

# DESIGN REPORT

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REDESIGN REPORT FOR  
THE PHILIPS AVENT BABY  
MONITOR WITH APP



**PHILIPS**  
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University of Technology

# Hello!

# We are Team Mont

This report entails a redesign proposal of the Philips Avent Baby Monitor. In the prior report, the evaluation and concept phase was discussed. In this report, the concept is developed into a complete redesign tested with the target group. The baby monitor, camera, packaging, and the app have all been redesigned by the team. The team detailed the final concept and evaluated it amongst themselves and with actual user tests. The data will be analyzed and compared to the stated design goal from phase 1. In the end, a conclusion is drawn from the key insights but with a critical look at the data analysis. From there, the team saw that the design goal was met by implementing a couple of recommendations, which will be discussed at the end of the report.

Team Mont consists of five Design for Interaction master students at the University of Technology in Delft. For the course Usability and User eXperience Assessment in Design, we took on a project for Philips Avent. The team consists of people from various design and cultural backgrounds to have a diverse look at the project and bring in varied expertise.

# Introduction

This report aims to detail the converged concept discussed in phase 1. The final redesign will be developed further and tested with the intended target group to finalize this project with a discussion and further recommendations.

The first chapter will discuss the design process that team Mont took to finalize the redesign. The chapter will start with a small recap of phase 1 to give an overview of the most important conclusions. After that, the design decisions towards the final redesign are discussed.

In chapter two, a test plan is discussed for the redesign. The team starts off with the design goal and the criteria to see which data they need to evaluate the redesign. A test setup will be presented alongside prototypes and the questions necessary to perform the user test. At the end of this chapter, the results will be shown, and insights will be derived.

In chapter 3, the key insights derived from the user test will be compared to the design criteria and goal to finalize the project and see if the project met the goals stated. It was found that the redesign was more reliable and supportive with the implementation of a new way of giving feedback by a LED strip and visual on the screen and also the new onboarding process. To make the product feel more like an extension, the team introduced a clip-on and a medical feature, which must be looked at again in the recommendation section. Still, the add-on of the onboarding made sure that the users were more familiar and thus felt made it feel more like an extension of their parenting style. So, to conclude, the redesign meets the design goal with some alterations, which are addressed in the recommendation section.

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# Redesign



- 1.1 Design Goal**
- 1.2 Phase 1 Recap**
- 1.3 Design process**
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- Conclusion**

The reader can find a short recap of the previous report in this first chapter, including the team's Design Goal, converged concept, and medical direction. The second part of the chapter focuses on detailing the design decisions and the redesign of the parent unit, packaging, and medical application that will be tested in the second chapter.

## 1.1 Design Goal

**"The goal is for users to experience the system as reliable, supportive and as an extension of themselves."**

### RELIABLE

The interaction should feel intuitive, and the concept should be indicated consistently.

### SUPPORTIVE

The parents will feel less overwhelmed when enabling the functions of the monitor.

### EXTENSION

Make it easy for the parent to effectively and efficiently integrate the functions in their routine.

# 1.2 Phase 1 Recap

Phase 1 ended with a converged concept in terms of functionality and needs. In the first phase, the team analyzed the product in detail. After analyzing the reviews a compact field study was conducted to better comprehend the use cases of the product. A set of user tests were carried out to understand the problems and drawbacks of the current design. Based on these studies a design brief was formulated.

The **medical feature** was scoped in **more detail** with regards to **competitor features** and feasibility. A direction was defined which is further explored in detail in the current report.

Using this framework, multiple ideation sessions were carried out leading to 3 main concept directions. Based on evaluating these concepts some patterns emerged. The final converged concept is a balance between all the strong points of these concepts and practicality. The goal of not overwhelming the users remained key to the project.

## Primary solution area

These areas are the **main focus** for the redesign

### Physical Interaction

- Response from the **Camera unit** (6)
- **Wired and wireless** (5-7)
- **Set modes** (4)

### Screen UI (icons, visuals)

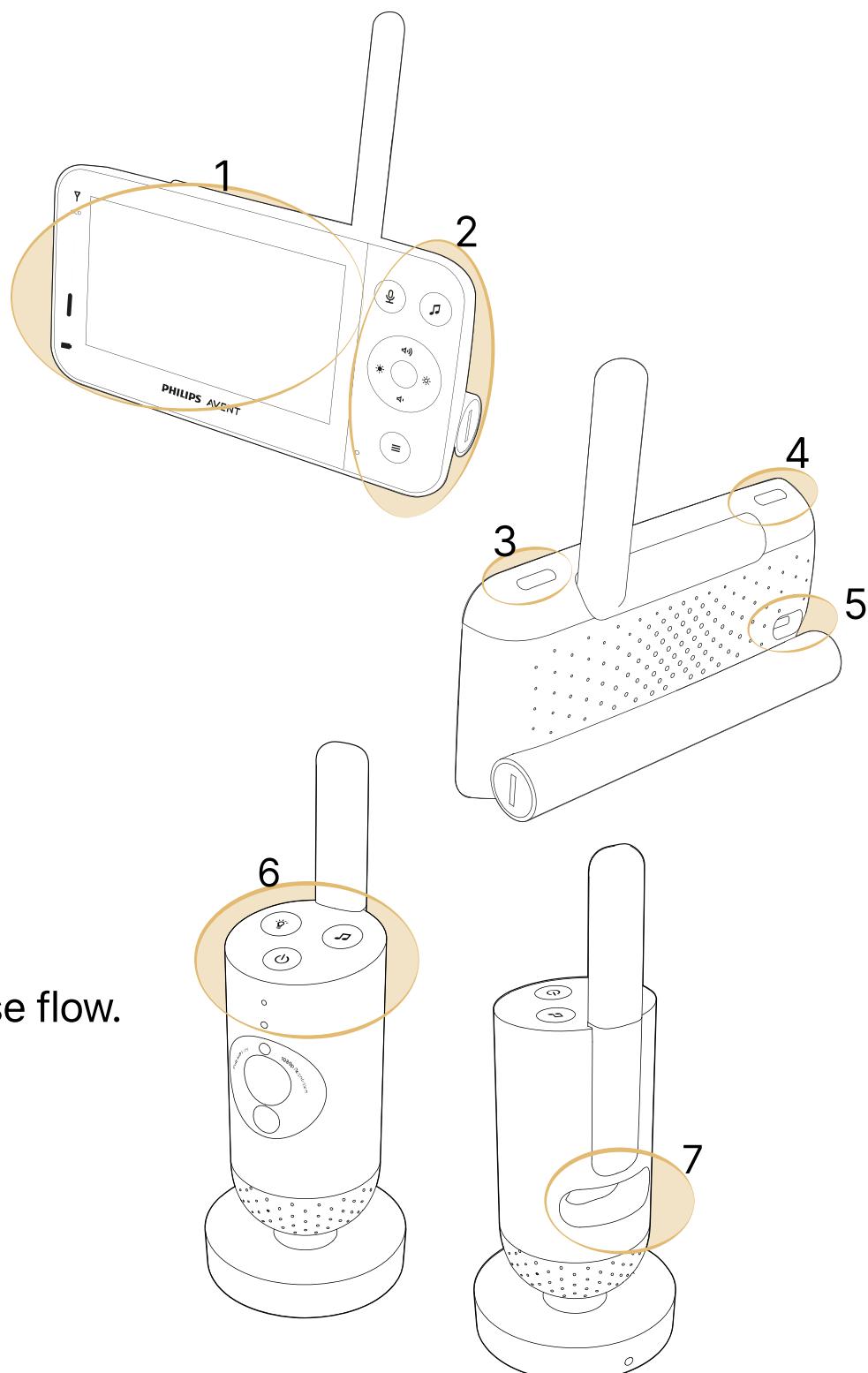
- **Unclear UI aspects**, like the icons for connectivity (1)
- **Unclear hierarchy** of functions (2)
- **In-cohesive visual language**. (1-2)

### Interaction Pattern

- Feedback and response system.

### Information Architecture

- Flow of functions is **not in harmony** with the product use flow.



## Secondary solution area

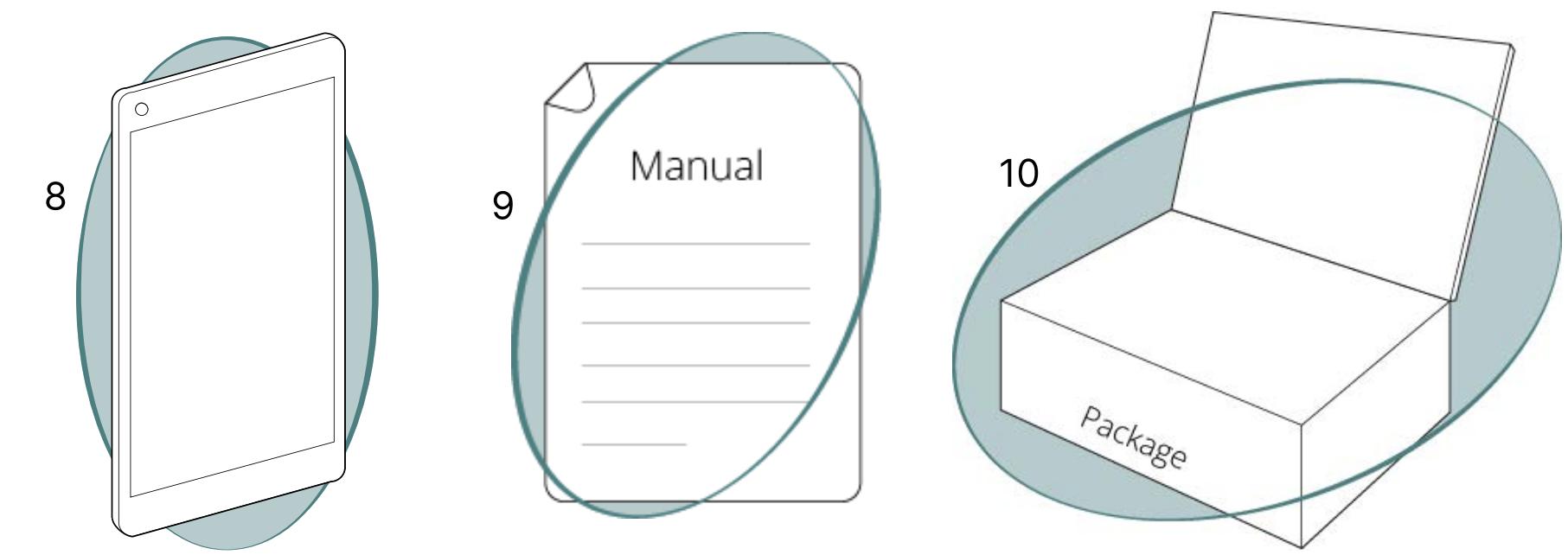
These improvements will **add to** and support the changes of **the essential elements**

### Phone application

- Possibility to **add supportive features through the app.** (8)

### Package and Manual

- Too many **unnecessary manuals** that could be simplified. (9)
- **Unpacking experience** is overwhelming. It could be **simplified** and made **more** intuitive. (10)



# 1.3 Design Process

To develop the design, decisions per unit have been made to challenge the current problem we had found. By aligning them to the user journey, they comprehensively covered the holistic user experience.

