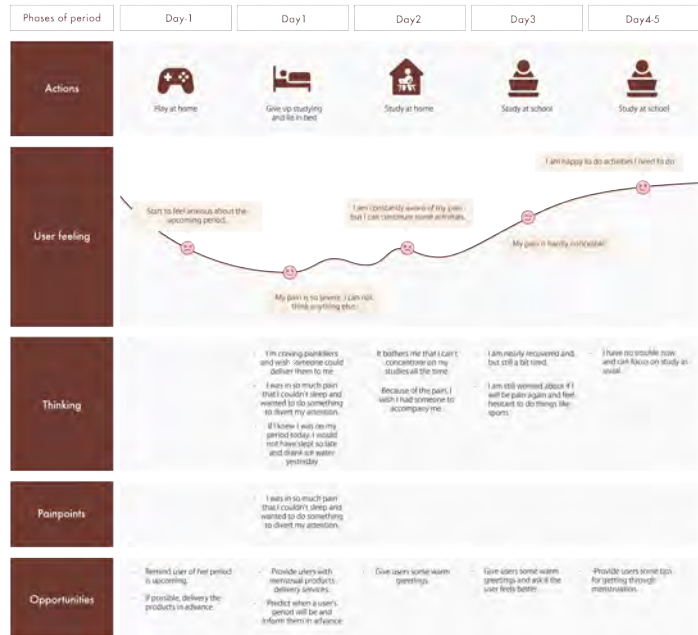


Figure 5.

2.1.2 Cultural Probe

A. Cultural Probe

In order to understand the specific needs of the users and the details of their lives, a cultural probe was used, also for male and female respondents. The female probe contains a body pain board, a comfort card, a feeling board and a preference map, while the male probe contains only the first two. (Figure 6) The Cultural probe was administered on a 2-3 week cycle in order

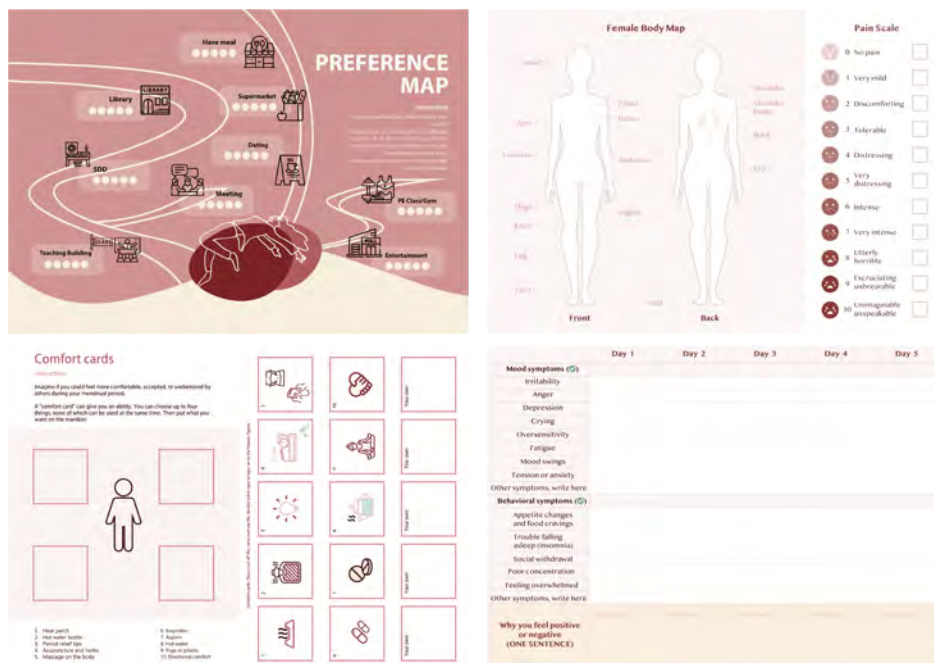


Figure 6.

to allow respondents to record their feelings at the time of their menstrual cycle, rather than just from memory. From the 9 female and 2 male probes collected, the following points were drawn:

- Inconvenience caused by different locations for purchasing different supplies.
- Lack of timeliness in the distribution of supplies
- Personalised product supply
- Distraction to relieve pain
- Need of mental comfort

B.First Version of Outcome

Combining the findings of both the interview and cultural probe cycles, a model and service system for the initial version of the app was proposed. (Figure 7) At the same time, the user side for male users was also taken into consideration. This version will be presented in 2.1.3 Co-design & User Test.

