Faculty of Science and Technology

Department of Computer Science

User Experience Design

CST3180

Phase 1: Group Report

Project Title: Period Tracking App

Student ID: M00852973, M00851354, M00857842

Contents

1. Problem definition

1.1 Background

The menstrual cycle is an integral aspect of women's health, impact not only physical wellbeing but also significantly on the psychological and emotional states. Despite its critical role, a substantial portion of women encounter reproductive health challenges dexterously monitoring their menstrual cycle. This difficulty stems from a myriad of factors, including irregular menstrual cycle patterns, a deficient understanding of menstrual health intricacies, particularly polycystic ovarian syndrome (PCOS) which is a common hormonal disorder currently raging among women of reproductive age and the absence of a sophisticated, user-centric tool for accurate tracking and insightful analysis.

1.2 Existing solutions and identified gaps.

The digital landscape proffers countless menstrual cycle tracking applications in all distribution services, including the acclaimed Flo app (FINN H, 2023). Nonetheless, users frequently articulate dissatisfaction with these extant solutions, citing several pervasive issues: -

Table 1 - Identified gaps.

Reasons	Explanation
1. Accuracy and predictability issues	A crucial concern is the lack of accuracy in predicting menstrual cycle where it has been coined that the average prediction error margin is 5.6 days (Winter, 2018), a challenge further compounded for the those with irregular cycles or diagnosed with PCOS.
2. Educational resources shortfalls	There is a significant loophole in the provision of thorough medical vetted information about menstrual health and its related conditions, preventing users to take necessary measures (McShane, 2021).
3. User experience shortcomings	Certain applications are beleaguered with convoluted interfaces or a dearth of essential functionalities diminishing their user-friendly aspect.
4. Lack of tailored health insights	Most applications offer health advice, lacking customization needed for users with fertility issues, PCOS, pre-menopause and anaemia.

1.3 Problem solution

Acknowledging these challenges underscores the need for a more robust period tracking solution. The quintessential application should be equipped with accuracy, user interface enhancements, encompass stringent data privacy measures and an extensive educational content that also provides health insights. Delving into and addressing these user requisites is paramount for the development of an application that truly empowers women in their menstrual health management with efficacy and assurance.