## Before/set up

During phase one, it was found that the current product felt **overwhelming** even before users started to use the product. The **feedback** given to the user during the setting up process was **unclear** and there were **too many unknown features** afterwards that they had to **figure out themselves**.

The design decisions aim is that the user should feel more **confident** while using the device. The new set up procedure introduces all the different functions and aspects of the monitor which makes the user more **familiar** and therefore **confident** in using it. The user has a run through of everything while setting it up and can more easily find and adjust different settings (see fig 1.1).

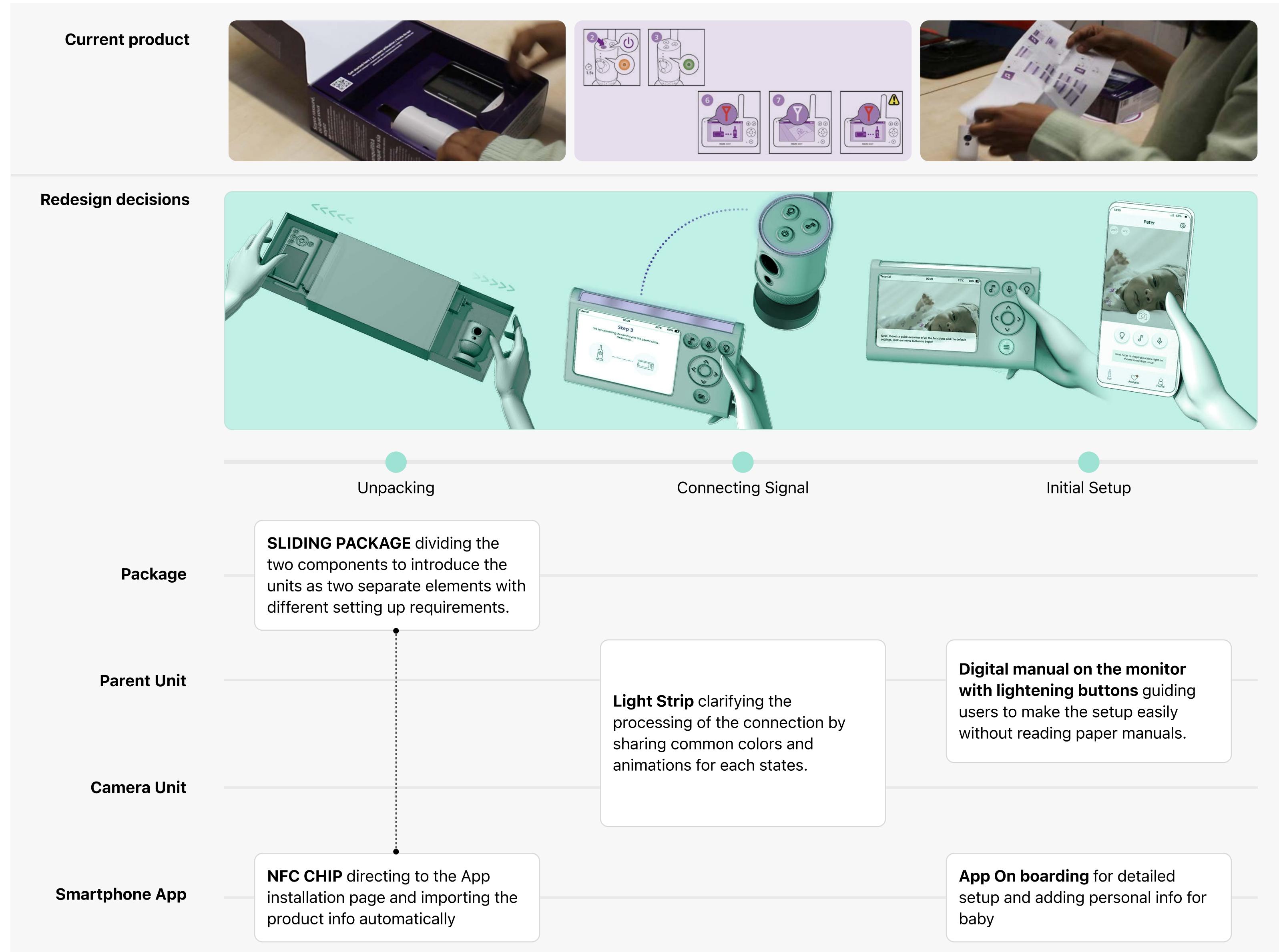


Figure 1.1 Work flow and the different points interaction for the setup

# 1.3 Design Process

## Operating

While operating the device, it was found to be very **confusing** for the user to understand the feedback and feedforward. Many functions were **unused** and **unnoticed** because of the **complicated** menu and interaction pattern.

These design decisions lead to a more **comfortable** usage of the product. The product will deliver **clear information** to the user with the use of the light strip. The combination between light and the screen will clearly indicate **the status of the different functions** that are **active/inactive**. The functions themselves are **easy to access** and easy to use with the help of the suggestive function of the device, this will also make them more effective (see fig 1.2).

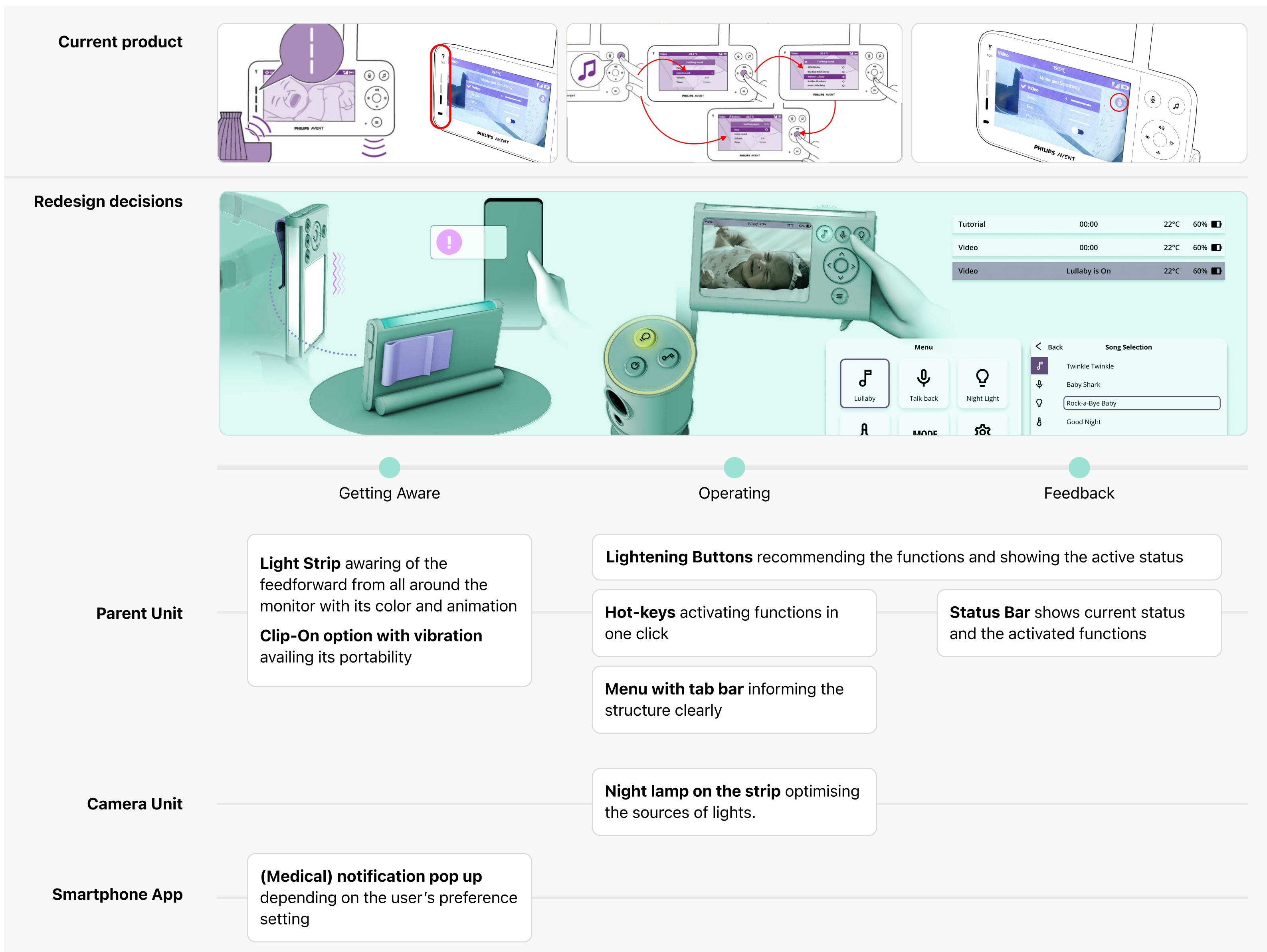


Figure 1.2 Work flow and the different points interaction for the operation

# 1.3 Design Process

## After/Further Usage

After operating the device it was found that the app merely added **new value** to the experience of the product. Users could not get enough incentive to take further action with the device.

With the implementation of the **medical feature**, the app and monitor become more of an extension of the parent, in their parenting behavior. The user trusts the device more and gives more overview of relevant data on the baby. With this feature, the product is more accessible in multiple new ways. This will make the product more upgradable to additional needs of monitoring for parents (see fig 1.3)