- In this version, the main functions provisionally included:
- Menstruation tracking
 - Personalised menstruation kit
 - Companionship and entertainment

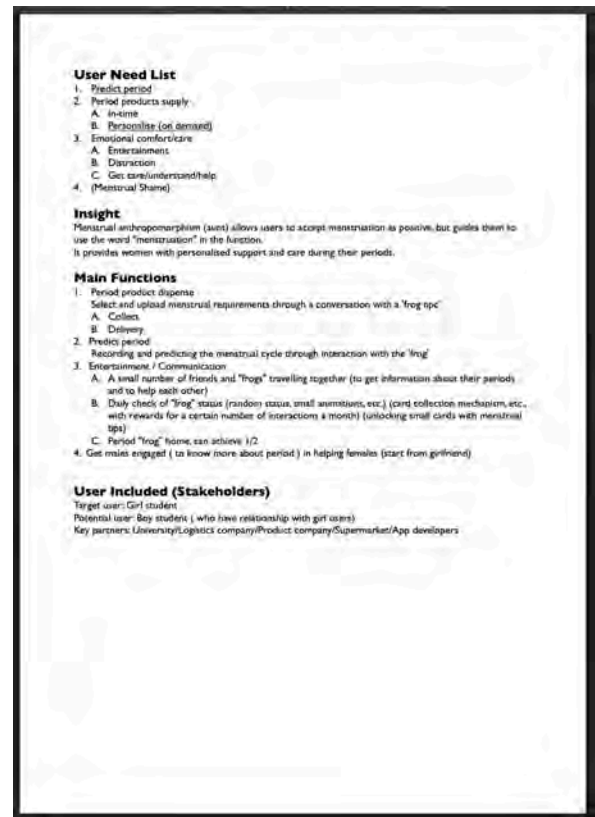


Figure 7.

2.1.3 Co-design & User Test

The first version of the App and delivery system was presented to users in the form of a tabletop game with the goal of allowing users to experience the functionality of the product. (Figure 8) At the same time, the game allowed the users to experience the process in a more understandable and fun way. (Figure 9)



Figure 8.



Figure 9.

From the feedback of the participants, the following were derived:

Two features and experiences need to be valued: accuracy of date prediction, entertainment interactivity.

One additional feature was expected: the physical end of the product. (etc. wearable devices with temperature detecting sensor to calibrate the prediction)

One feature needs to be removed: the male client. (For the reason of that participants feedback that building a male user side does not make males more motivated to engage in caring for females, the product should focus more on the female users)

2.2 Concept

2.2.1 Definition

In combination with the above user research and testing, the final product positioning and functionality was clarified: a service system based around an entertaining App that enables accurate prediction of menstruations, facilitates menstrual material needs and gives users emotional care during their menstruations.

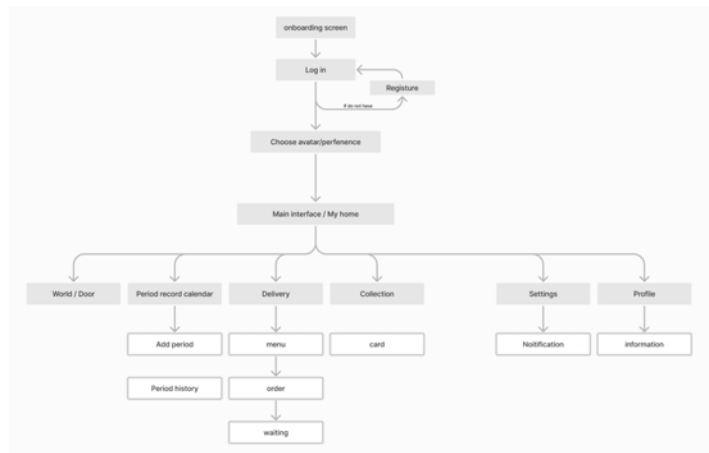


Figure 10.