2. Expert evaluation of an existing similar system

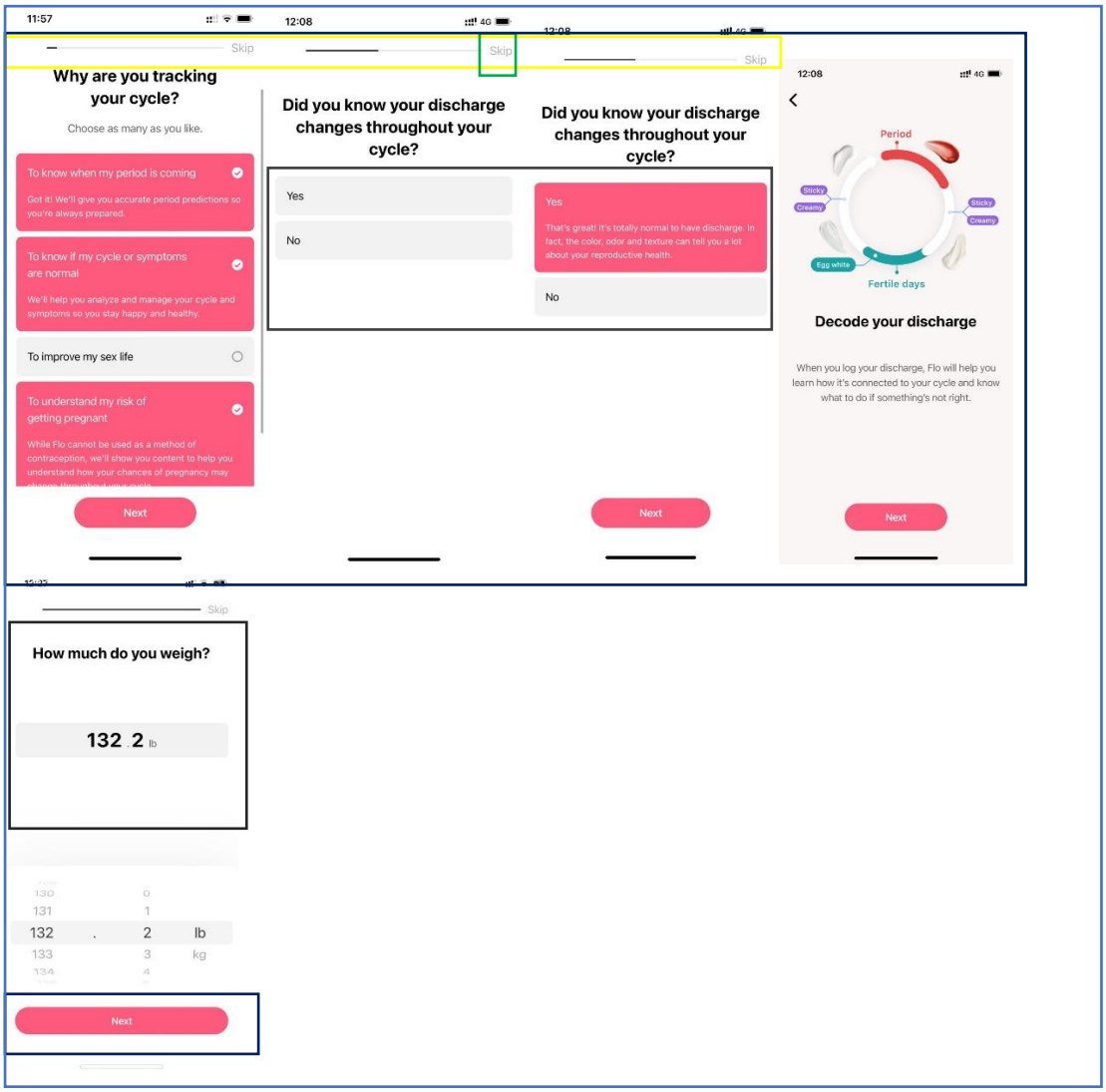


Figure 1:Questionnaire Page 1, 2, 3, 4, 5

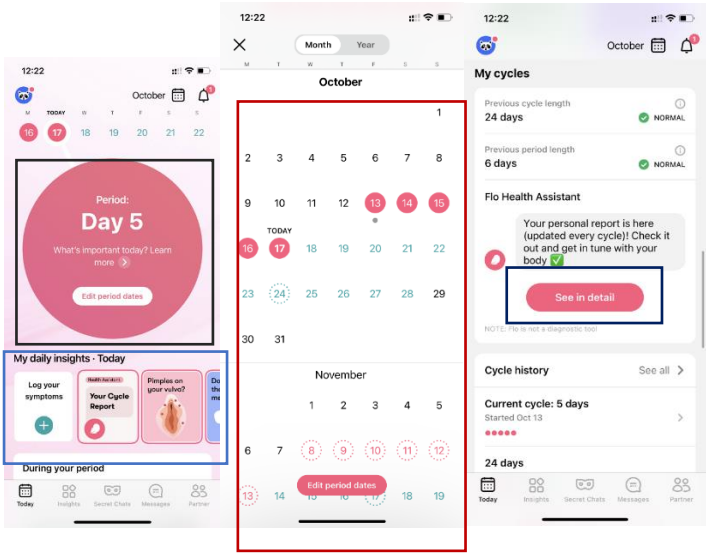


Figure 2: Home Page 1, 2, 3

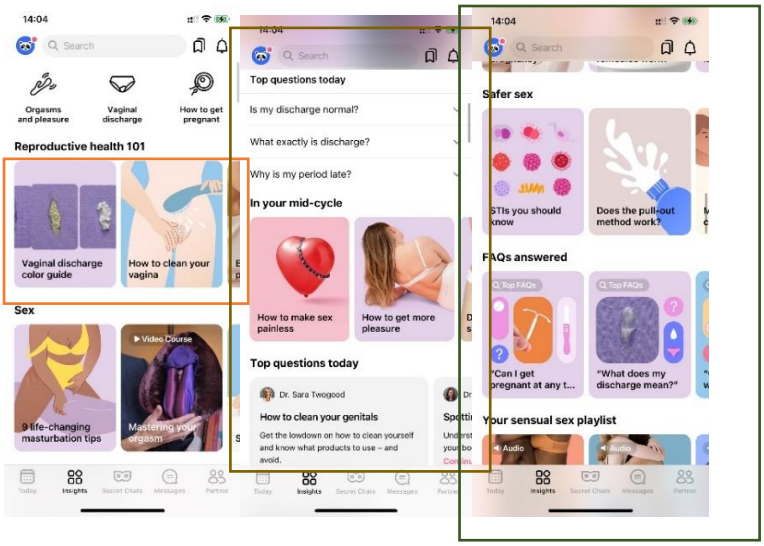


Figure 3: Insights Page 1, 2, 3

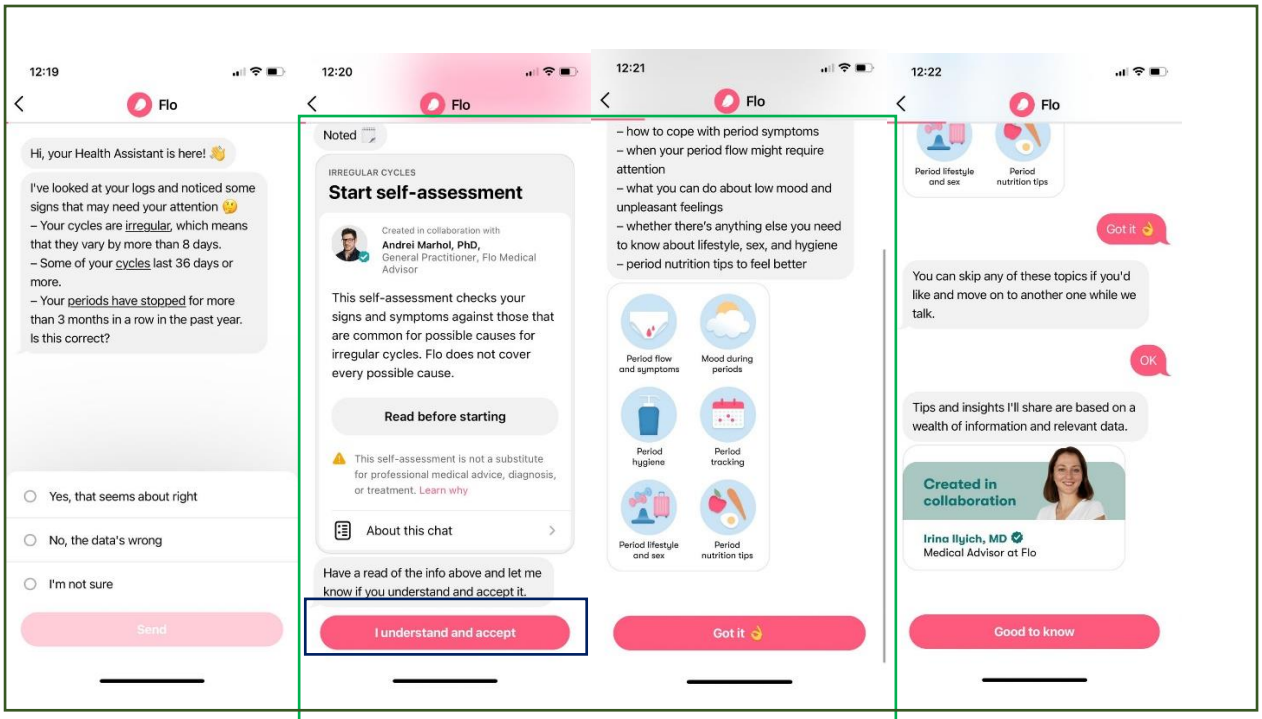


Figure 4: Chat Page 1, 2, 3, 4

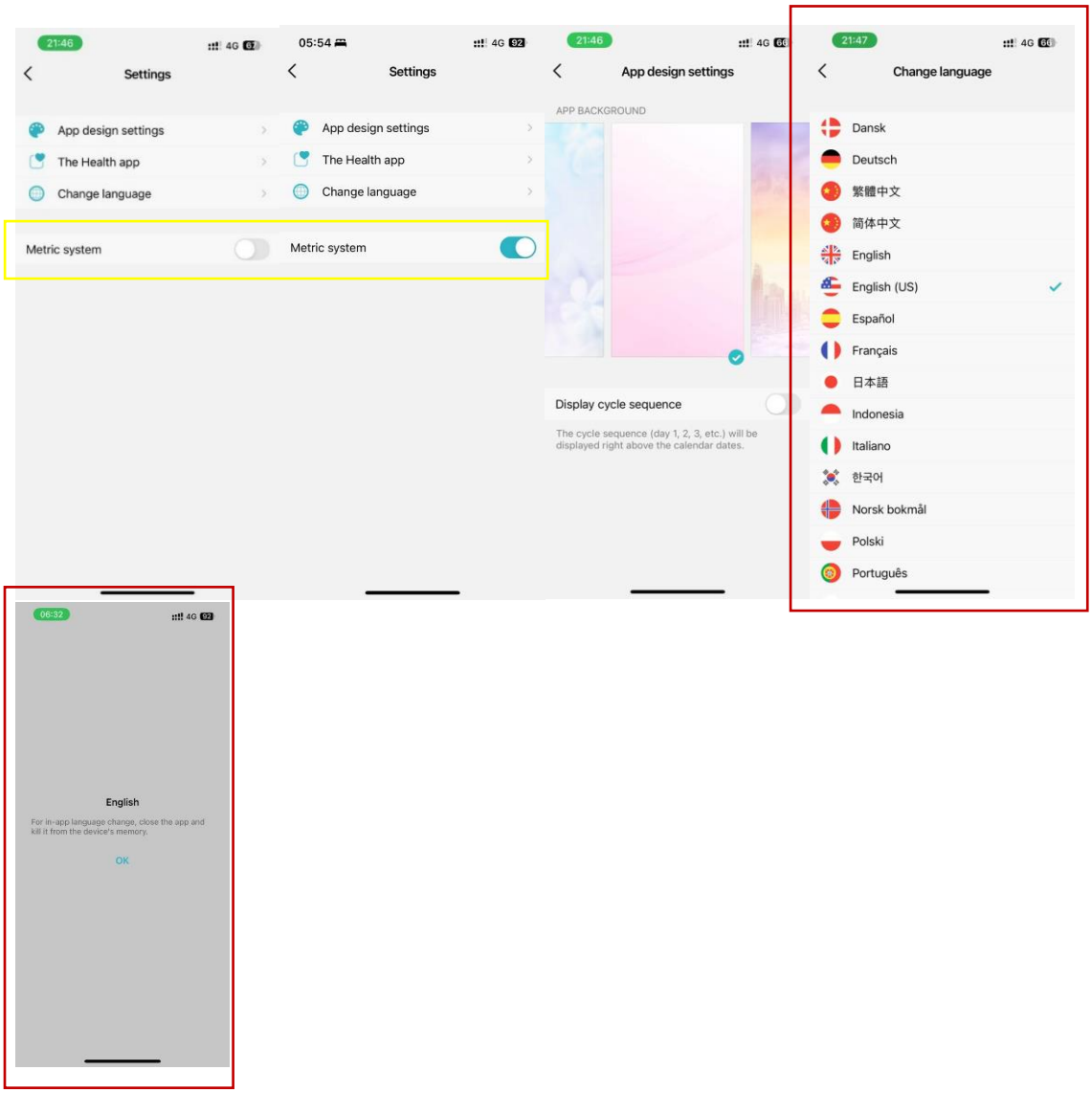


Figure 5: Setting Page 1, 2, 3, 4, 5

Rule of Thumb	**Is this rule being applied? How so?**	**Is this rule violated? How so?**	**How can this rule further improve usability, utility, and desirability?**
1. Visibility of system status ■	Figure 5.1, 5.2: Upon tapping "metric system" toggle icon, the switch toggle to the right and lights up.	Figure 1: The questionnaire is long. The progress bar shown above does not do an efficient job to convey the number of questions left.	Figure 1: The progress bar should include quantitative measures to clearly represent the progress of the questionnaire.
2. Match between system and the real world ■	Figure3: The Insights Page uses intuitive icons to represent fertility and health concepts.	Figure 4: The questions asked by the chat assistant uses technical jargon such as PCOS and FHS leaving the	Figure 4: Make use of user-friendly language instead of complex medical terms use drawings

		user confused while also ruling out good communication between user and the app.	for human representation of the body to explain user complex cycles or terms.
3. User control and freedom ■	Figure 1: The user can skip a question. (refer to all)	Figure 4: User can't go back if a question was wrongly answered in the assistant chat.	Figure 4: There must be two clear and labelled options if the user wants to continue with the statement or question provided by the app or choose another topic of conversation.
4. Consistency and standards ■	Figure 1, 2, 4: Most of the system uses the same tone of colour(pink) for icons with background white.	Figure 1.1- 1.4: The user interface is not predictable. For examples, the questionnaire includes questions and add a sudden information page breaking, the flow of the process	Figure 1.1- 1.4: The questionnaire should not include information pages during the survey part.
5. Error prevention ■	Figure 2.2: Editing period dates is simple and clear.	Figure 5.4, 5.5: If someone changes the language, the confirmation message cannot revert the action.	Figure 5.5: Add a button that can revert changes in language.
6. Recognition rather than recall ■	Figure 2: information about your cycle is displayed, for example, DAY 5. Users do not have to access the calendar to count the number of days.	The question in Figure 1.3 is not clear in the sense that it does not provide a clear action.	Change the question to "Enter your weight" in figure 1.3.
7. Flexibility and efficiency of use ■	Figure 3: The insights page provides information for all types of problems for a spectrum of users.	Figure 4: There are sometimes countless of short beginners' questions are lengthy, slowing down experienced users.	Figure 4: Provide shortcuts options as well as advanced features options in the chat to accommodate both

			beginners and advanced users.
8. Aesthetic and minimalist design ■	The overall app has minimal information that convey an effective approach to do the priority tasks.	Figure 3.2: The page offers a lot of content the leaves the user engaged on too many topics.	Figure 3.1: The Page could have shown the three options given on top in figure 3.1 first with a search bar first and give information centred on the user's needs.
9. Help users recognize, diagnose and recover from errors ■	Figure 2.1: 'My Daily Insight' provides suggestions and solutions to common issues that women face related to menstruation.	Figure 1: There is no way to check and review the answers given at the end of the questionnaire.	Figure 1: Add a review section to be able to check and edit the answers after the last
10. Help and documentation ■	Figure 1.2, 1.3: The user is given clear explanation after entering a choice.	Access on documentation or help system issues is not easily founded.	The system could have designed a FAQ page for answering popular issues or question.

3. Data gathering methods used

Table 2 - Data gathering methods.

Data Gathering Method 1	Semi-structured interview
Describe	The Interview will take place on campus and recorded for transcription. It is important to note that permission for recording is asked beforehand. The duration would be around 10 to 15 minutes. The team plans to conduct five back-to-back interviews. The interview would be semi-structured. This is where, set questions would be asked to the participant and further exploration is allowed. The questions would be based off on the user behavioural questions available in the appendix. There would be three main actors in this method. The first actor is the interviewee. The participant would be female. The second actor would be the female interviewer. The third actor is a transcriptionist where, the person's job is to transcribe the recorded interview into text.

	The interview answers would be processed and organised in a table. A sample for table results can be viewed in the appendix.
Justify	The semi-structured interview is chosen as the first data gathering technique because of the following reasons. A semi-interview is a suitable way to collect qualitative data from the participant and, also enables the team to understand the user's perspective while using the app. This can help to tailor the survey to further quantify the opinion of the users. For example, the interview can be used to identify task undertaken by the participants while, using the app. The survey would list the tasks mentioned, and ask the survey participants to choose the task(s) they performed on the app. By the collective output of the survey, the essential tasks can be deduced by counting their number of occurrences in the survey answers. The campus allows for the team to ease the finding of potential participants. Issues such as scheduling and commuting is overcome. The interviews just have to be conducted at a convenient time interval and in a meeting room, booked in the University Library. Moreover, it allows the ability to use visual cues. (Adeoye-Olatunde & Oleknik, 2021) For example, the participant can show the interviewer how she uses her preferred period app. The duration Is set to be around 10 to 15 minutes. This helps to keep the participant engaged. The data analysis process also would be more efficient as, less time is required to process the data collected compared to an unstructured interview. The interviewee is to be female as the developed prototype is centred to help women manage their menstrual health. The interviewee is chosen to be female to allow a more intimate, comfortable, and relatable dialogue on the subject. The transcriptionist is implemented to grant the interview to be more of a conversation than a data gathering exercise and thus, facilitate the flow of information. The format is semi-structured because, it allows the users to output their perspectives rather than, the interviewer collecting a general input from participants using a structured interview format. (Adeoye- Olatunde & Oleknik, 2021) Additionally, it helps to personify the experiences of the app through the user's needs and desires. Moreover, the questions asked would be based off user behaviour themes covered in the module.

Will you collect Qualitative or Quantitative data? Explain.	Qualitative Data The interview questions would be orchestrated to give out an opinion, experience, or a perspective which are qualitative data. Moreover, according to (Lester et al., 2020), semi-structured interview collects qualitative data.
Data Gathering Method 2	Survey
Describe	The survey would be conducted online using the platform, JotForm. There would be 25 questions where, the first five questions are background questions. The remaining questions would be based off user behavioural questions in the appendix section. The format of the questions would be created using checkboxes, rating system, and radio buttons. At the beginning of the survey, the participants will have to read the terms and conditions and enter their signature on the platform. The survey would be distributed across the team's network to specifically women from the university and beyond. The participant would be sent the website link, provide a signature, and take part in the survey. The survey answers would be processed and organised in a table. A sample for table results can be viewed in the appendix section.
Justify	An online survey can reach more people than a traditional paper-style survey. The survey can serve as a confirmation and specification of the exact need and wants of the users. The user behavioural questions would be formatted in a way such that the data collected will serve to collect ratings on the preferences, let users select preferred features, and gave insights on their personality and lifestyle. As the choices are predetermined, the choices can be analysed and sorted by popularity and rank. These simple insights help to segment our users and understand how they can be best served. The answers are tabulated so that the data can be effectively processed and analysed. Thus, it reduces the time to gain insights from data.
Will you collect Qualitative or Quantitative data? Explain. How will you carry out Triangulation?	How will you carry out Triangulation? According to (Noble & Heale 2019), research triangulation involves employing multiple methods, data sources, or perspectives to enhance the trustworthiness and accuracy of research findings. Validity in research pertains to the accuracy of a chosen methodology in measuring a specific phenomenon and how closely the obtained results align with the actual values or concepts under investigation.

	There are two distinct data gathering methods employed: semi-structured interview and survey. The two techniques collect qualitative and quantitative data, are carried across different medium (face-to-face and online), with different approaches (semi-structure and heavily structured) about a similar set of questions. The differences help to provide two different perspectives. When the data is analysed, the findings can be validated based by the match of similar answering results. For example, the appendix mentions the data analysis for survey and interview on the most popular task selected/mention. The results shows that the most popular for both was tracking period cycles.

4.Analysis of gathered data

4.1 Hierarchical Task Analysis

Hierarchical Task analysis is a method of decomposing complex tasks into smaller, more manageable subtasks. This approach is particularly beneficial for UX designers as it offers a structured and systematic way to comprehend user tasks and goals, thereby aiding in the creation of more user-centric designs (Felix A. Dreger, 2023).
The reasons for the usage of HTA for the period tracking app is provided below: -

Table 3 - reasons to use HTA.