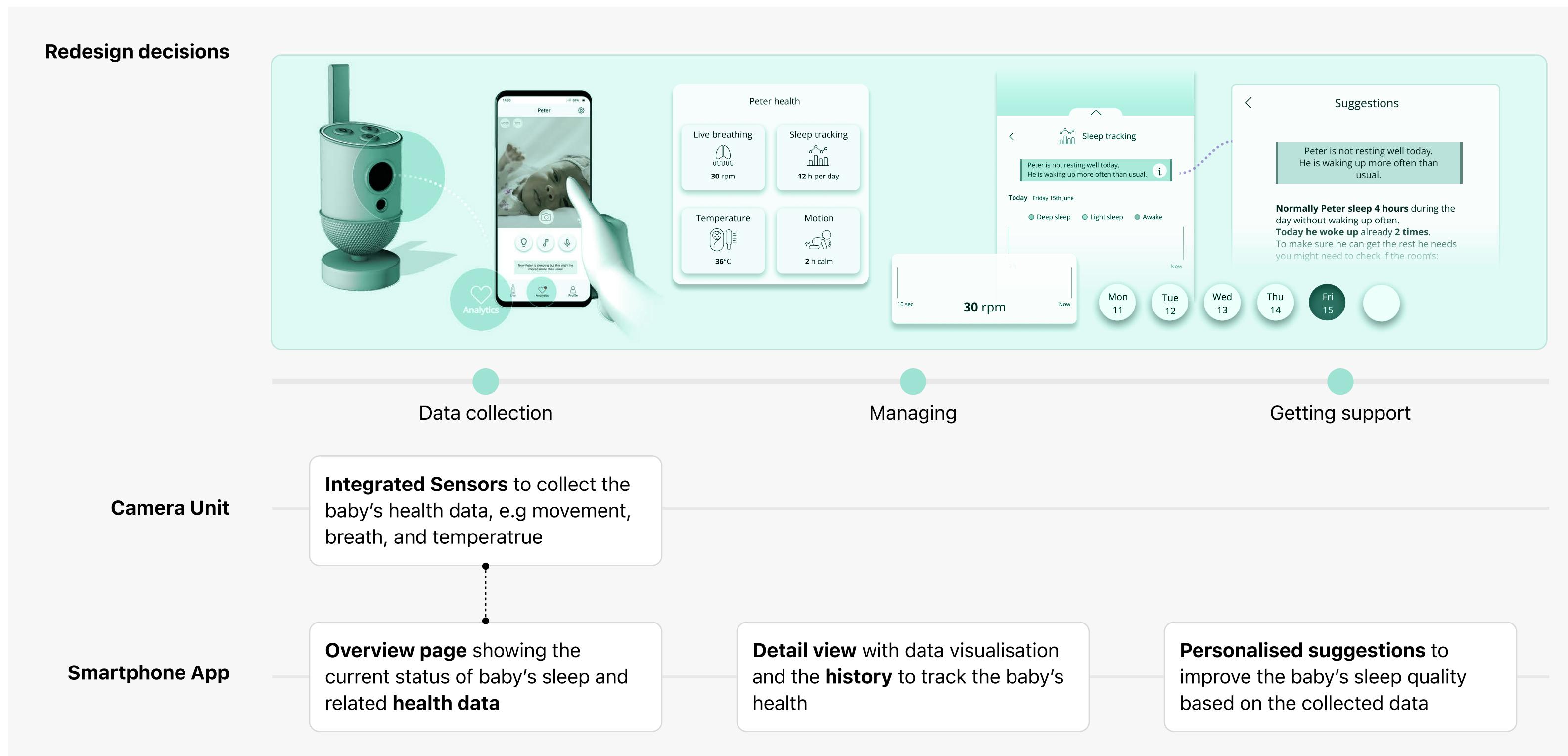


Figure 1.3 Work flow and the different points interaction for the phone application

After defining the Design decisions in detail, the team went through the Usability inspection using both the cognitive walkthrough and the heuristic evaluation to conclude with the iterative design decision.

The aim was:

- To finalize the user test setup before the pre-pilot and the final tests with the participants.
- To start the evaluation of the redesign

To mention some of the insights:

- The elements in the app have to be consistent
- The NFC spot on the packaging shouldn't make the user wonder about the function of it
- The design of the buttons (shadow) on the screen (ex., The "Next button") makes the screen looks touchable
- Feedback should support the user more by clarifying the status of the devices in the system.

The use case for this phase followed the flow of the user test and protocol that will be explained in detail in Chapter 2.2. More details on the methods, insights, and outcomes of this phase can be found in the appendix 4.1 & 4.2

## 1.4 Refined design

Through the previous iterative process, the final re-design was applied to both physical and digital touchpoints of the product. It covers the **package**, the **physical units**, and the **smartphone application** to improve the overall user experience.



### Package

#### Sliding compartments

**Arrows indicate the sliding directions** of the two compartments in the box. With the arrows it is more clear where the box should be opened and that there are two different components in this product. Now the user knows the differences and knows **which adapter goes with which component**.

#### NFC and mobile integration

With the use of the **NFC logo** the user is guided to put the phone on this spot. While taking out the 2 compartments **a slot with the size of a phone will also appear** and invite the user to place the phone on the NFC reader (see fig 1.4), which will guide the smartphone to the download page. The user is notified about the **existence of the app immediately after the purchase**.



Figure 1.4 Renders of the package, two units and the phone interaction

# 1.4 Refined design

## Physical parts of the parent unit and the camera unit

### Light strip

Two units have **light strips** on the **upper edge of their bodies**. While simplifying the multiple light indicators into one, the colors and the animations of the **light deliver the current status of the system**. The **strip** on the camera unit **performs as the night light** as well, and the unit is made **more compact** by saving the space for the lamp (see fig 1.5).



Figure 1.5 Different colored light indicators on the top of the units

### Buttons

**Three buttons** are located on the **top-right corner** of the parent unit to be easily approachable (see fig 1.6). They are used as '**Hot keys**' to operate functions within one click. With the half-transparent material, they are **lightened up** to give **suggestions** or indicate the **active status**. This gives the user more confidence while using the monitor and feel more in control.



Figure 1.6 The buttons lighting up to suggest the use of the function

### Clip-on

The **clip-on on the back of the monitor** gives the user the possibility to **wear the monitor** on their clothes. The clip-on will make the monitor **more reliable** because the user can keep it close at all times while still being **ergonomic** (see fig 1.7).



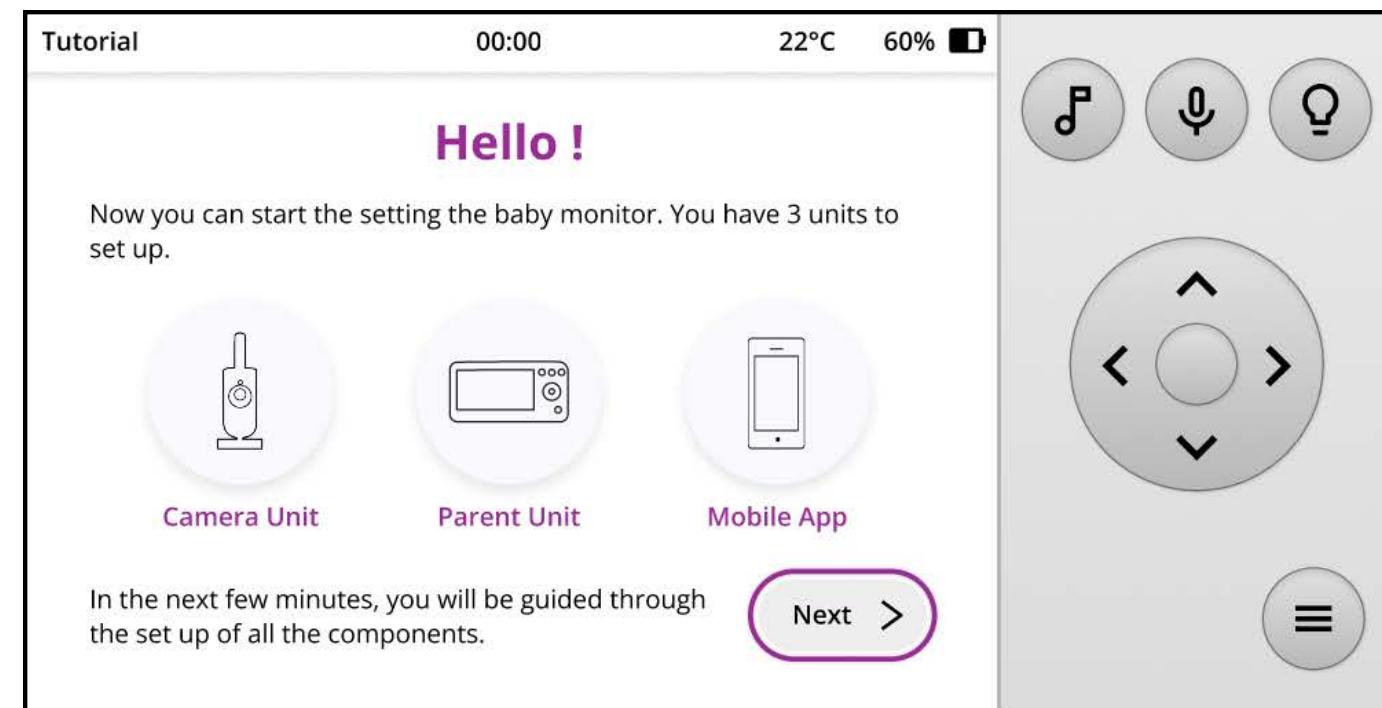
Figure 1.7 The clip on mechanism for the parent unit

# 1.4 Refined design

## Parent unit digital interface

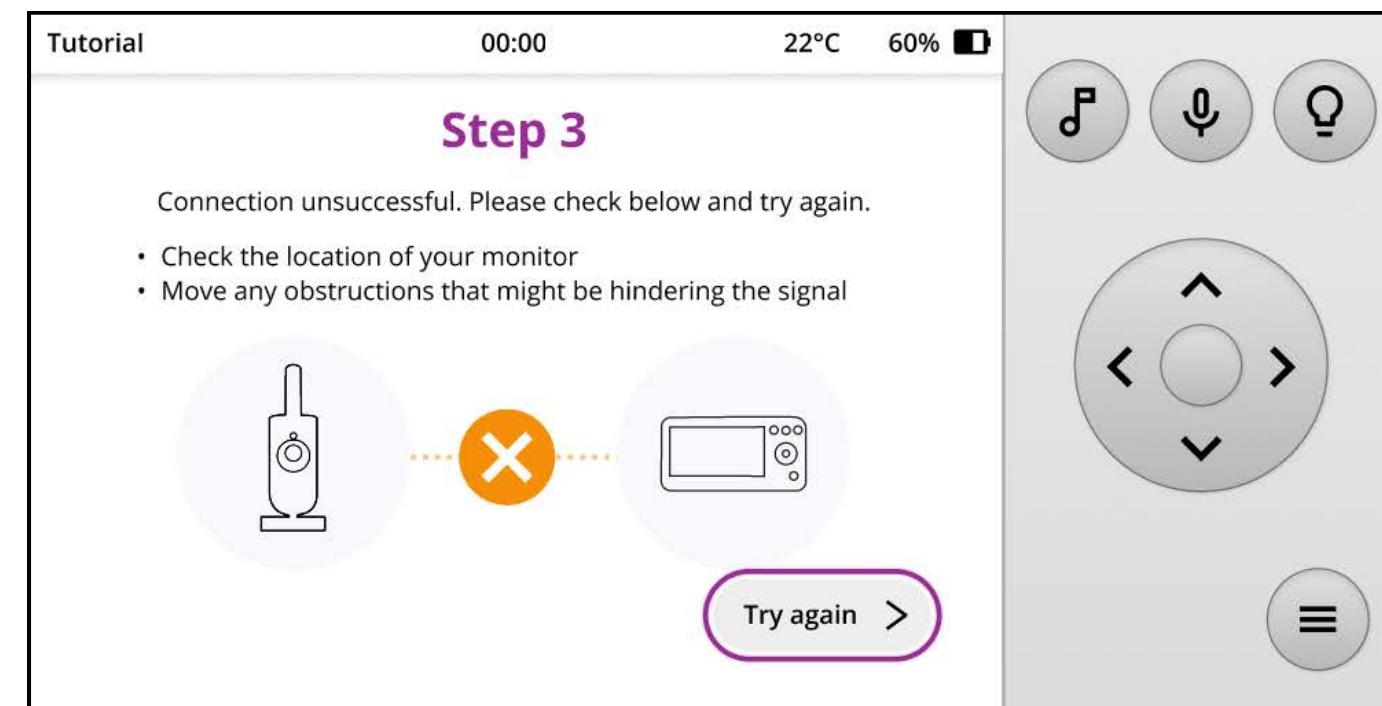
### Onboarding

The physical **manual** is replaced by a **digital** one on the parent unit. The user is **guided** through the setup procedure and features through **light-up buttons and visuals on the screen**. With these steps, users can make initial setups allowing direct access to the functions later, and easily understand the screen structure, like the menu and the modes (see fig 1.8, 1.9, 1.10). In appendix 4.3 there is a more in depth overview of the whole flow.