2.2.2 Flowchart and Wireframe

Flowchart and Wireframe were created so that the full functionality of the product and the using process can be clearly presented in order to confirm the final version. (Figure 10) (Figure 11)



Figure 11.

2.3 Final Output

2.3.1 Storyboard

Several using scenarios which show main functions are presented in the storyboard.(Figure 12)



Figure 12.

2.3.2 High fidelity

A. Main functions

Tracking menstruation

Reminders for upcoming menstruations via pet conversations. It is a much easier way of interacting with menstruation than just actively entering it from memory.

Delivery service

Users can choose the amount of supplies they need and the channel how they get them, which allows for personalisation. At the same time, the selectivity of the quantity of supplies reduces waste, as research has shown that many people will only use one piece but buy a whole pack of medication for emergency.

Entertainment

All functions can be achieved through interaction with the pet character. And the behaviour of the pet provides companionship to the user. This makes the App more entertaining and emotionally caring, because pet games empirically reduce stress level (Na, Park and Dong, 2022).

B. Sub functions

Collection

Save and collect pet status cards by viewing the world page and encourage users to use the App through a collection reward mechanism

Notifications

Timed tweets of caring words or menstruation tips and interactive desktop component to give users emotional care.

C. Potential function

1 Wearable devices (mentioned in 2.1.3)

2 Memory with pet character

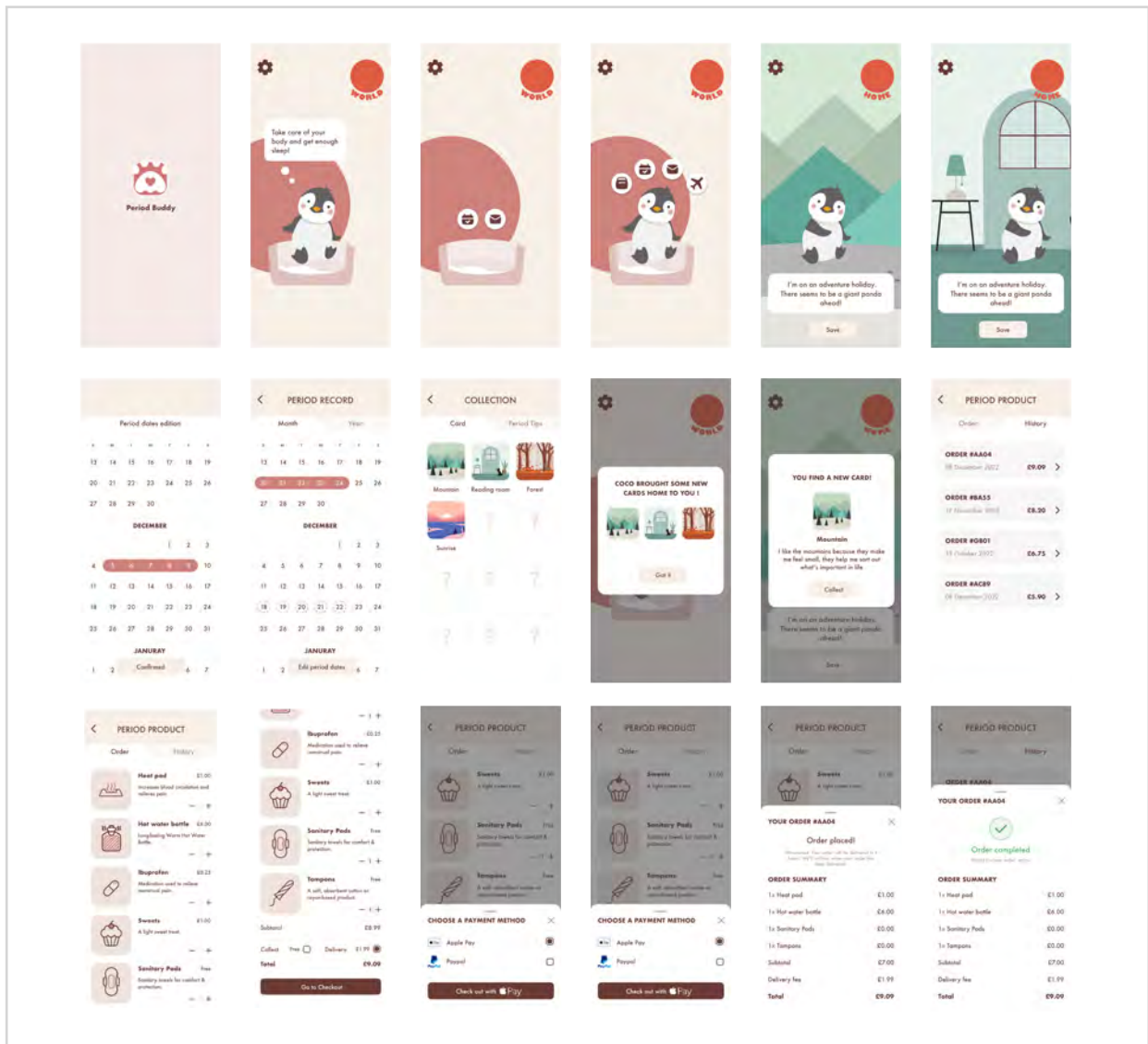


Figure 13.

3 Reflection

In this project, we have made good use of the three design methods and sequenced them in a logical way. After each cycle, we have clear conclusions or points that have an impact on the final result.

One of the most noteworthy is our culture probe. In order for participants to fill in details of their feelings during menstruation, we set the recall period at 2-3 weeks. This allowed details to be collected about their menstruation in the moment, rather than inaccurate information filled in from memory alone.