Advantages	Explanation
1. Clarity in functionality	Breaking down tasks in smaller components helps in the coherent definition of the functionalities required by the app. This clarity ensures that the app effectively meets user requirements.
2. User-centric	The HTA emphasizes comprehending the app from the user's standpoint, certifying that the design prioritizes the end-users' needs and preferences.
3. Guidance for development	With the provision of a concise overview of the app's necessary features and functions, the HTA will serve as a valuable guide to developers and in the fabrication of a user-friendly interface.
4. The identification of pain points	The HTA assists in perceiving potential challenges that users might encounter. Identifying these difficulties beforehand will allow designers to proactively address them, enhancing the app's usability.

4.1.2 Textual representation of the Hierarchical Task Analysis for the period tracking app

0. Manage menstrual cycle

1. Login/register
   - 1.1 Either choose register or log-in
     - 1.1.1 Registration: enter name, email address, password, age
       - 1.1.1.1 Submit registration
     - 1.1.2 Log-in : enter email address and password
       - 1.1.2.1 Click login button
   - 1.2 Choose option forgot password
     - 1.2.1 Recover forgotten password via email
       - 1.2.1.1 Re-enter password and login
       - 1.2.1.2 Resend email to recover password

2. Set-up profile
    2.1 Enter menstrual cycle information
        2.1.1 Input average length, last period start date, cycle irregularities
    2.2 Enter personal health information
        2.2.1 Enter symptoms, select birth control method used, set fertility goals
    2.3 Customize notifications and reminders
        2.3.1 Choose types of notifications, set reminder frequency, adjust notification sounds

3. Track menstrual cycle
    3.1 Log daily cycle information
        3.1.1 Select current date on calendar
        3.1.2 Enter period start/end date
        3.1.3 Record flow intensity
    3.2 Enter symptoms
        3.2.1 Rate severity of symptoms
    3.3 Add notes
        3.3.1 Open note and record observations

4. View cycle overview
    4.1 Access monthly calendar view
        4.1.1 Open calendar feature
        4.1.2 Navigate between months
    4.2 Review cycle history and patterns
        4.2.1 View past cycle data
        4.2.2 Identify patterns and irregularities
    4.3 Predict future cycle dates and fertility windows
        4.3.1 Access predict feature
        4.3.2 View predicted dates on calendar
        4.3.3 Adjust prediction settings

5. Manage health insights
    5.1 Receive personalized health tips
        5.1.1 Review personalized health tips based on cycle data
        5.1.2 Interact with tips
    5.2 Track health
        5.2.1 Enter or sync data on weight, sleep, water intake
        5.2.2 View trends on parameters
    5.3 Access educational content about menstrual health
        5.3.1 Browse educational articles
        5.3.2 Search for specific topics

6. Interact with online community
    6.1 Participate in community forums
        6.1.1 Read existing posts and threads
        6.1.2 Create new posts or respond to others

6.2 Share experiences and ask questions
6.2.1 Write and share personal experiences
6.2.2 Ask questions and seek advice from community
6.3 Access support resources
6.3.1 Contact support for help

7. Update personal settings
7.1 Change personal information or cycle details
7.1.1 Edit personal credentials or health details
7.2 Modify app settings
7.2.1 Change app theme or preferred language
7.3 Manage privacy
7.3.1 Review and adjust privacy settings

8. Seek medical assistance
8.1 Access in-App medical consultation section driven by AI
8.1.1 Input symptoms or concerns
8.1.2 Communicate with health care professionals
8.2 Receive recommendations for professional care
8.2.1 Get personalized medical advice
8.2.2 Follow-up on recommendations

4.1.3 Hierarchical Task Analysis for the period tracking app diagram

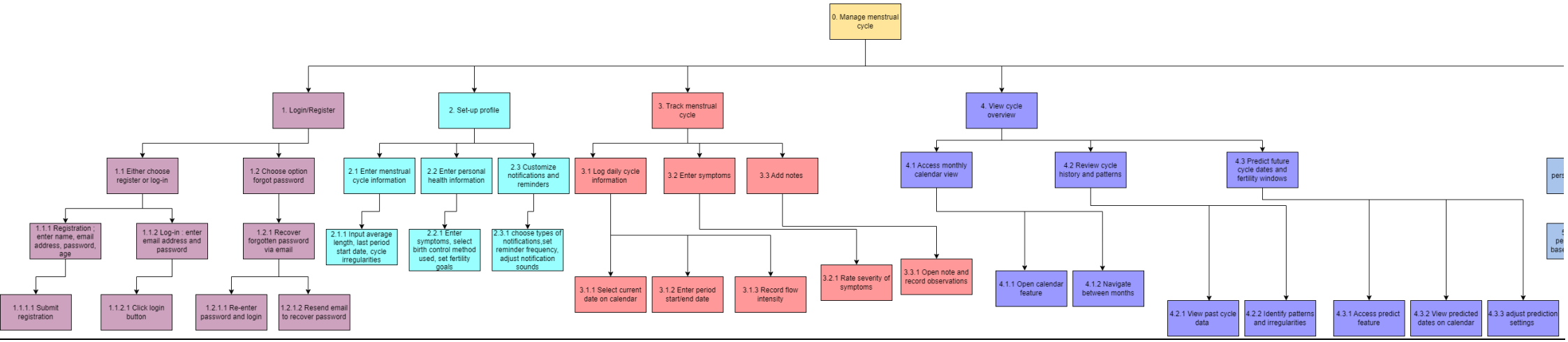


Figure 6- HTA first part

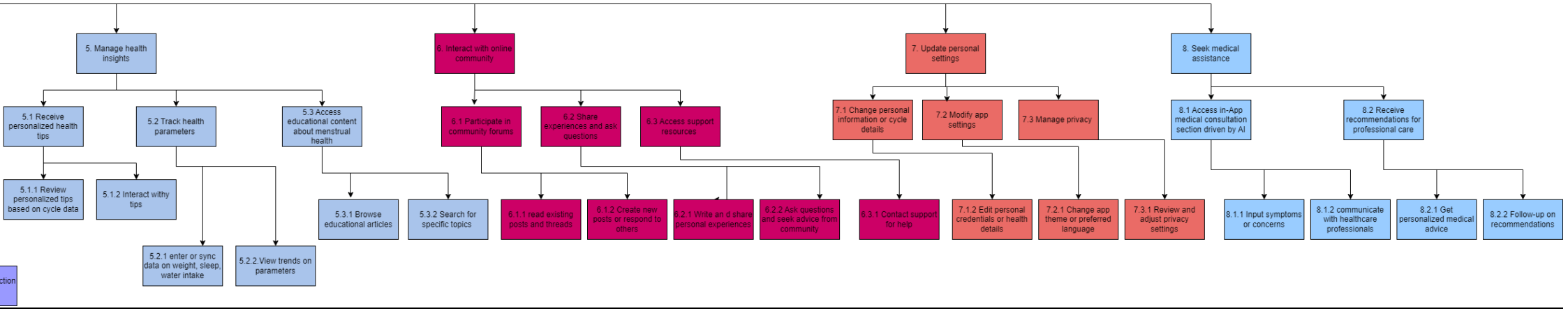


Figure 7 - HTA second part

4.2 Requirements specifications

4.2.1 Functional requirements

Functional requirements describe the specific behaviours or functions of a system.

Table 4 - Functional requirements

Functional requirements	Justification
1. User registration and authentication	Users should be able to create account by using their email and password and log in the app to access personalized featured. This ensures for the creation of a secure and personalized user experience. For instance, a user can track her cycle history over time.
2. Menstrual cycle tracking	The app should allow users to input and view information about their menstrual cycles, such as start and end dates, flow intensity, and symptoms. This is the core function of the app. For instance, a user logs her period start date, and the app tracks the cycle length and predicts the next start date.
3. Symptom tracking	Users can log various physical and emotional symptoms experienced during different phases of their menstrual cycle. This helps in identifying patterns and potential health issues. For example, a user might consistently log severe cramps, prompting the app to suggest consulting a healthcare provider.
4. Cycle prediction and notifications	The app predicts future menstrual cycles and sends notifications for upcoming periods or fertile windows. This feature aids in planning and preparedness. A user could receive a notification a few days before her expected period, allowing her to prepare accordingly.
5. Health insights and tips	Based on the tracked data, the app provides personalized health insights and general menstrual health tips. These insights educate users and encourage healthy practices. For instance, the app might suggest dietary changes based on logged symptoms.
6. Data sharing	Users can export their menstrual health data or share it directly with healthcare providers through the app. This facilitates better-informed medical consultations. A user might share her cycle data with a doctor for more personalized advice.

Community forum access	A feature allowing users to participate in forums, share experiences, and seek advice from a supportive community. It enhances user engagement and provides peer support. For instance, a user seeking advice on managing PMS symptoms could find tips and empathy from peers.

4.2.2 Data requirements

Data requirements specify the kind of data that needs to be input into or output from the system. They define the type and structure of the data, how it should be stored, retrieved, and used.

Table 5 - data requirements

Data requirements	Justification
1. Menstrual cycle data	The system will record dates and details of menstrual cycles, including symptoms, flow intensity, and duration. This data is essential for tracking and predicting menstrual cycles. Accurate logging of period start dates over several months can help the app predict future cycles with higher precision.
2. User personal and health data	The data recorded ttailors the app experience. For example, age and weight can influence menstrual cycle regularity, which the app can use for more accurate predictions.
3. User preferences and settings	Customization improves the user experience. For instance, a user may prefer discreet notifications about their period for privacy reasons.
4. Data about symptoms	The system will collect data related to menstrual symptoms like cramps, mood swings, and food cravings. It helps to understand symptom patterns in managing menstrual health. For example, tracking mood swings may help in identifying premenstrual syndrome (PMS).

4.2.3 Environment requirements

Environment requirements outline the conditions and settings under which a system must operate.

Environment requirements	Justification
1. Cross-platform compatibility	The app should be functional and responsive on multiple platforms and devices, including smartphones and tablets. For example, a user might switch

	from using the app on an iPhone to an Android tablet.
2. Cloud based storage	The system will eensures data security and accessibility. For instance, if a user loses her phone, she can still access her data on a new device.
3. Internet and offline accessibility	The system will have key features like cycle tracking should be accessible even without an internet connection.

4.2.4 User requirements

User requirements focus on the needs, expectations, and capabilities of the end-user. They often involve user interface and user experience aspects and address usability, accessibility, and the overall user journey.

Table 6 - user requirements

User requirements	Justification
1. Accessibility features	The app should include features like screen reader compatibility, large text options, and colour contrast setting as it makes the app inclusive. A visually impaired user might use a screen reader to navigate the app.
2. Multi-language support	The app should be available in multiple languages. For example, offering the app in Spanish as well as English can significantly expand the user base in bilingual regions.
3. Intuitive user interface	The app should have an easy-to-navigate interface, with clear labels and logical flow. This will ensure ease of use for all users, regardless of tech proficiency. For instance, a first-time user should find it easy to log her period without needing a tutorial.

4.2.5 Non-functional requirements

Non-functional requirements detail the operational characteristics of a system, focusing on 'how' it functions rather than 'what' it does. They encompass various operational criteria used to evaluate the system's performance, including aspects like security, reliability, efficiency, maintainability, scalability, and user-friendliness. Unlike functional requirements that pertain to specific tasks of the system, non-functional requirements apply to the system's overall operation.

Table 7 - non-functional requirements

Nonfunctional requirements	Justification

Data security and privacy	The system will have an implementation of robust security measures for data protection, including encryption and secure login processes as it builds user trust. Users are more likely to use the app if they feel their sensitive health data is secure.
Scalability	The app should be able to support an increasing number of users and data volumes without performance degradation because as the user base grows, the app should continue to function efficiently.
Reliability	The app should function consistently without crashes or data loss as users rely on the app for tracking important health data and expect reliability.
Performance and responsiveness	The app should have quick load times and smooth transitions between different features because it improves user experience if the users can expect quick access to features like the calendar or forums.
Usability	The app should be user-friendly and accommodating to a diverse user base, with clear instructions and support. A user-friendly design encourages prolonged engagement with the app.