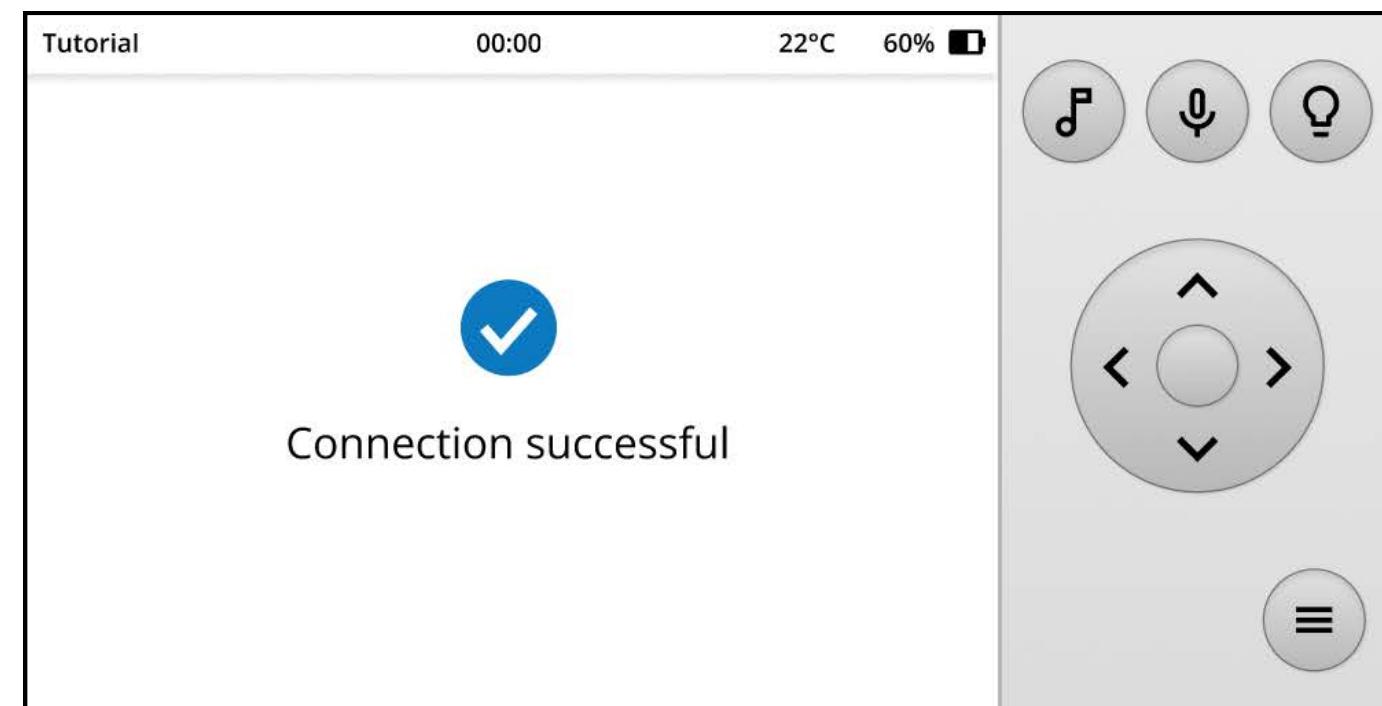
Start of the setting up process

Figure 1.8 Parent unit screen right after switching on



Connection error feedback and support from the device to the user to solve the problem

Figure 1.9 Parent unit screen when connection is unsuccessful



Feedback of task successfully accomplished

Figure 1.10 Parent unit screen to confirm connecting with the camera

# 1.4 Refined design

## Parent unit digital interface

### UI Design

There is a **visual notification** on the screen when a **function is enabled**. This has to be done by giving the **status bar a different color** and the header when a function is active. This colored bar and the light in the buttons (see fig 1.11) give sufficient feedback on the enabled function. This will help achieve a **more supportive interaction**. Users are more in control of the monitor and the system's status. The **settings, mode, and all the features are merged into the menu** to make it **less overwhelming** for the user (see fig 1.12, 1.13).

The appendix 4.4 contains more information about the screen interaction.