During the interview, despite the fact that the results were not what we expected, we were able to identify unconsidered psychological aspects of the users' needs. At the same time, our market research and functional research on menstrual prediction software was also stimulated and started here.

The tabletop game in Co-design was the vehicle for presenting the features of our initial release. This way the user feels more involved and has a better experience of the process than if they were directly presented with the features of the app and gave their opinion.

In the final output phase, we increased the richness of the App's function. We incorporated a variety of key features from similar Apps and enhanced their caring and social nature in a way that has never been seen on the market before. By adhering strictly to the design process, we iterated and refined the details and

interactions in each functional section in multiple versions. We also anticipated potential features to be developed for the product. All of these made our design more user-sticky and expanded the reach of the App.

4 Table for Group Contributions

Group member name	Responsibilities and contributions	
Jenny LONG	Research Interview Cultural probe Co-design Iteration High Fidelity Report Video shooting Video Editing Video Presentation	25% 30% 25% 25% 30% 5% 0% 35% 20% 15%
Jiaqi DONG	Research 25% Interview 30% Cultural probe 25% Co-design Iteration High Fidelity Report Video shooting Video Editing Video Presentation	25% 30% 25% 25% 30% 0% 75% 35% 45% 5%
Liyuan SUN	Research 25% Interview 30% Cultural probe 25% Co-design Iteration High Fidelity Report Video shooting Video Editing Video Presentation	25% 30% 25% 25% 30% 95% 0% 10% 30% 5%
Pingqi LI	Research Interview Cultural probe Co-design Iteration High Fidelity Report Video shooting Video Editing Video Presentation	25% 10% 25% 25% 10% 0% 25% 20% 5% 75%

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