4.3 Behavioral mapping

The table below represents behavioral variables where actors have a counter beneath them. The counter serves as a representation of the number of people who answered similarly to a question in Data Gathering. A sample of the questionnaire as well as the summary of the responses of the questionnaire and the interview questions are found in the appendices. Notably a zip file of the questionnaires is also found in the folder.

The table below shows the behavioral variables for activities (interaction frequency). Starting from the left, the five actors represent *never, rarely, monthly, weekly, and daily.*

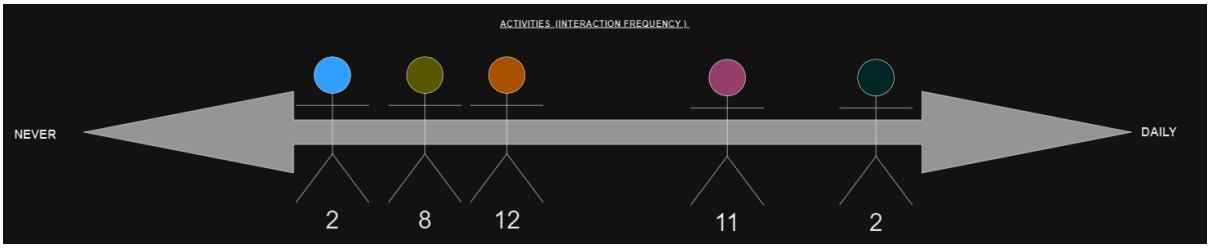


Figure 8- activities (interaction frequency)

The table below shows the behavioral variables for attitudes (importance of period app). Starting from the left, the three actors represent the *rating of 3, 4, 5. 1 and 2 are not included as, they were not chosen in the survey and no interviewee indirectly or directly said it was not important.*

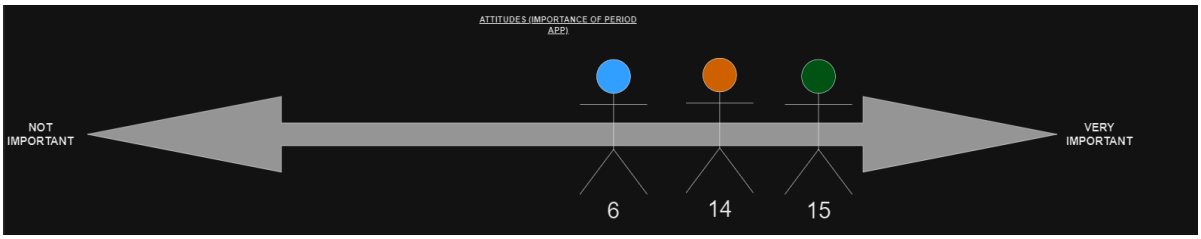


Figure 9 - attitudes (importance of app)

The table below shows the behavioral variables for motivation (effectiveness for menstrual health management). Starting from the left, the five actors represent *not effective, somewhat effective, effective, and extremely effective.*

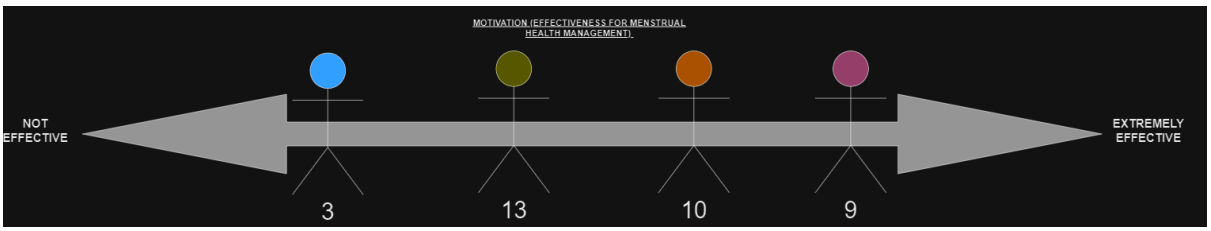


Figure 10 - motivation (effectiveness for menstrual health managment)

The table below shows the behavioral variables for aptitude (familiarity with terminology). Three actors represent the *rating of 3, 4, 5. 1 and 2 are not included as they were not chosen in the survey and no interviewee indirectly or directly said they were not familiar with terminology.*

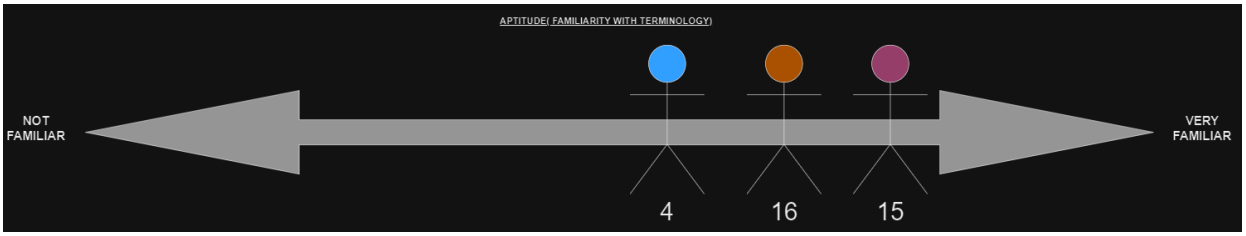


Figure 11 - aptitudes (familiarity with terminology)

The table below shows the behavioral variables for motivation (effectiveness for menstrual health management). Three actors represent the *rating of 3, 4, 5. 1 and 2 are not included as, they were not chosen in the survey and no interviewee indirectly or directly said it was not proficient.*

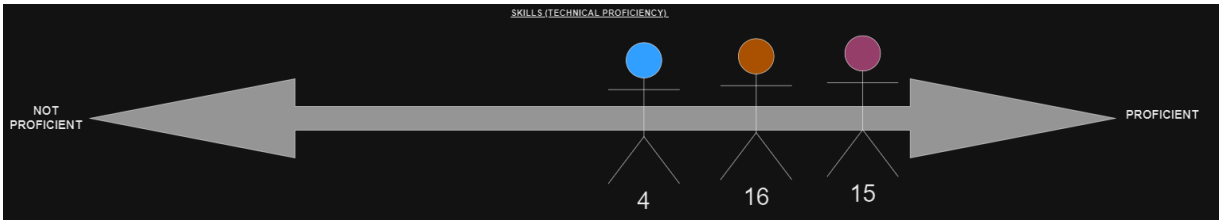


Figure 12- motivation (effectiveness for menstrual health management)

4.3 Personas

The following are the personas for essential for data analysis.

Xtensio Upgrade your account to remove Xtensio branding and access premium features.

Figure 13 – Ariana Donovan persona

Xtensio Upgrade your account to remove Xtensio branding and access premium features.

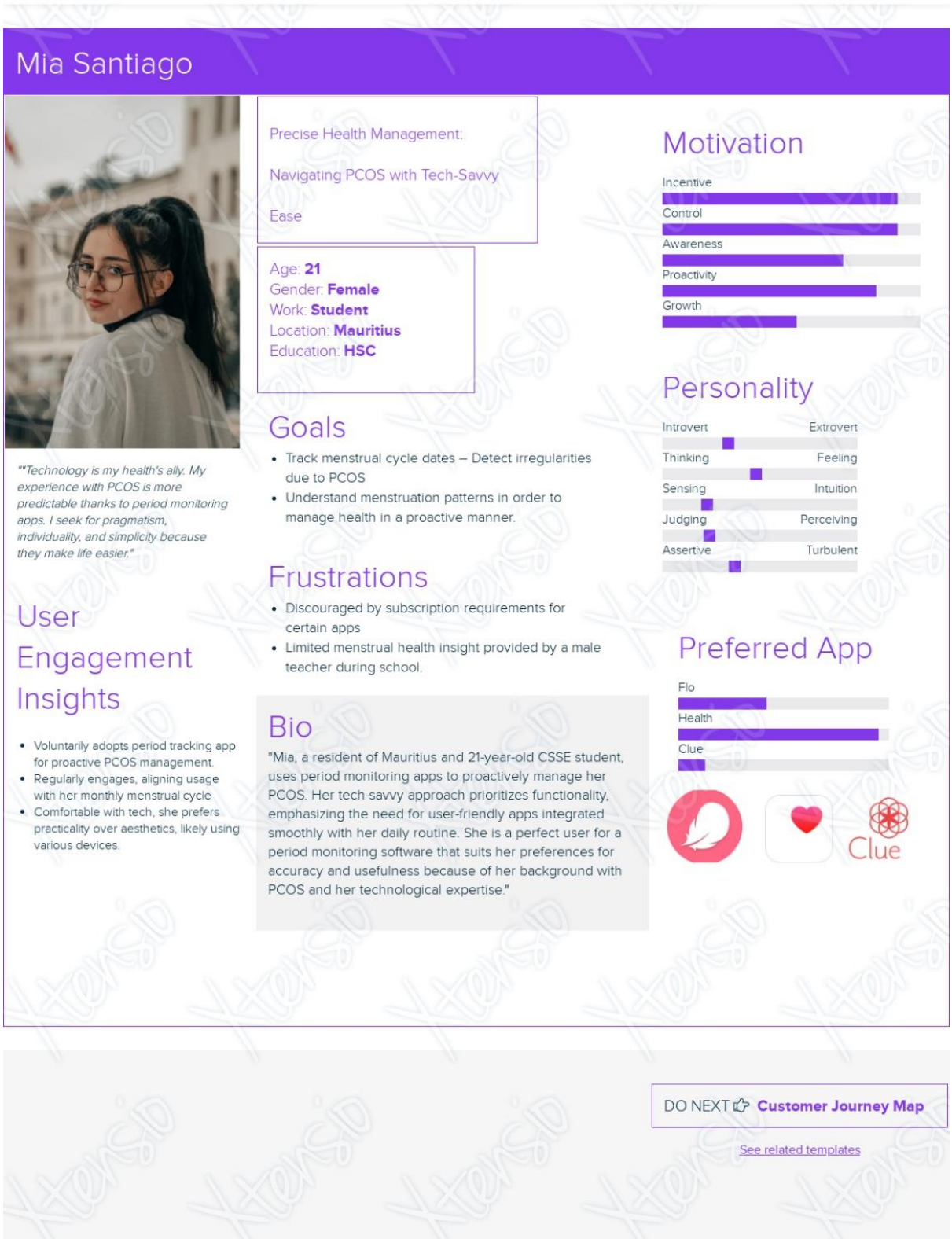


Figure 14 - Mia Santiago persona

Xtensio Upgrade your account to remove Xtensio branding and access premium features.

Lily Smith

"Navigating the cadence of life, my period app is like a friendly monthly sidekick—beyond mere predictions, it syncs with my emotions, softly suggests self-care, and guides me through the ups and downs with a gentle touch."

Harmony in Every Cycle: Lily's Journey with Precision and Care."

Age: **24**
Work: **Auditor**
Gender: **Female**
Location: **Mauritius**
Education: **BSc**

Goals

- Use the app to know about the fertile days for optimized conception
- Viewing menstrual health reports/summaries, that is to see indications of health concerns

Frustrations

- Inaccurate predictions of ovulation are provided by the apps, leading to missed fertile days and potential setbacks in conception
- Intrusive ads interfere with the app experience, diverting attention from the primary goal of supporting her menstrual health.

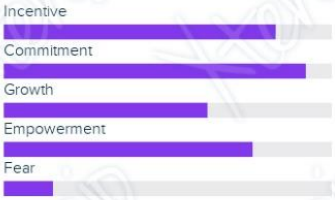
Bio

Lilly, a 24-year-old aspiring to start a family, comes from Mauritius. As an experienced user of period tracking apps, She skillfully manages the complexity of fertility and reproductive health. Lily's proficiency in using technology, combined with her strong desire to conceive, positions her as a valuable user with insights deeply rooted in the challenges and expectations of those on the journey to parenthood. Her experiences offer a practical perspective on the app's potential impact on family planning and fertility optimization

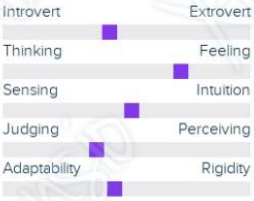
User Engagement Insights

- Voluntarily uses the app as a monthly health companion
- Consistently engages with the app for predicting and managing menstrual cycles
- Comfortable with technology, functional usage over aesthetics is prioritized

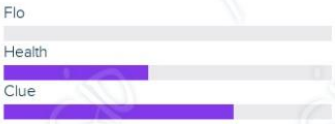
Motivation



Personality



Preferred App



Clue

DO NEXT **Customer Journey Map**

See related templates

Figure 15 - Lily Smith persona

Xtensio Upgrade your account to remove Xtensio branding and access premium features.