### Feedback

#### Status bar: Tutorial phase



#### Status bar: Video mode



#### Status bar & lighted buttons: Feature activated

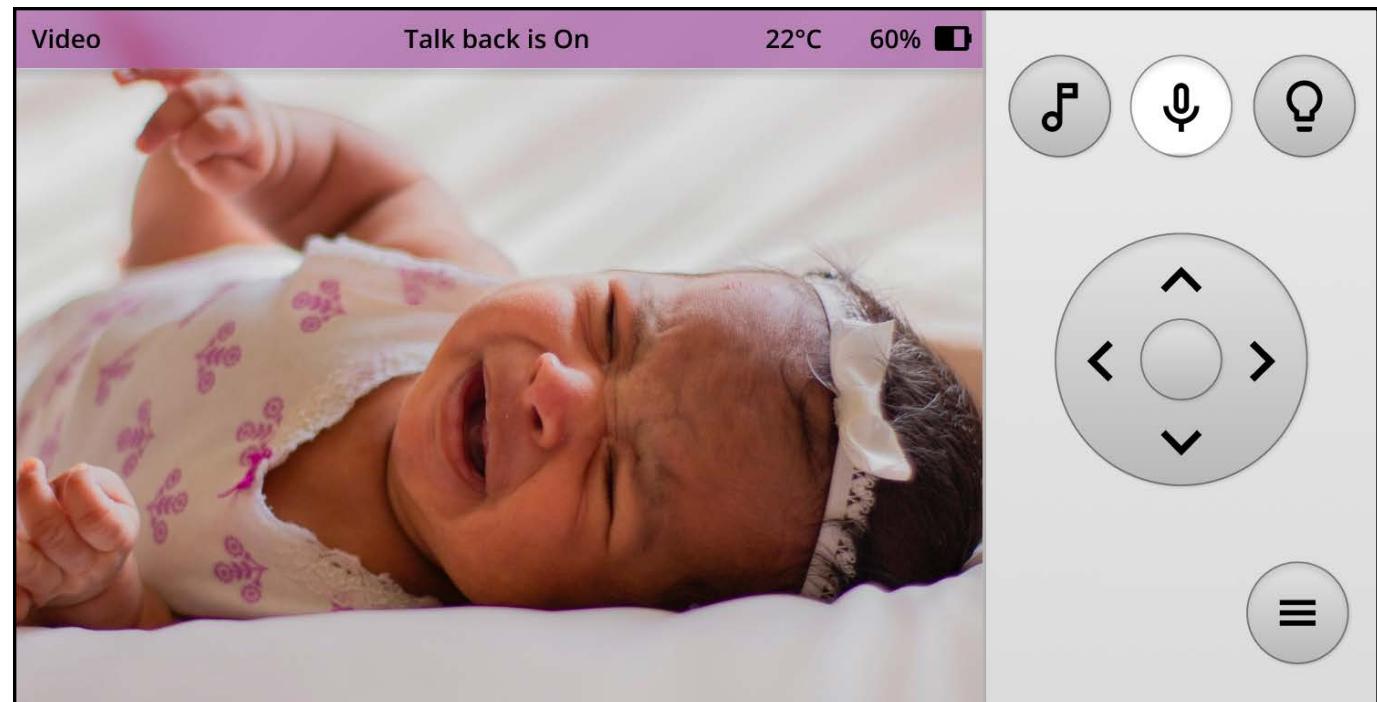


Figure 1.11 Parent unit screen with function on status bar

### Tab bar

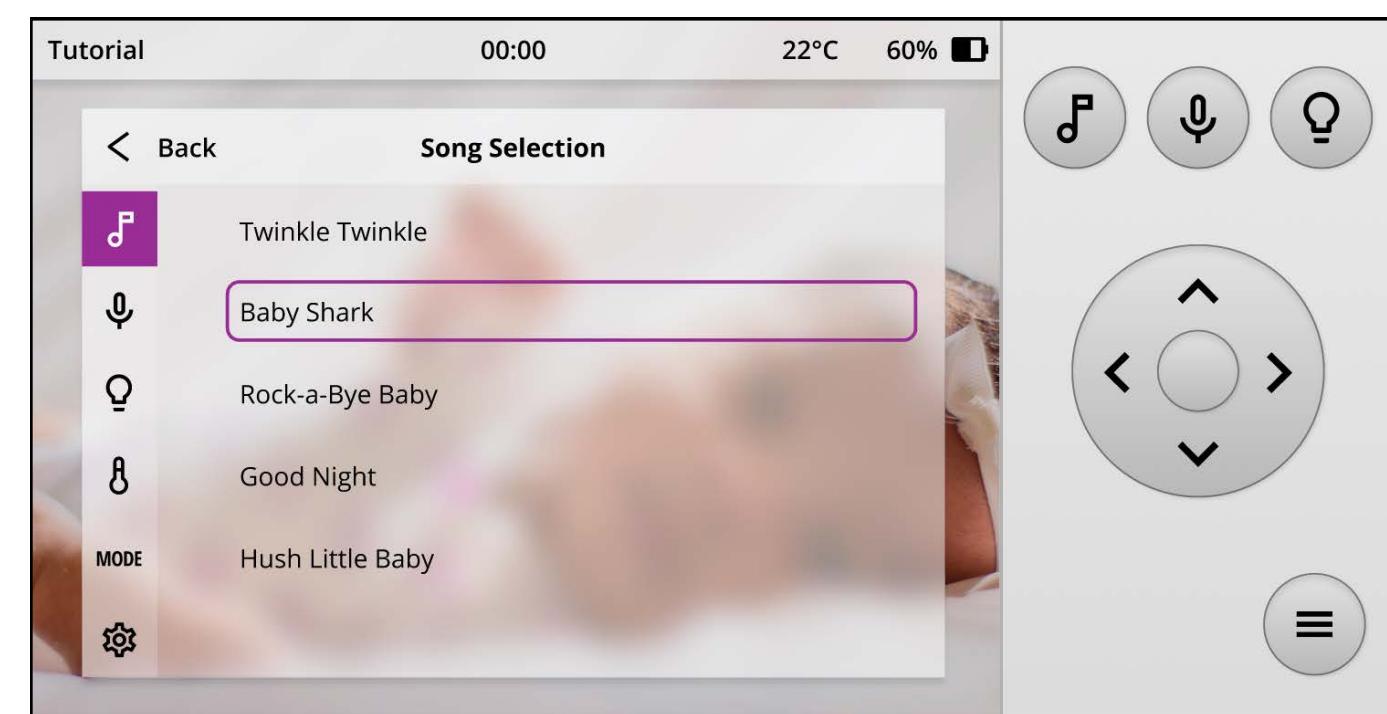


Figure 1.12 Parent unit screen to help select a lullaby

### Menu structure

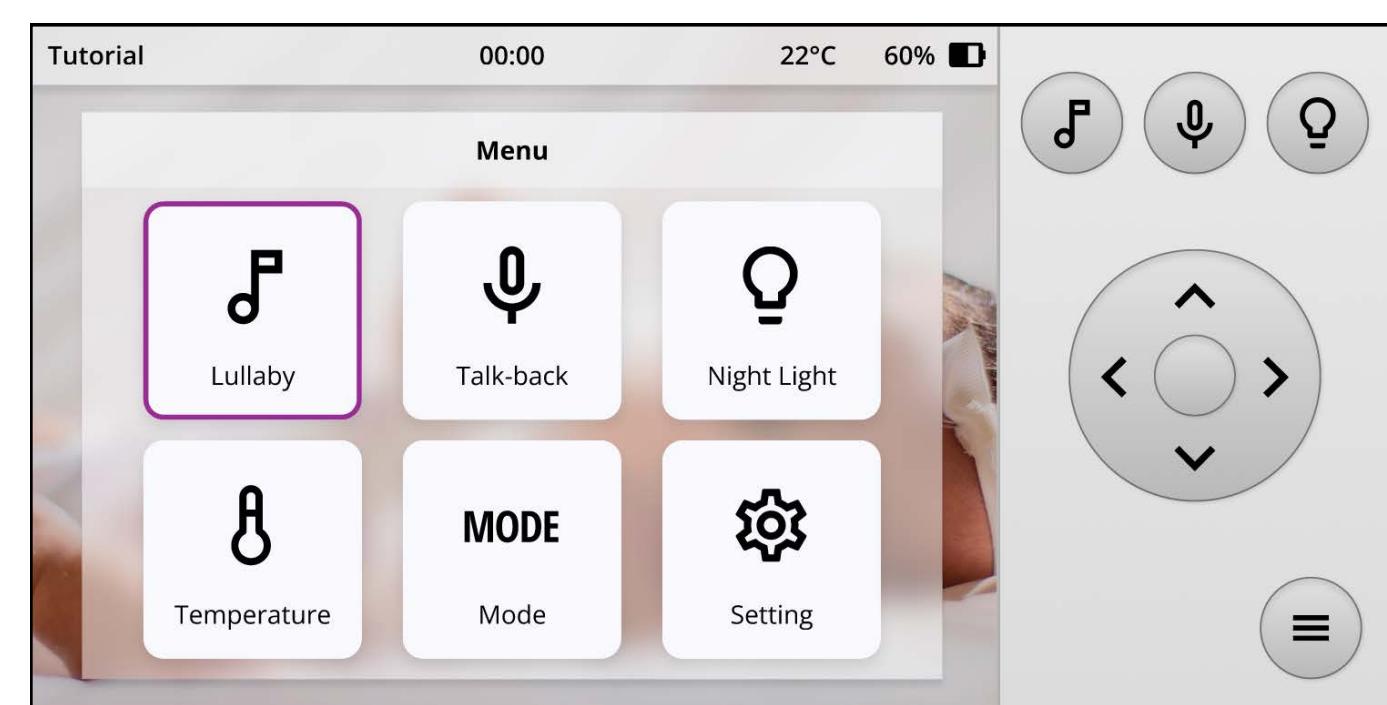


Figure 1.13 Parent unit screen to showcase overall menu

# 1.4 Refined design

## Smartphone App

The app follows the parent unit design and structure. It presents three main sections: **live, analytics, profile**.

In the app a **red dot** appears **to indicate** that there is **new data that can be checked** on the **"Analytics" page** (see fig 1.14). On this page the **medical data** will be shown to the parents to add ore insight with the goal of making the user more secure about the **baby's health and behavior when they are not around**.

The **activation of the sensors** and the notifications are customizable making the app adaptable to any context, situation, and parenting style.

The notifications (see fig 1.15) have to be in the background, if not in an urgent case, as extra help to keep an eye on the baby without giving the parents reason to worry about.

When the device detach some changes in the usual baby' pattern (see fig 1.16) will also suggest to the parents by which condition they might be influenced

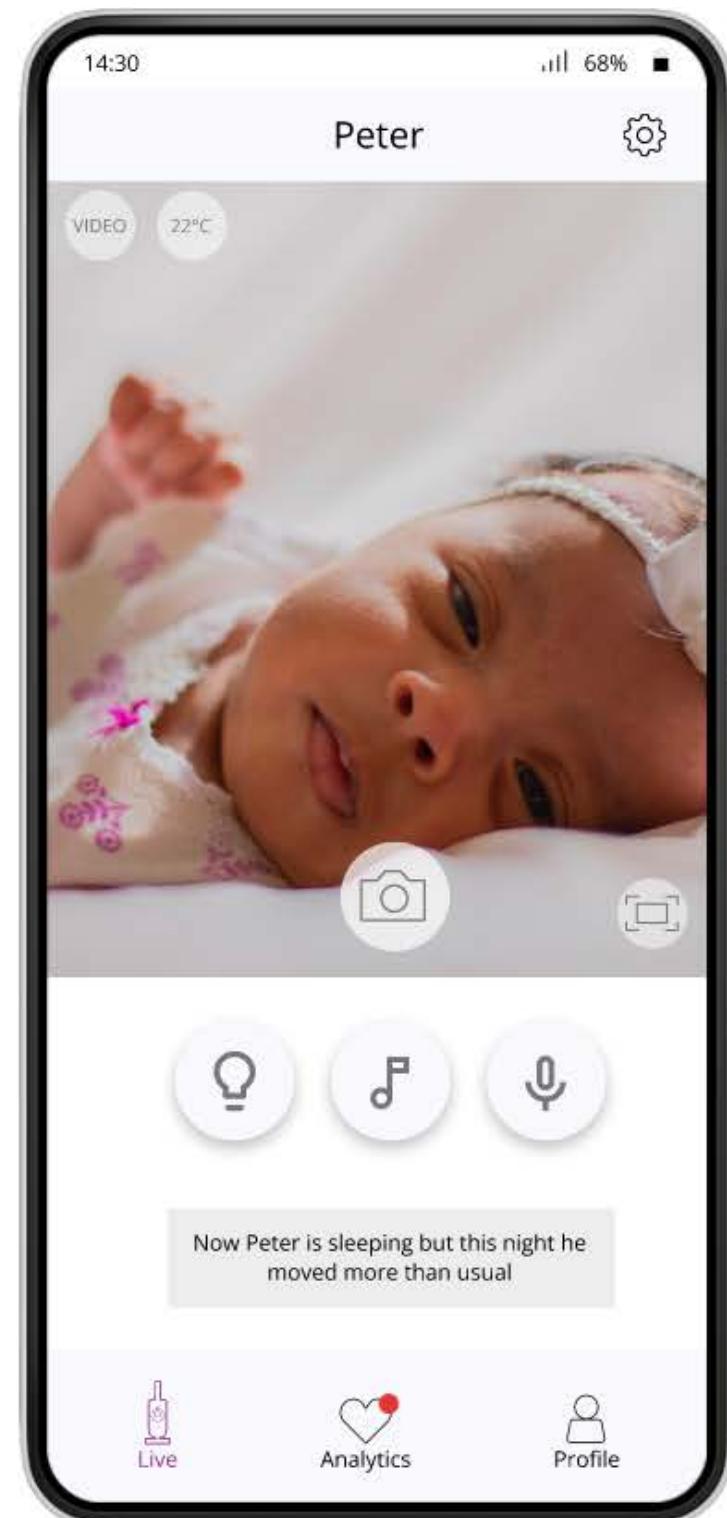


Figure 1.14 Mobile app soon after opening

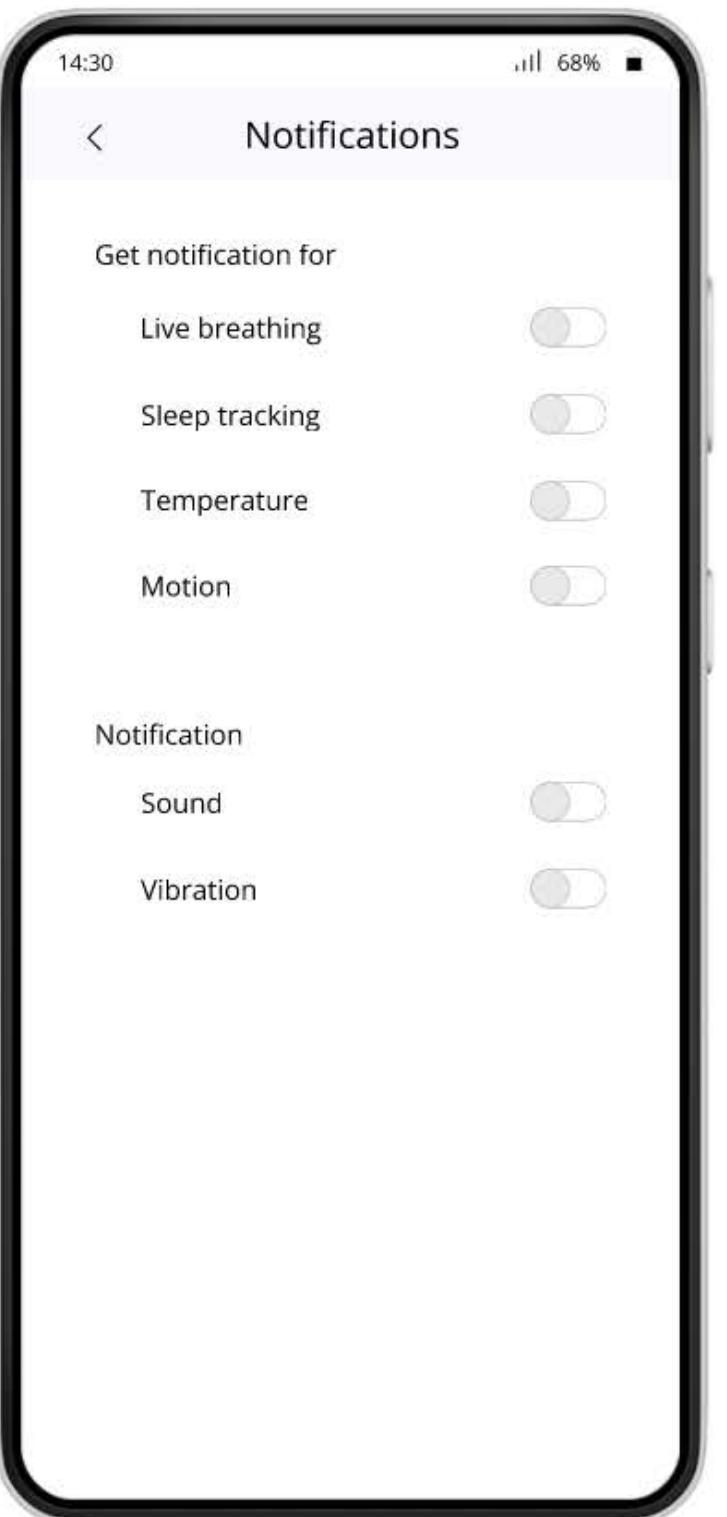


Figure 1.15 Mobile app to personalise notifications

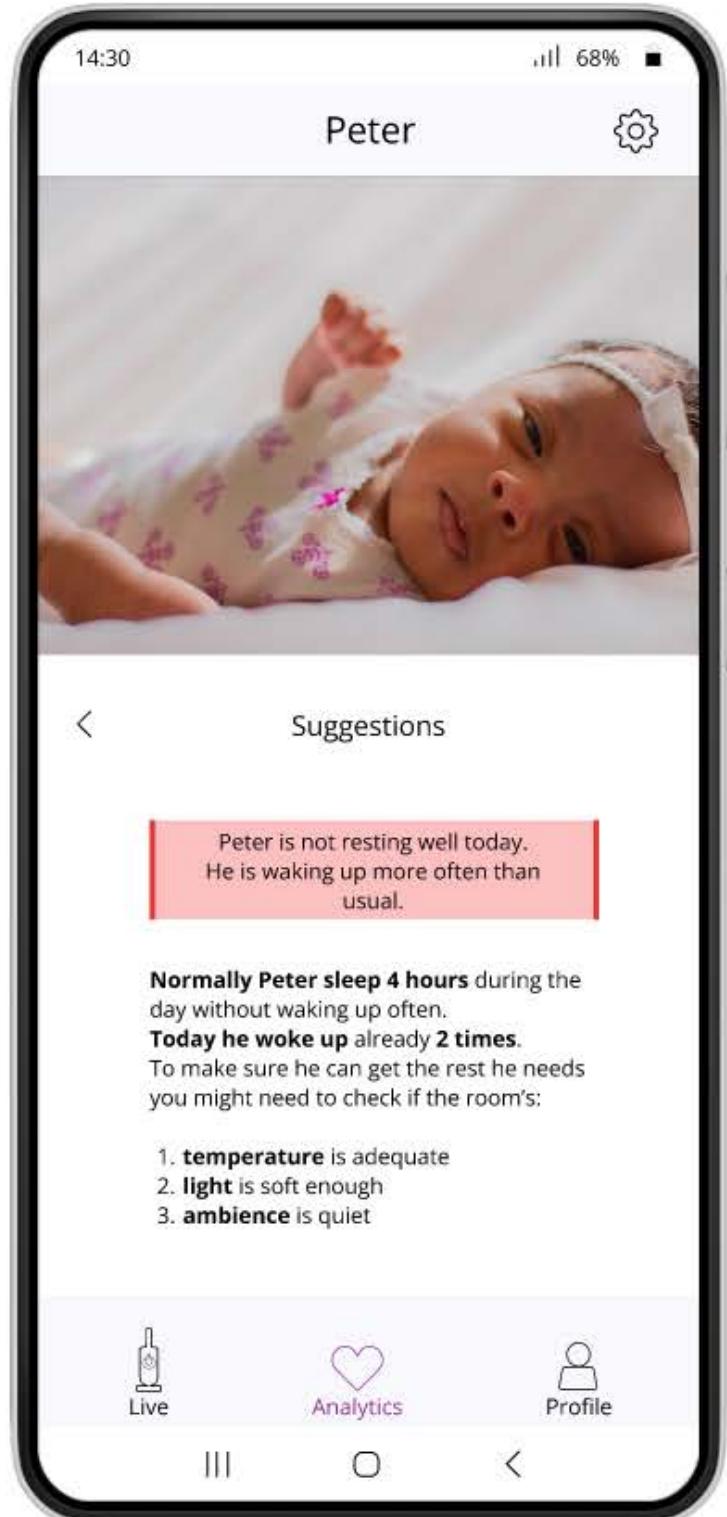


Figure 1.16 Suggestions on the mobile app based on the sleep tracking

# 1.4 Refined design

## Smartphone App

The main difference between the app and the monitor is that the app has an **entire section dedicated to the baby's health called "Analytics"** (see fig 1.17). In this section, they won't be able to control the features such as talk back, night light, etc. **The camera view** in this section will not disappear but will be **more compact** to give space to the medical menu:

- **Live breathing,**
- **Sleep tracking,**
- **Baby's temperature,**
- **Motion tracking.**

In each section, it is possible to **view the live data**, an **overview of the day and the night**, and also the data **history of the previous days** so that the user can keep track of the parameters.

More about the app can be found from the appendix 4.5 to 4.7

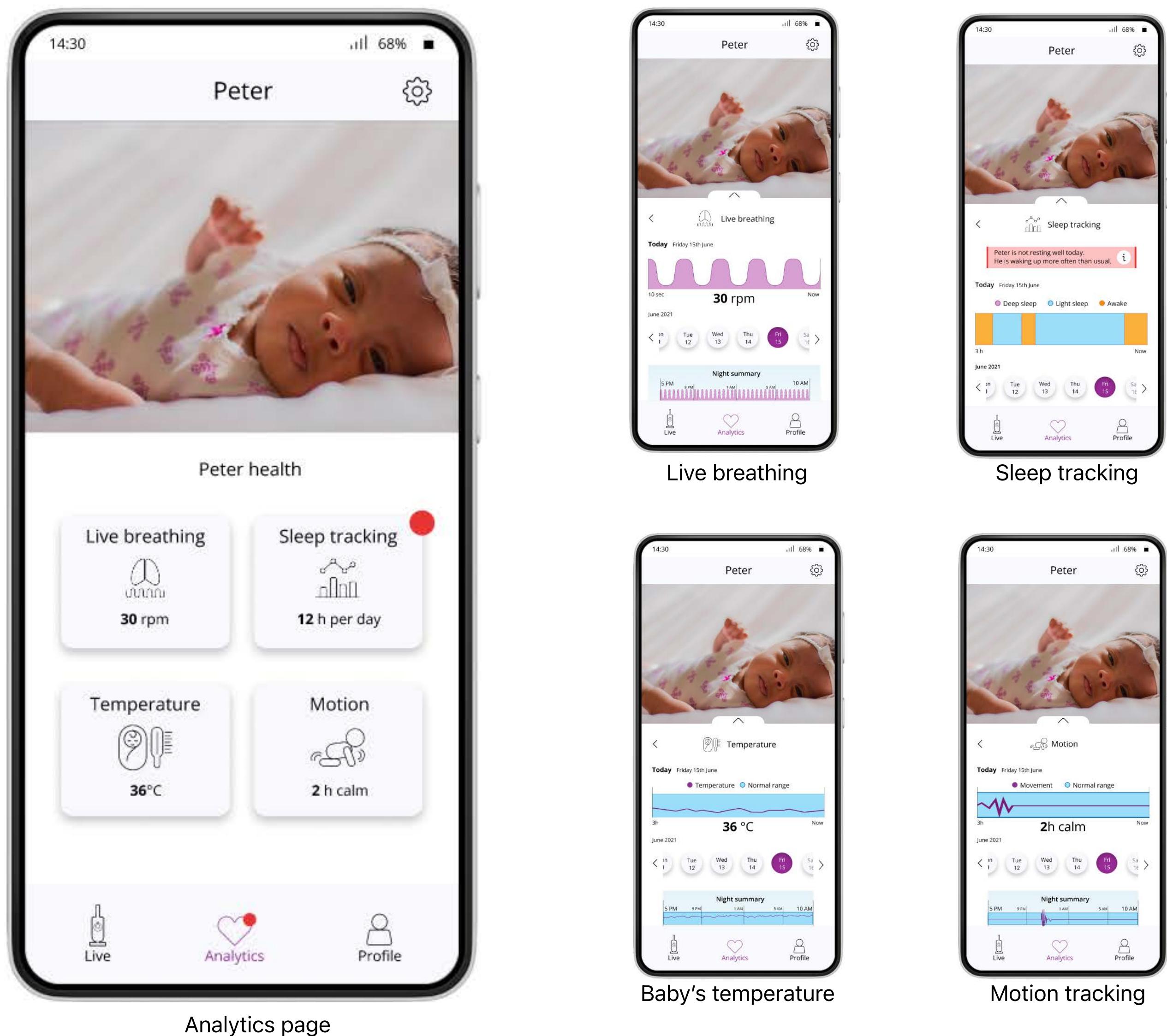


Figure 1.17 Detailed phone app screens for the medical functions

By the end of this chapter:

- Phase one was summarized with the introduction of the **problem statement** and the **design goal**. From these insights and with this goal in mind, a **converged concept** was created to build upon for the rest of this report.
- The **final design decisions** were presented to address all the weaknesses in the user journey of the baby monitor. The design was detailed for each step (set up, operating, and further usage) to overcome these challenges and improve the current design. A final redesign was concluded after an iteration based upon a cognitive walkthrough and a heuristic evaluation.
- The final redesign was shown with the highlighted details to get a more in-depth view of the concept's functionality. With this redesign, a prototype can be built, and a user test plan can be written in the next chapter.

# User testing



- 2.1 Test schema**
- 2.2 Test scenario**
- 2.3 Testing**
- 2.4 Results**
- Conclusion**

In this chapter, the first thing to be done was to define what data the team needed to gather to test the redesign. The data should be matched to the testable targets, design goal, and design criteria formulated in Phase 1. Based on this, the prototypes are defined, and a user test is made to test the redesign. At the end of this chapter, the results will be shown, and critical insights will be derived.

## 2.1 Test schema

The goal of this test was to find out whether the redesign is experienced as reliable, supportive and as an extension of the user. By aligning the design criteria with testable targets, the test has been designed to evaluate the design goal. In appendix 4.10 an argumented test setup can be found.