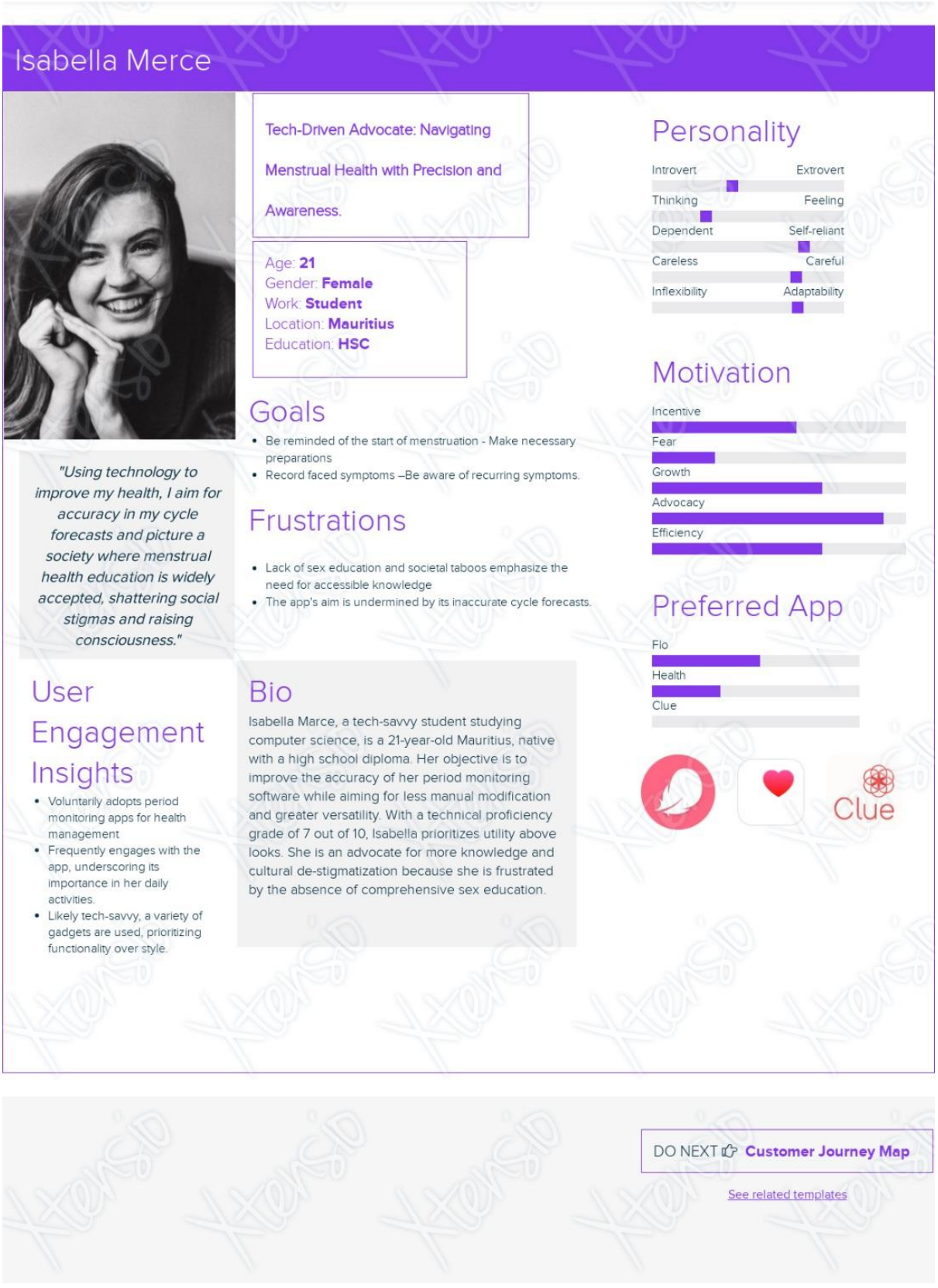


Figure 16- Isabella Merce

4.4 User stories

The user stories of each of the personas are provided below: -

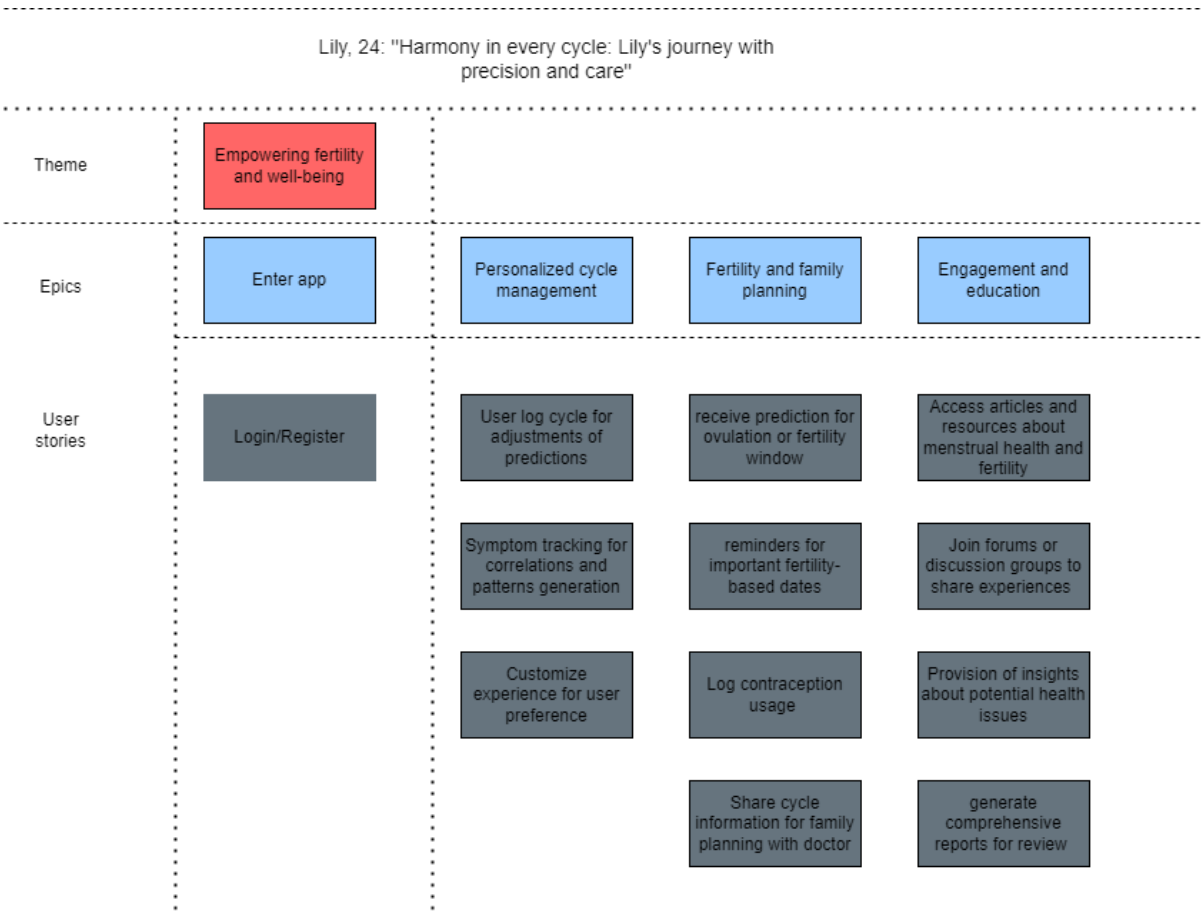


Figure 17 - Lily user story

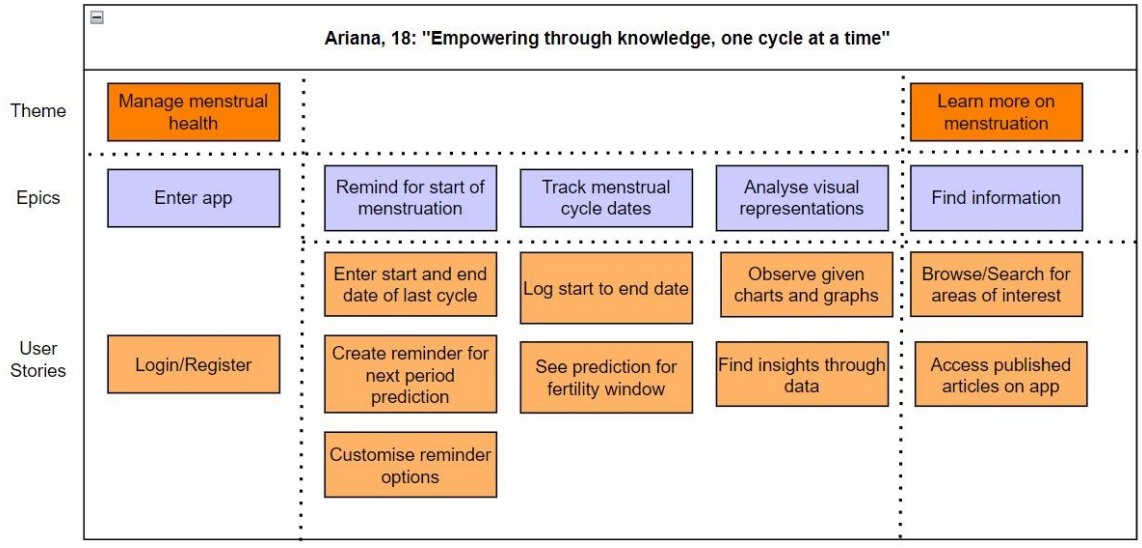


Figure 18 - Ariana user story

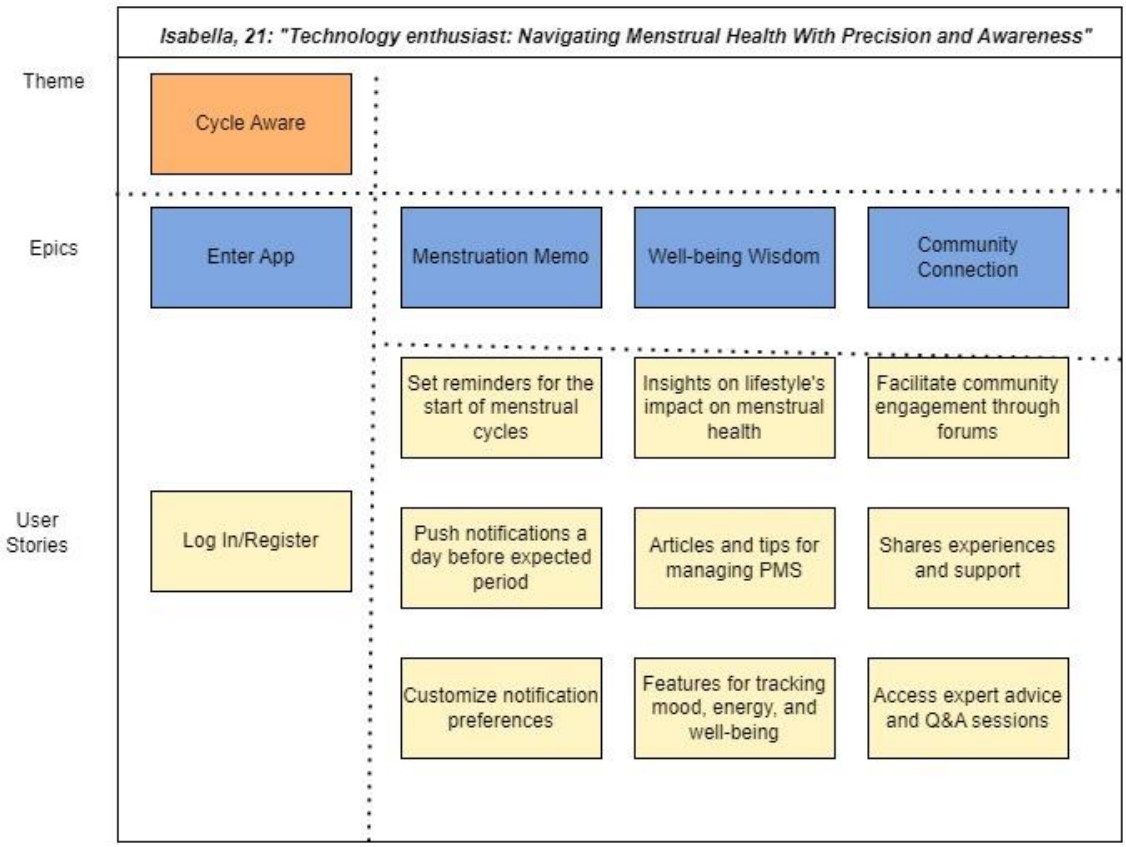


Figure 19 - Isabella user story

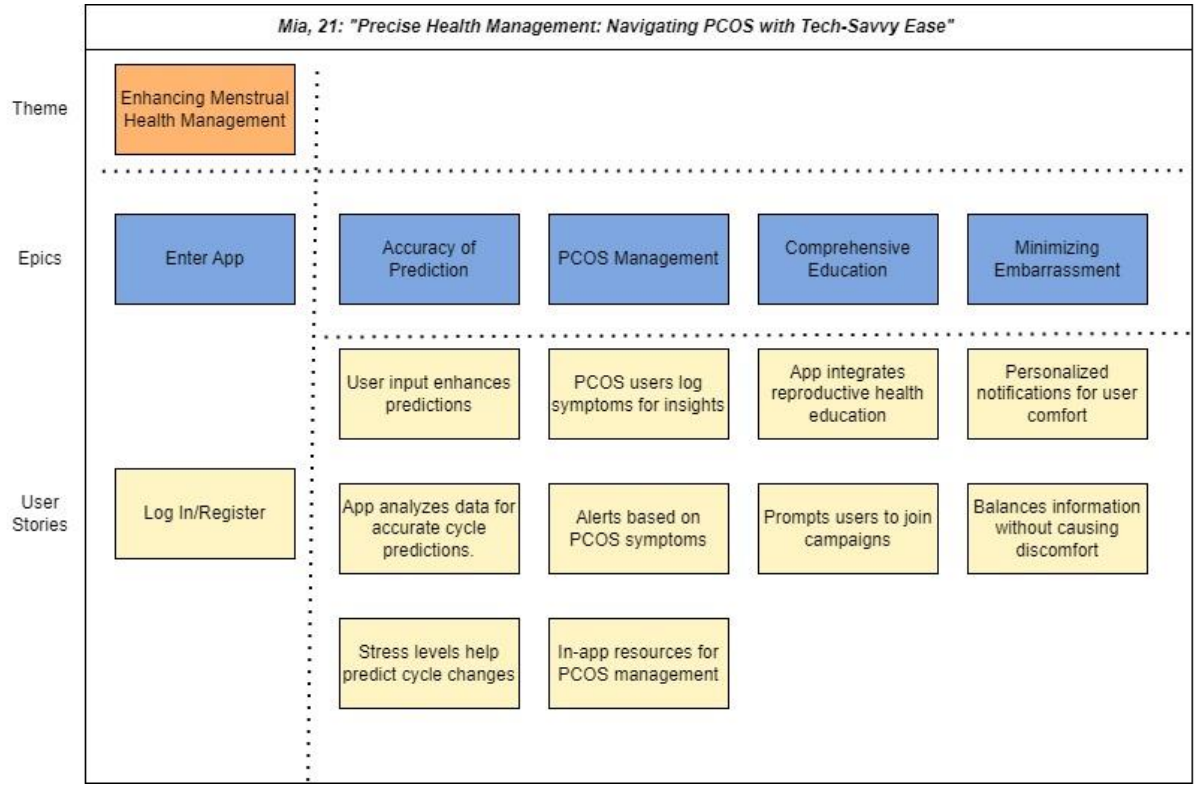


Figure 20 - Mia user story

4.6 User journeys

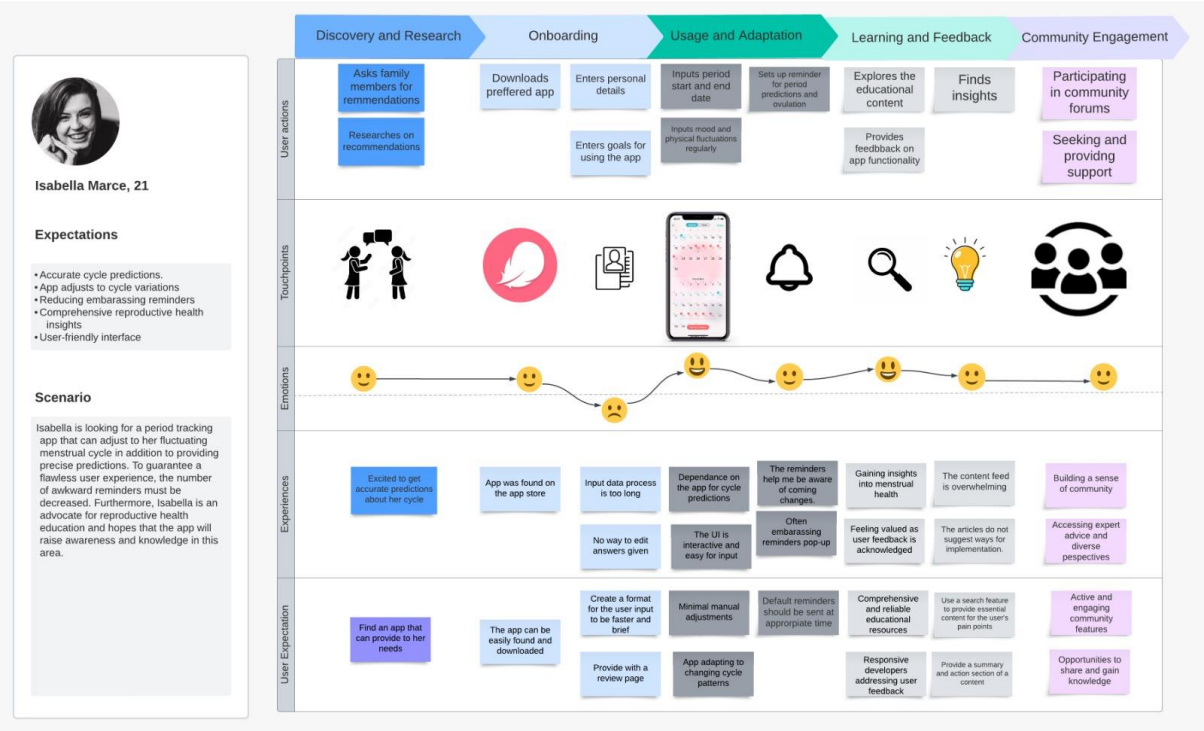


Figure 21 - Isabella user journey

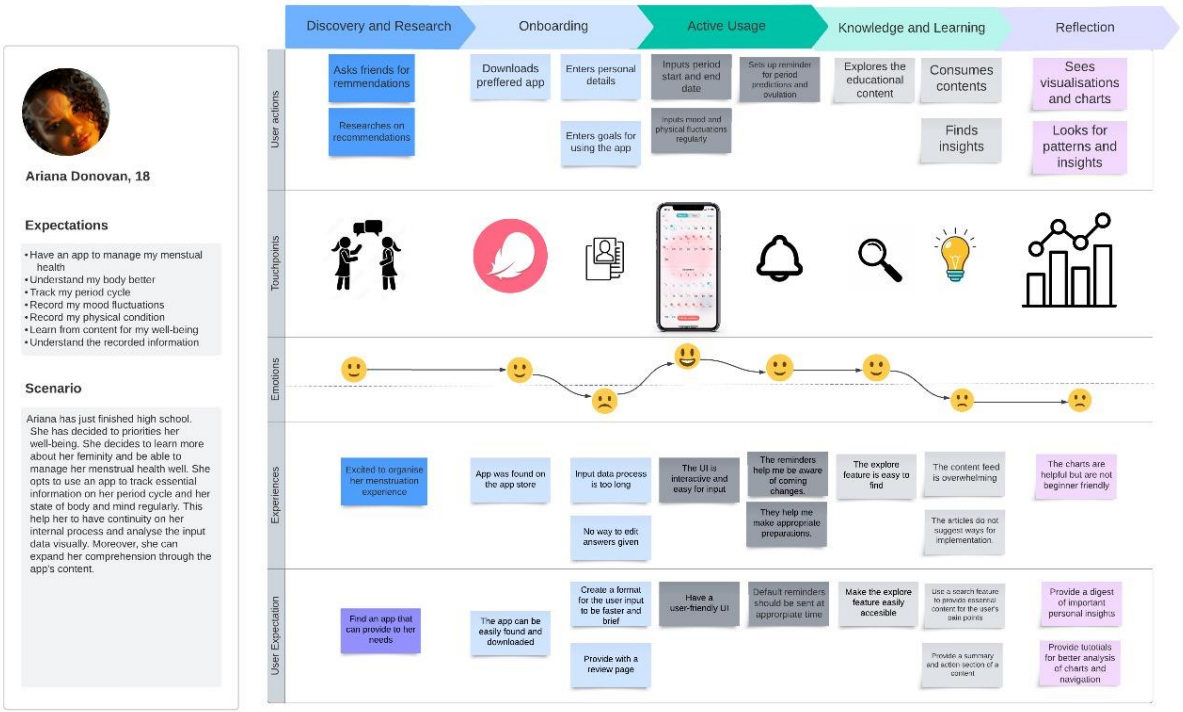


Figure 22 - Ariana user journey

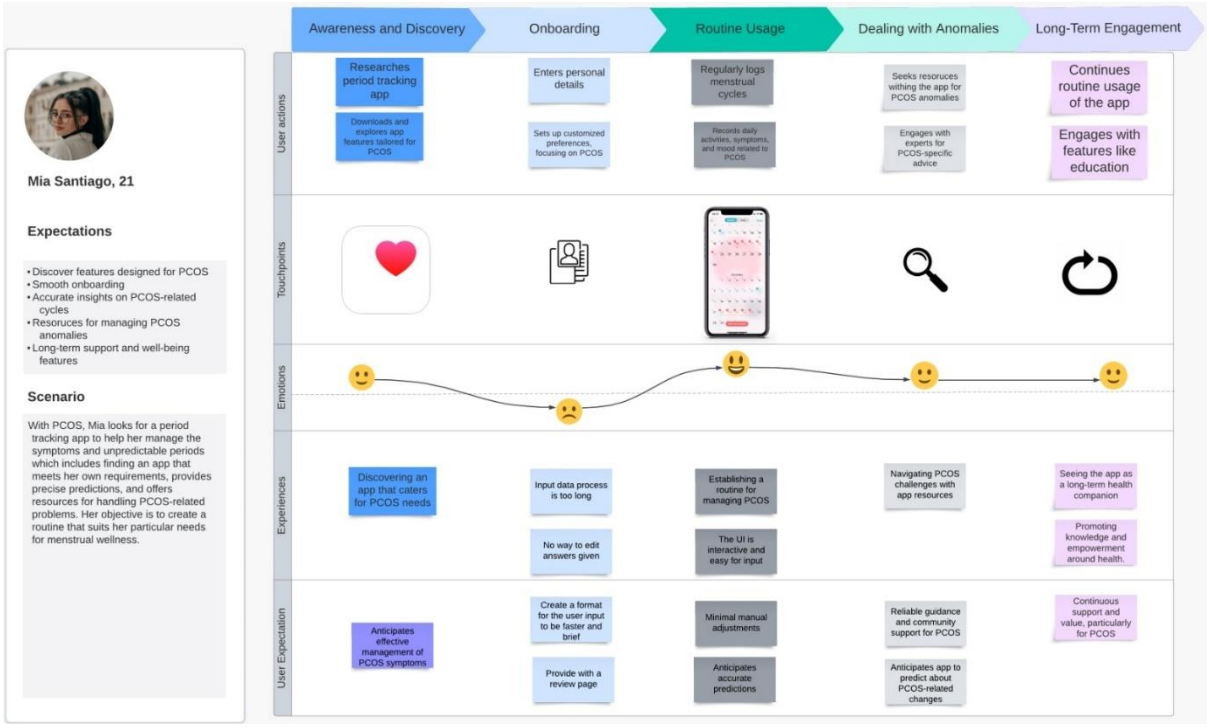


Figure 23 - Mia user journey

4.7 UXI matrix

Table 8 - UXI MATRIX

UXI Matrix	Target Personas				Estimates & Priority			UX Metrics
	Lily Smith	Ariana Donovan	Mia Santiago	Isabella Merce	UX Complexity	Dev est./Story Points	PO Business Impact	Story Verified
Fertility tracking								
User log cycle for start and end date	Y	Y	Y		1	90	H	Y
Symptoms tracking for correlations and patterns generation	Y			Y	3	60	H	Y
Customize experience for user	Y		Y	Y	3	70	M	Y
Receive predictions for ovulation or fertility window	Y	Y		Y	4	30	H	Y
Log contraception usage	Y				2	40	M	Y
Access articles and resources about menstrual health	Y		Y		3	30	L	Y
Join forums or discussions groups to share experiences	Y		Y		4	20	L	Y