The colors refer to the design criteria and which ones are evaluated per task

In appendix 4.12 all questions can be found

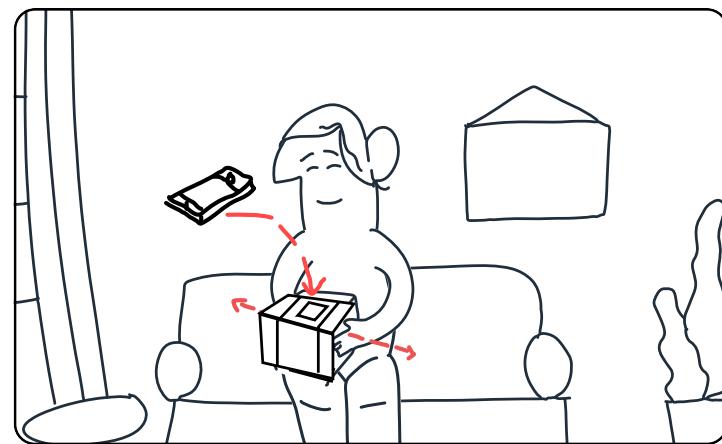
TEST GOAL	TEST CRITERIA	TEST SETUP / Scenario	QUESTIONS
Users experience the system as <b>reliable, supportive</b> and as an <b>extension of themselves</b>	Operating the 4 cases without the use of a physical manual	Pre-test questionnaire The participants were asked to describe their experience with their previous/current monitor (mothers)	Mothers Do you have experience with a baby monitor? How and where did you use it?  Students Are you planning to have a baby? What kind of parent do you want to be?
	The feedback should be understood intuitively*	Scenario 1: setup The participants were asked to go through the setting up of the monitor (unboxing, connecting, presetting)	UNBOXING CONNECTING PRESETTING  Introducing all the units and applications for the first time Guidance through the connecting phase with the LEDstrip Introducing all the available functions and their settings
	The monitor should feel as an extension of the parenting	Scenario 2: using The participants are using the product. They interact with the monitor at the moment the baby starts crying	FEEDBACK FEEDFORWARD PORTABILITY  Visualizing the baby's noise for extra feedback Alerting the function is relevant and still enabled Easy accessibility of the monitor
	The monitor should be reliable for a longer time	Scenario 3: health app The participant is looking on the app of the monitor and searches the information about the health of the baby	HEALTH NOTIFICATION  Daily and life health information about the baby Information about improving the babies (health) patterns
	The different functions of the monitor should be clear	Post-scenario questions After each scenario their general experience of the task was discussed.	Can you explain what you thought about this task? Did you have any doubts during this scenario? about what? Was it clear what the feedback meant? Can you explain why you choose to do that? Did you understand the value of this?
	The user should be able to hear and see the baby intuitively	Post-test questionnaire The overall test was being rated at the end through a questionnaire consisting both of scale and experience questions	Scale question about guided feeling Scale question about overall clarity Scale question about understandability Scale question about confidence Choosing the relevant word for their overall experience
	User should understand the structured overview		

## 2.2 Test scenario

Detailed scenarios has been defined to execute the test setup as seen on the previous page. With them, the redesign could be evaluated using the prototypes. Each prototype was designed focussing on certain interactions of a scenario. In appendix 4.8-4.9 the process of making the prototypes is explained in more detail.

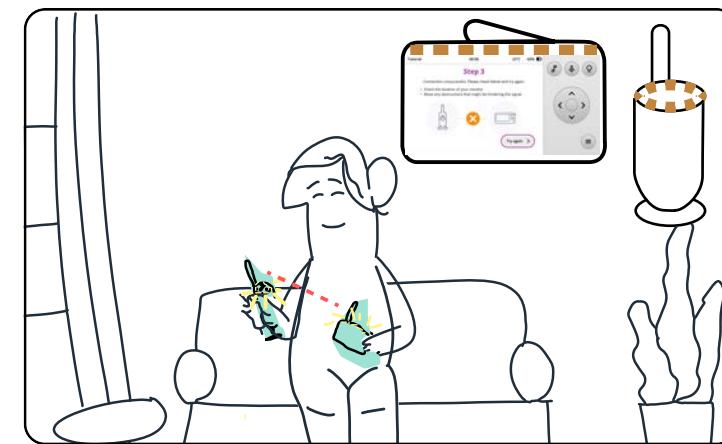
### Scenario 1

#### Unboxing



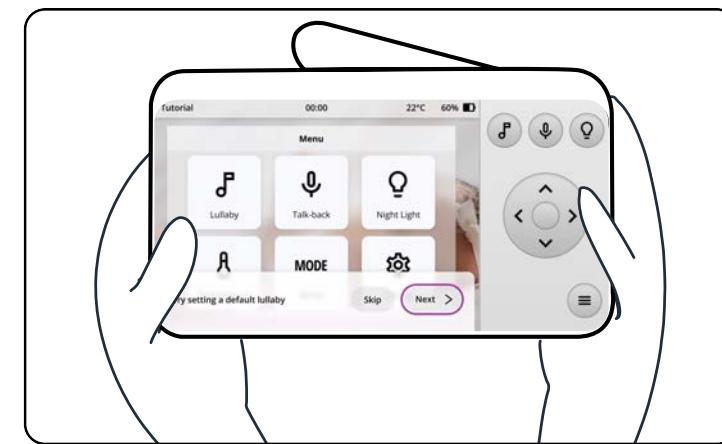
The user just bought the product and has to install. The user gets all the units out of the box and downloads the app.

#### Connecting



The user enables the monitor, and the welcoming screen will guide her through the connecting process with the camera unit.

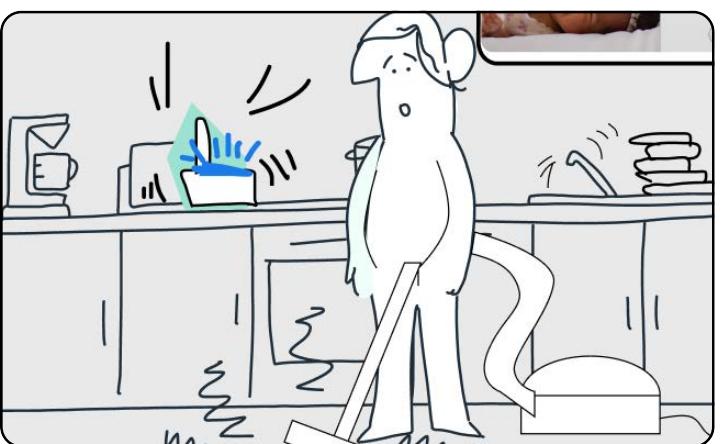
#### Presenting



After the connection, the onboarding gets started. With the blinking button, it guides the user through the functions and helps to make the initial setup.

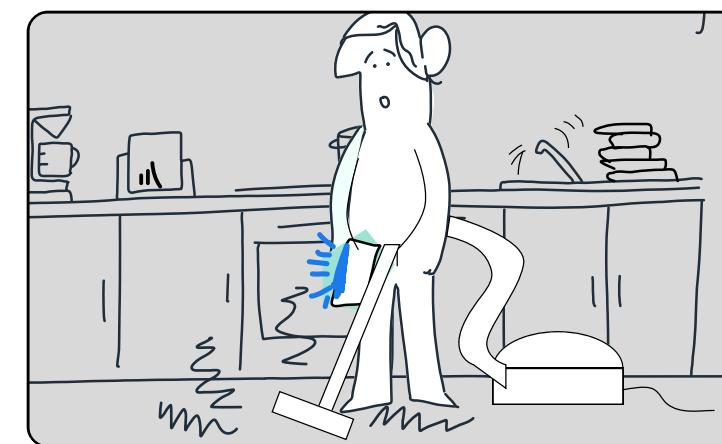
### Scenario 2

#### Feedback&forward



The user is vacuum cleaning around the house. The monitor shows light with the sound of the baby crying. The blinking buttons suggest functions to enable.

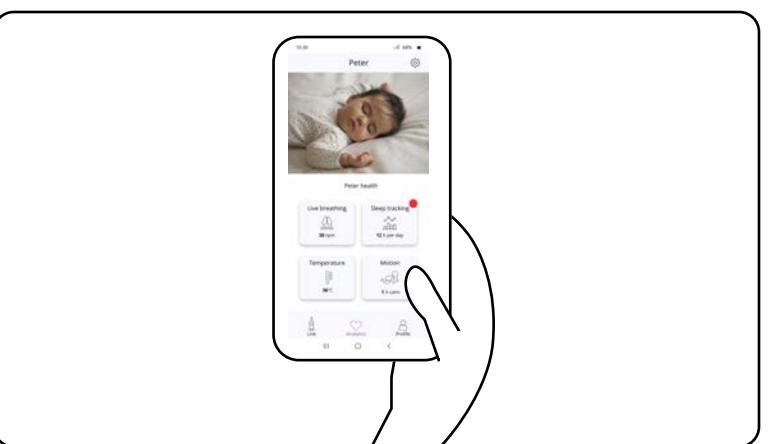
#### Portability



The user is carrying the monitor with her when vacuum cleaning. The monitor can be hanged onto her clothes with the clip on.

### Scenario 3

#### Health App



The analysis tab in the app shows an overview of the health data from the sensors. While managing the data, the user gets aware and supported about the sleeping health.



A prototype of the package with all the units in it.



A static prototype to test the LED strip while setting up.



A phone screen with the onboarding process to walk the user through the setup.



A static prototype to test the animations of the lights.



A portable prototype so we could test the comfort and ergonomic of the prototype.



Prototype of the app to test medical aspects, how intuitive and valuable it is for users to have this add-on feature

## 2.3 Testing

### The test setup

The team mapped out the ideal test setup to keep the test in different locations coherent. This can be found below in figure 2.1. The ideal test would be done with four people of the team, where three people are behind the participant, so as not to stress the participant with too many people in their vision. The room should be as clean as possible with as few distractions as possible. The team conducted a pre pilot test (detailed in Appendix 4.9)

### The participants

The team decided to expand the range of participants for the user test to get adequate feedback and arrive at the best possible redesign (see fig 2.2). The participants consisted of two sets of current/potential users. One group of mothers with toddlers and young children. The other group included students from the TU Delft who wish to have children and are prospective users of the product in the coming few years. The data of both sets were analyzed separately.

#### Mothers (n=3):

For the mothers, we were especially interested in the mother. They already had used a baby monitor (either with or without video) in the past to provide a comparison and nuanced reflection on the prototypes of the test.

#### Students (n=4):

The students did not have any experience with a baby monitor, which provided us with a different set of reflection points. The question were asked at the beginning of the test whether the participant wanted to become a parent in the future and made them think about how their parenting style would take form with the presence of the baby monitor redesign.

#### Data comparison:

What was striking between the data of the two participant segments was the focus on practicality (students) and the emphasis on motherhood experience (mothers). In the discussion section in the last chapter, the team will take a critical look at the choice of testing with two different user groups.