Provision of insights about potential health issues		Y	Y		Y	3	20	L	Y
Manage menstrual health									
Create reminder for next period cycle			Y	Y		3	60	H	Y
Customize reminder options			Y	Y		2	10	L	Y
Observe given charts and graphs			Y			3	80	M	Y
Find insights through data inputted			Y	Y	Y	4	50	L	Y
Search for any topic			Y			4	40	L	Y
Cycle awareness									
Mood and water intake tracking				Y		2	10	L	Y
Articles and tips			Y	Y		3	10	L	Y
Access expert advice and Q&A sessions				Y		4	40	L	Y
Enhancing menstrual health									
Stress level changes tracking				Y	Y	2	10	L	Y
Alerts based on PCOS symptoms				Y	Y	2	90	M	Y
Prompts user to join campaign					Y	2	10	L	Y
	Overall, Persona Weight	8	9	12	8				
	Persona Verified	Y	Y	Y	Y				

Y = Yes

N = No

M = Medium Impact

L = Low Impact

UX Complexity: Could be simply a count of personas to consider, or more complex, like number of pages to be designed, etc.

Story Verified: Do we have any data on this story to verify it's of value to the target personas?

Column Name	Possible Values	Description
Persona	Persona's name	Identifies the persona a user story applies to
UX complexity	1 to 5	Estimates design effort separate from implementation effort
Story verified	Y/N	Is this story fiction or fact? Is it based on user research or customer inp
Design complete	Y/N	Is the design coherent enough for development to be able to code it?
Staffing	Resource's name	Who's owns the design, at whatever level of fidelity is agreed to.
Task completion rates	0 to 100%	The percentage of users who have been observed to complete the story without any assistance.

5. Discussion

The research techniques implemented for the period tracking app was multifaceted, including both qualitative and quantitative data collection techniques to develop a well-rounded understanding of the user base. The use of personas, such as Lily Smith, was instrumental in guiding the design process. These personas were developed based on data collected from user interviews, surveys, and behavioural analytics, ensuring a user-centred approach to app development. One of the strengths of our methodology was the emphasis on direct user engagement. Through interviews and focus groups, we were able to capture detailed user stories

and experiences, which informed the creation of a UXI matrix to prioritize development tasks. This approach ensured that the features developed were closely aligned with user needs and preferences. However, there were areas that could be enhanced in future studies. The user testing phases, while thorough, had limited participation due to resource constraints, which may have restricted the diversity of feedback. Future research could benefit from a broader demographic to ensure the app's features and design are inclusive of a wider audience and the incorporation of more objective metrics and user engagement data to quantify these assessments further.

6. .Appendices (5%)

Ethics form

MIDDLESEX UNIVERSITY

PARTICIPANT SHEET (PIS)

Participant ID Code:……

1. Study title

User research, design and evaluation of a Period Tracking App prototype

2. Invitation paragraph

You are being invited to take part in a user research study about the experience of use for a Period Tracking App. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Thank you for reading this.

3. What is the purpose of the study?

The purpose of the work is to carry out user research towards design of a Period Tracking mobile app to provide an improved user experience. As a participant, you will be asked to take part in a short 8–10-minute interview with a female interviewee and to answer an online survey based on your unique experience on a Period tracking app such as Flo. Your answers would be collected and used for analysis alongside the answer of other users' experience. It should be noted that the data gathered is confidential.

4. Why have I been chosen?

It is important that we assess as many female participants as possible, and you have indicated that you are interested in taking part in this study.

You have been chosen as eligible because your design needs are closely matched with the potential end users of the system which plan to design. Your experiences with similar systems will give us a useful indication of whether our intended design that will meet with all design needs.

5. Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. If you do decide to withdraw from the study then please inform the researcher as soon as possible, and they will facilitate your withdrawal. If, for any reason, you wish to withdraw your data please contact the researcher within a month of your participation. After this data it may not be possible to withdraw your individual data as the results may have already been published. However, as all data are anonymised, your individual data will not be identifiable in any way.

6. What will I have to do?

The session will take no more than 20 minutes.
- You will only need to participate in one or more of the following:

- One to One Interview

The interview will be conducted in the school premise or online. The interview will involve a set of semi-structured questions whereby the duration of the interview will last approximately 8-10 minutes maximum for each participant. It is important to note that the interview would be recorded. Notably each participant must give their consent before the interview.

- Survey

The survey would in the form of 24 well-defined questions, The survey will be conducted on an online platform, where participants from outside the university and students can participate in the survey. Normally, we intend to share the survey link in our network and approaches on the university campus. The prospects can choose or refuse to participate.

8. What are the possible disadvantages and risks of taking part?

It is unlikely that you will feel any discomfort during the session, but if you do you can stop immediately. Appropriate risk assessments for all procedures have been conducted and will be followed throughout the duration of the study.

9. What are the possible benefits of taking part?

The information we get from this study may help us to improve the design of existing designs. There is no intended benefit to the participant.

9. Will my taking part in this study be kept confidential?

The research team has put a number of procedures in place to protect the confidentiality of participants. You will be allocated a participant code that will always be used to identify any data you provide. Your name or other personal details will not be associated with your data, for example, the consent form that you sign will be kept separate from your data. All paper records will be stored in a locked filing cabinet, accessible only to the research team, and all electronic data will be stored on a password protected computer. All information you provide will be treated in accordance with the UK Data Protection Act.

10. What will happen to the results of the research study?

The results of the research study will be used as part of the UX Design Module. The results may also be presented at conferences or in journal articles. However, the data will only be used by members of the research team and at no point will your personal information or data be revealed.

11. Who has reviewed the study?

The study has received full ethical clearance from the Research ethics committee who reviewed the study. The committee is the Middlesex Psychology Department Research Ethics Committee

12. Contact for further information

If you require further information, have any questions or would like to withdraw your data then please contact:

Mark Springett, School of Computer Science, Middlesex University, The Burroughs, Hendon, London NW4 4BT, m.springett@mdx.ac.uk

Kritik Luchun Middlesex University, Flic en Flac, Mauritius .- KL1008@live.mdx.ac.uk
Vanshika Chooah – Middlesex University Flic en Flac Mauritius – VC394@live.mdx.ac.uk
Suhaib Khodabocus – Middlesex University, Flic en Flac, Mauritius – SK2334@live.mdx.ac.uk

Thank you for taking part in this study. You should keep this participant information sheet as it contains your participant code, important information and the research teams contact details

Middlesex University Guide to Research Privacy Notices

Privacy notices need to be presented whenever data is collected and should be understandable and accessible. Privacy notices must explain the type and source of data that will be processed. They will also set out the processing purpose, data retention schedules and data sharing. Privacy notices must include details of the subject's rights and who the subject can complain to.

The following example may be used and completed for your research purposes.

Middlesex University Privacy Notice for Research Participants

Middlesex
University
London

The General Data Protection Regulation (GDPR) protects the rights of individuals by setting out certain rules as to what organisation can and cannot do with information about people. A key element to this is the principle to process individuals' data lawfully and fairly. This means we need to provide information on how we process personal data.

The University takes its obligation under the GDPR very seriously and will always ensure personal data is collected, handled, stored and shared in a secure manner. The University's Data Protection Policy can be accessed here: https://www.mdx.ac.uk/__data/assets/pdf_file/0023/471326/Data-Protection-Policy-GPS4-v2.4.pdf.

The following statements will outline what personal data we collect, how we use it and who we share it with. It will also provide guidance on your individual rights and how to make a complaint to the Information Commissioner's Officer (ICO), the regulator for data protection in the UK.

Why are we collecting your personal data?

As a university we undertake research as part of our function and in our capacity as a teaching and research institution to advance education and learning. The specific purpose for data collection on this occasion is to …evaluate a software prototype.

The legal basis for processing your personal data under GDPR on this occasion is Article 6(1a) consent of the data subject.

Transferring data outside Europe

In the majority of instances your data will be processed by Middlesex University researchers only or in collaboration with researchers at other UK or European institutions so will stay inside the EU and be protected by the requirements of the GDPR.

In any instances in which your data might be used as part of a collaboration with researchers based outside the EU all the necessary safeguards that are required under the GDPR for transferring data outside of the EU will be put in place. You will be informed if this is relevant for the specific study you are a participant of.

Your rights under data protection

Under the GDPR and the DPA you have the following rights:

- to obtain access to, and copies of, the personal data that we hold about you;
- to require that we cease processing your personal data if the processing is causing you damage or distress;
- to require us to correct the personal data we hold about you if it is incorrect;
- to require us to erase your personal data;
- to require us to restrict our data processing activities;
- to receive from us the personal data we hold about you which you have provided to us, in a reasonable format specified by you, including for the purpose of you transmitting that personal data to another data controller;
- to object, on grounds relating to your particular situation, to any of our particular processing activities where you feel this has a disproportionate impact on your rights.

Where Personal Information is processed as part of a research project, the extent to which these rights apply varies under the GDPR and the DPA. In particular, your rights to access, change, or move your information may be limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we may not be able to remove the information that we have already obtained. To safeguard your rights, we will use the minimum personally-identifiable information possible. The Participant Information Sheet will detail up to what point in the study data can be withdrawn.

If you submit a data protection rights request to the University, you will be informed of the decision within one month. If it is considered necessary to refuse to comply with any of your data protection rights, you also have the right to complain about our decision to the UK supervisory authority for data protection, the Information Commissioner's Office.

None of the above precludes your right to withdraw consent from participating in the research study at any time.

Collecting and using personal data

We will record your utterances and input actions as you use the prototype. We will also record your answers to questions after you have used the prototype.

Data sharing

Your information will usually be shared within the research team conducting the project you are participating in, mainly so that they can identify you as a participant and contact you about the research project.

Responsible members of the University may also be given access to personal data used in a research project for monitoring purposes and/or to carry out an audit of the study to ensure that the research is complying with applicable regulations. Individuals from regulatory authorities (people who check that

we are carrying out the study correctly) may require access to your records. All of these people have a duty to keep your information, as a research participant, strictly confidential.

If we are working with other organisations and information is shared about you, we will inform you in the Participant Information Sheet. Information shared will be on a 'need to know' basis relative to achieving the research project's objectives, and with all appropriate safeguards in place to ensure the security of your information.

Storage and security

The University takes a robust approach to protecting the information it holds with dedicated storage areas for research data with controlled access.

Alongside these technical measures there are comprehensive and effective policies and processes in place to ensure that users and administrators of University information are aware of their obligations and responsibilities for the data they have access to. By default, people are only granted access to the information they require to perform their duties. Training is provided to new staff joining the University and existing staff have training and expert advice available if needed.

Retention

Under the GDPR and DPA personal data collected for research purposes can be kept indefinitely, providing there is no impact to you outside the parameters of the study you have consented to take part in.

Having stated the above, the length of time for which we keep your data will depend on a number of factors including the importance of the data, the funding requirements, the nature of the study, and the requirements of the publisher. Details will be given in the information sheet for each project.

Contact us

The Principal Investigator leading this research Mark Springett

Mark Springett, School of Computer Science,
Middlesex University, The Burroughs, Hendon,
London NW4 4BT

+44 2084115015

m.springett@mdx.ac.uk

The University's official contact details are:

Data Protection Officer

Middlesex University

The Burroughs

London

NW4 4BT

Tel: +44 (0)20 8411 5555
Email: dpaofficer@mdx.ac.uk

User Behavioural Questions

Table 9 - user behavioural questions

Activities *What the user does (frequency and volume)* *Other brands or websites they may like*	Question 1: How often do you use period tracking apps like Flo?
	Question 2: How easy is to find and use specific features or sections within the Period tracking app.
	Question 3: Can you share a specific positive experience you've had while using the Period tracking app, related to its design or features?
	Question 4: In your own words, describe any challenges or frustrations you face when interacting with the design of the Period tracking app.
Attitudes *What the user thinks about product domain and technology* *A person's current pain points or frustrations* *A person's attitude in general, or towards the website / service / product*	Question 1: How satisfied are you with the overall design and visual appeal of the Flo app or any other Period tracking app?
	Question 2: To what extent does the design of the app contribute to your likelihood of recommending it to others?
	Question 3: Share your thoughts on any specific design element that stands out to you, positively or negatively.
	Question 4: How do you perceive the Flo app's design in comparison to other menstrual tracking apps you may have used?
Motivations *Why the user is engaged in the activity area.* *A person's goals on your website / service / product*	Question 1: Rank the importance of design in influencing your decision to use the Flo app, or any other Period tracking app.
	Question 2: How well do you feel the current design of the app supports your primary goals in using it?

A person's motivations for using it	
	Question 3: Are there specific design features that you believe could better align with your personal motivations for using the Flo app or any other Period Tracking app?
	Question 4:
Aptitudes *General education and training the user has.*	Question 1: How would you rate your technical proficiency in using digital apps, including those with health tracking features?
	Question 2: On average, how many different devices do you use for accessing the Period tracking app?
	Question 3: Describe any challenges you face due to your technical proficiency when interacting with the design of the Period tracking app.
	Question 4: How has your educational background influenced your understanding and ease of use of the app's design?
Skills *User capabilities related to technology and product domain.* *A person's technical ability along with which devices they use and how often*	Question 1: How confident do you feel in navigating through different features and menus within the Flo app or any other Period Tracking app?
	Question 2: How frequently do you encounter issues related to the app's design that hinder your ability to accomplish tasks?
	Question 3: Are there any additional features or design changes you would suggest improving the app's usability for users with varying skill levels?
	Question 4:

Survey

Attached to this folder is a zip file of all the questionnaires.

This is a sample showing the survey answers in a table view format.

Background	Age	Country	Occupation	Highest Education Level	Activities	Interaction Frequency	Tasks Carried out in the App	Most Valuable Aspects of the App	Satisfaction on knowledge offered by app	Attitudes	Importance for menstrual health management	User-friendliness of UI	Frustrating Tools	Desired Tools	Motivation	Motivation to use period app	Effectiveness for menstrual health management	Frustrating features	Desired features
	18-24	Mauritius	Network Engineer	Bachelor's Degree		Weekly	Tracking menstrual cycle dates Setting reminders for period start dates	Ease of tracking menstrual cycles User-friendly interface and navigation Customizable reminders and notifications	4		5	5	None	Advanced fertility and ovulation prediction tools Personalized health tips and advice Options for tracking mood and mental health Comprehensive health reports and analytics Menstrual health education and resources		Accuracy of menstrual cycle predictions	Effective	Cycle tracking and calendar	Accurate and reliable menstrual cycle tracking
	18-24	Mauritius	Sales assistant	Bachelor's Degree		Rarely	Monitoring ovulation and fertility windows	Accuracy of fertility	3		5	3	None	More detailed symptom tracking options		Accuracy of menstrual cycle predictions	Effective	Educational resources about menstrual health	Detailed fertility and ovulation tracking
	18-24	Mauritius	Student	High School		Never	None	None	3		3	3	None	None		Intermediate	No	No	
	18-24	Mauritius	Student	High School		Weekly	Tracking menstrual cycle dates Setting reminders for period start dates Viewing menstrual health reports or summaries Accessing educational content about menstrual health	Accuracy of fertility predictions User-friendly interface and navigation Customizable reminders and notifications Educational resources about menstrual health	4		5	4	None	More detailed symptom tracking options Integration with wearable health devices Personalized health tips and advice		Specific features (e.g., fertility tracking, symptom logging)	Effective	Cycle tracking and calendar Fertility and ovulation prediction Reminders and alerts for cycle dates Community forums or support groups Personalized health tips and advice	Clarity and accuracy of information provided Quality and usefulness of notifications and reminders Availability of offline functionality Privacy and security of personal data
	18-24	Mauritius	Student	Bachelor's Degree		Monthly	Tracking menstrual cycle dates Monitoring ovulation and fertility windows Setting reminders for period start dates	Ease of tracking menstrual cycles Accuracy of fertility predictions User-friendly interface and navigation Customizable reminders and notifications	4		4	5	None	Integration with wearable health devices Personalized health tips and advice Options for tracking mood and mental health		Specific features (e.g., fertility tracking, symptom logging) User-friendly interface and ease of use Accuracy of menstrual cycle predictions Privacy and security of personal data Availability of health insights and analytics	Effective	Reminders and alerts for cycle dates	Clarity and accuracy of information provided Quality and usefulness of notifications and reminders Detailed fertility and ovulation tracking Privacy and security of personal data

Figure 24 - summary of surveys

Aptitudes	Technical Proficiency	Educational curriculum on menstrual health	Completed relevant courses		Skills	Technical Proficiency	Comfortability on navigation in app	Primary Device used	Engagement with App
	Proficient	Yes	No	4		5	Very confident	Smartphone	Frequently
	Proficient	Yes	No	5		5	Extremely confident	Smartphone	Rarely
				3		4			
	Intermediate	Yes	No	4		4	Very Confident	Smartphone	Frequently
	Proficient	No	No	5		5	Very Confident	Smartphone	Frequently

Figure 25 - summary of surveys

From the survey, the most popular tasks carried out in the app are:

Tasks	**Occurrences**
Tracking menstrual cycle dates	28
Setting reminders for period start dates	20
Recording symptoms (e.g., cramps, mood changes)	18

Tasks	Occurrences
Monitoring ovulation and fertility windows	17
Viewing menstrual health reports/summaries	11
Accessing educational content about menstrual health	3
Engaging with a community or forum within the app	1

Figure 26 - count of answers for surveys

Semi-structured interview

Below are the questions used for the semi-interview: -

BACKGROUND QUESTIONS:

1. Gender
2. Age
3. Location (where you from)
4. Education level

ACTIVITIES:

1. What is the usual frequency of your interactions with your favorite period tracking app? What motivates you to interact with it daily?
2. Could you comment on the specific tasks or features that you find most significant or relevant in the app, based on your experience using it? Furthermore, are there any elements that stand out to you as being especially worthwhile or advantageous?

ATTITUDES:

1. Could you provide your thoughts on the significance of period tracking applications for efficient management of menstrual health and which factors are essential in this context, in your opinion?
2. Considering the design of your app for monitoring your periods, could you share some personal experiences you've had with menstrual health management? Are there any aspects that irritate or inconvenient to you? In addition, are there any resources or choices you wish were offered for improved management of menstrual health?

MOTIVATIONS:

1. Could you describe the main causes or influences that made you decide to download and use this specific period tracking app?
2. When you think back on your experience, how useful do you think the site is for helping you manage your menstrual health? Are there any platform elements that you find especially useful in reaching your menstrual health objectives, as well?

APTITUDES:

1. How technically skilled are you at utilizing digital applications, particularly period tracking apps? To what extent do you feel at ease using technology in your daily routines for managing your health?
2. Thinking back to your schooling, were there any topics covered in biology, health, or reproductive health courses? Furthermore, have you taken any specific classes or training in reproductive science, menstrual health, or similar fields?

SKILLS:

1. What would you say is your technical competency level when it comes to using digital tools or mobile applications? In general, how do you use and adjust technology in your day-to-day life?
2. Regarding your experience with the period tracking app, could you describe how user-friendly its features are for you? Furthermore, are there any app features that you find especially useful for reaching your menstrual health objectives? If so, please describe why these aspects stand out to you.

   This is the full table view for the interview:

Background	Gender	Age	Country	Education Level	Activities	Interaction Frequency	Tasks	Advantageous Elements	Attitude	Comments on significance of period app	Positive Experiences	Negative Experiences
	F	18-24	Mauritius	Y2		Monthly	Track Regular period	Notification two days before predicted cycle		Helpful - prediction accuracy : 7.5/10		Not enough information on dietary suggestions Feed: Ovulation period to someone not having sex
	F	18-24	Mauritius	Y3		Weekly	Track ovulation period	Add notes on experiences Track menstrual flow, mood fluctuations		Good for taking precautions - prediction accuracy off 1, 2 days	Provide useful information by video Easy to view with calendar chart	Too many ads
	F	18-24	Mauritius	Y3		Weekly	Track cycle length					Could not identify symptoms from chat question with bot Constant Reminders of discharge - embarrassing in front of people No annual check up on cycle changes
	F	18-24	Mauritius	Y3		Monthly	Track irregularities in menstrual cycle	Indicates windows about period, ovulation, mood swings, how to cope with the flow. Prediction accuracy is more or less okay.			System to predict cycle Helps to plan outings	Sometimes the Ads
	F	18-24	Mauritius	Y3		Weekly	Track menstrual cycle	Calendar feature - present start and end of menstruation	Alarms when menstruation is late	Could be used to find irregular patterns in period thus detecting health issues.	Reminders a few days before menstruation	

Figure 27 - summary of interviews answers

From the interview, the tasks that were mentioned are:

1. Track menstrual cycle.
2. Record symptoms.
3. Track ovulation period.
4. Add notes about experiences such as mood fluctuation.
5. Learn more about the personal problems faced.

7. Bibliography

Felix A. Dreger, O. E. (2023, February 18). *Hierarchical Task Analysis (HTA) for Application Research on Operator Work Practices and the Design of Training and Support Systems for Forestry Harvester*. Retrieved from MDPI: https://www.mdpi.com/1999-4907/14/2/424

FINN H. (2023, May 3). *Flo review – our honest thoughts about this popular period tracking app*. Retrieved from you-well: https://you-well.co.uk/flo-app-review-honest-thoughts/

McShane, J. (2021, January 15). *More than 100 million women use Flo, a period-tracking app. Here's why some are deleting it.* Retrieved from TheLily: https://www.thelily.com/more-than-100-million-women-use-flo-a-period-tracking-app-heres-why-some-are-deleting-it/

Winter, L. (2018, July 24). *If you have irregular periods, you NEED this tracking app.* Retrieved from Glamour: https://www.glamourmagazine.co.uk/article/flo-period-tracker-app-review

Noble, N. & Heale, R. (2019). Triangulation in research, with examples. BMJ Journals, 22(3). Retrieved from https://ebn.bmj.com/content/22/3/67

Lester, N., et al. (2020). Learning to Do Qualitative Data Analysis: A Starting Point. Available from: https://journals.sagepub.com/doi/full/10.1177/1534484320903890

Adeoye-Olatunde, O. & Olenik N. (2021). Research and scholarly methods: Semi-structured interviews. Available from: https://accpjournals.onlinelibrary.wiley.com/doi/epdf/10.1002/jac5.1441