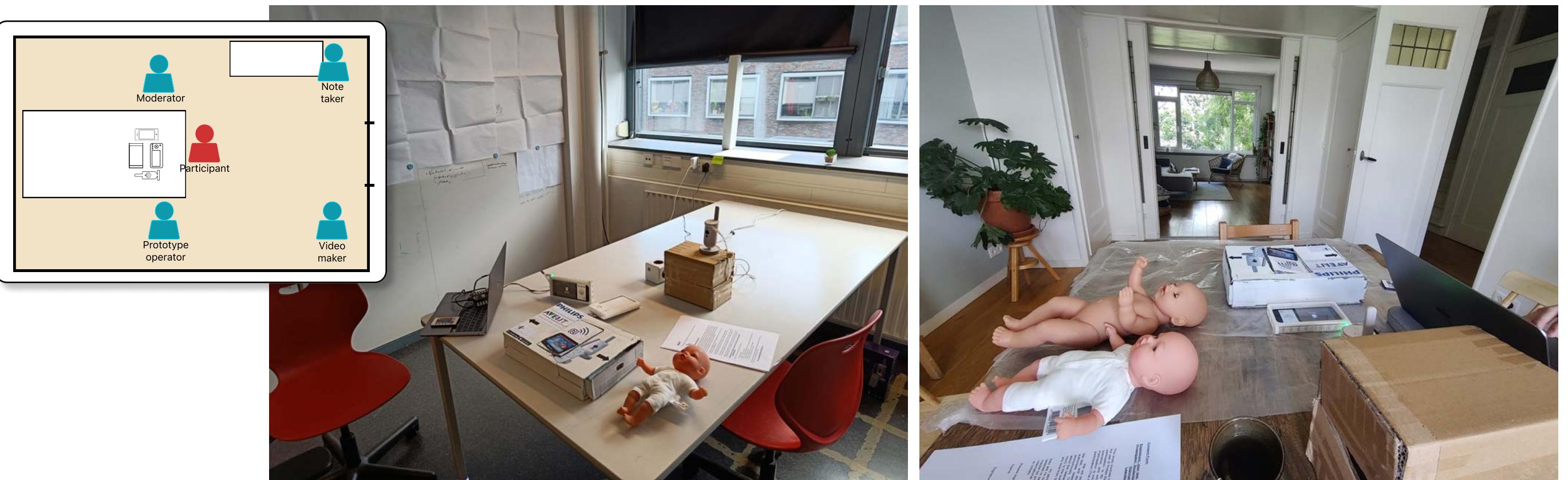


Figure 2.1 Test setup

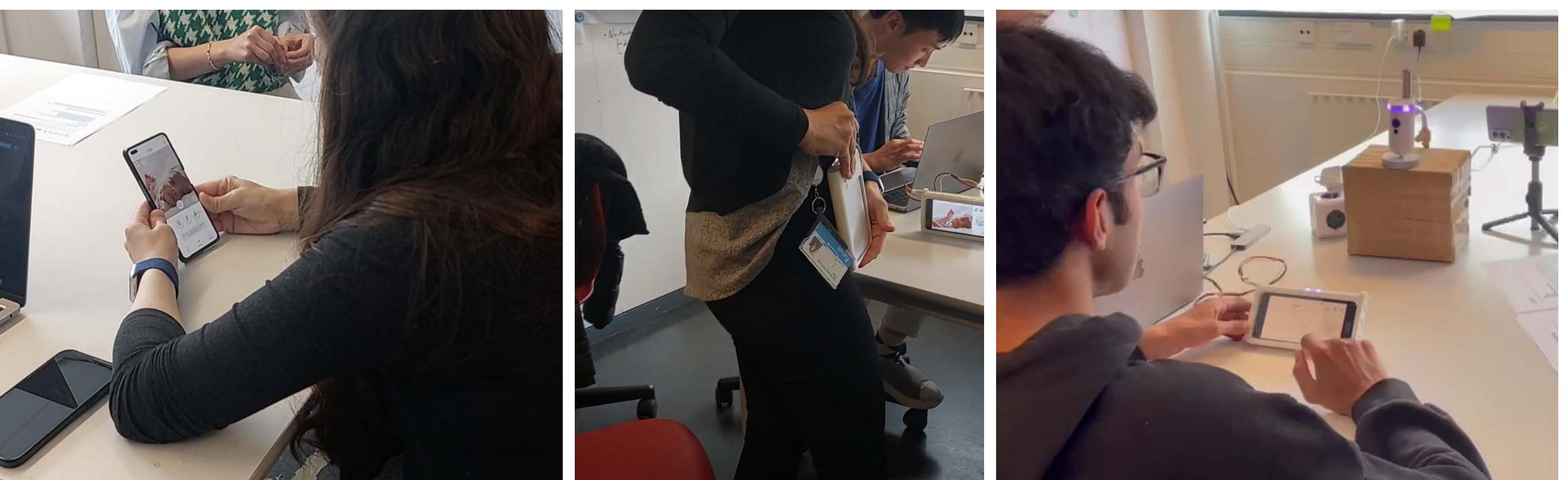


Fig 2.2 participants using the prototypes (bottom).

# 2.4 Results

In this section the results of the user test and the questionnaire are shown. The key insights is a combination of the key results and the outcomes of the questionnaire. Afterwards a small conclusion will be made to refer back to the design goal from page 15.

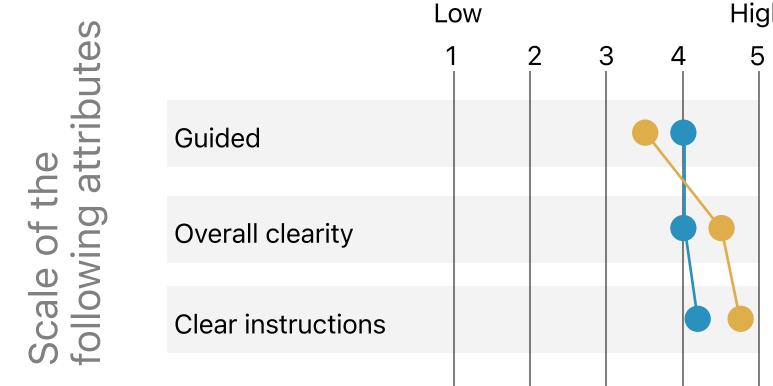
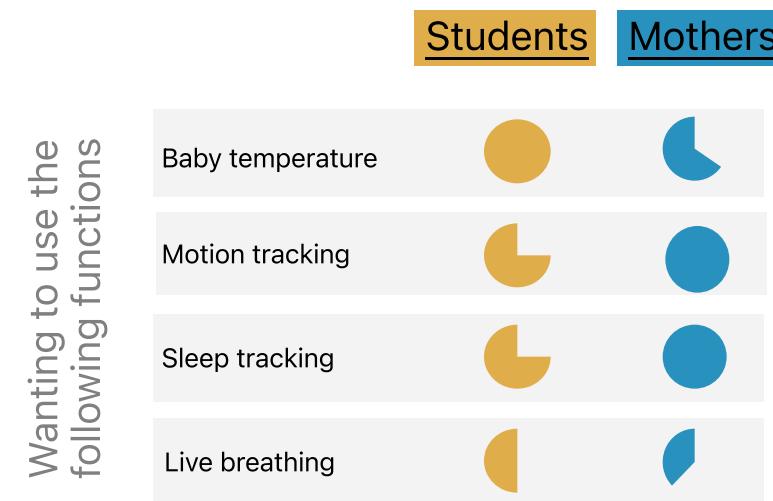
“

I always have headphones in and dont often hear the baby, light feedback is nice therefore

Mother, 43

”

## OUTCOMES OF THE QUESTIONNAIRE



The full set of results can be found in appendix 4.13 & 4.14

## KEY RESULTS

- NFC logo:** The NFC was not recognized as such
- Instructions:** They did not always read them thoroughly
- The LEDstrip on the two units:** Visualized the communication between the two, integrate the app in this communication as well.
- Presetting menu:** Tried to open the hotkey as a presetting menu at first, but the menu button caught enough attention by blinking.
- Presetting:** The presetting moment could be more relevant at a later stage, when the mother gained more understanding of the product.
- LEDstrip:** Visualizes the 'urgency' of cry
- Hotkeys:** The hotkeys were deactivated after using it
- Portability:** The monitor is mostly pushed into the pockets instead of hanging it. Should be more flexible
- Medical app:** The information should not be alarming and the mothers want to have control by finding correlations
- Medical graph:** There is a bit of disbelief about the validity of the graphs
- Connection Guide:** Flow of setting up and the app flow are clear, easy to understand and intuitive
- Feedback of the buttons:** The activation status has been well recognised and successfully deactivated
- The introduced functions:** Students were able to find the hotkeys and understand how to use it
- Status bar:** They noticed the change in the status bar and knew what it meant

Colors refer to the test criteria on page 15

## KEY INSIGHTS

- Connecting:** With the matching connecting lights the units showed exactly what was going on and the mothers were not tempted to push any extra buttons
- Feedback of the buttons:** The activation status has been well recognised, and they successfully deactivate the functions by pressing the button
- Portability:** The unit was too big to clip on their pants specially when they had to bend down. They suggested a cord.
- The notifications in the app:** were too intrusive. Correlation between the graphs gives the parents the feeling of autonomy when searching for information
- Introducing the functions:** The moment they were introduced was a bit too early. They wanted to find out later in the process when the moment was right.
- The LED strip:** makes the interpretation of the crying visible and flexible. It leaves room for own way of action. During the night they suggested a subtle vibration.
- The structured overview:** The blinking of the presetting menu was striking and suggested to check out the menu and its functions
- Portability:** They carried the monitor on their pants and turned the screen towards them when needed, thus using the buttons on the front
- The button shape:** The button shapes of the parent unit and the smartphone app could give confusing affordance. The round shape was perceived as touchable, and the rectangle shape as untouchable.

## CONCLUSION

### RELIABLE

It helps the user understand the multiple functions and the flow of the device and is therefore more intuitive

### SUPPORTIVE

It has clear feedback with the LED lights and a new visual layout on the screen. This altogether makes it less overwhelming.

### EXTENSION

The clip on and the app will be looked at again in the recommendation phase to enhance the feeling of the redesign being an extension of the parenting style.

In the next chapter the team will take a critical view upon the data analysis phase and go deeper into the conclusion with recommendations.

By the end of this chapter

- The approach for data analysis was shown. The team developed a test setup to test the redesign on the design goal and the sub-goals.
- The user test scenario was shown with the prototypes and why the team chose these aspects of the redesign. The activities are linked with the design criteria and the testable targets mentioned earlier.
- Results were found after testing with three moms and four students. A critical stand has been taken on this way of gathering data which will be discussed in the discussion part.
- In the next chapter, a critical view will be taken upon the data analysis. Key insights will be compared to the sub-goals and the design goal. This way, the team can form a conclusion about the value of the redesign based on the discussion and the key insights.



# Wrap up

- 3.1 Discussion**
- 3.2 Phase 2 conclusion**
- 3.3 Recommendation**

In the last chapter, the team will reflect upon the data analysis phase and be critical of this process. With this perspective in mind and the key insights derived from the user tests, the team will form a conclusion of the project. In this conclusion, the data will be compared to the stated design goal and the design criteria to see if they are met. In the last section, recommendations on the redesign will be made to improve the redesign further.

# 3.1 Discussion

This section discusses the shortfalls and limitations of the redesign thus far.

## 1. User Test

The user test was planned to be a **mixture of tests with current and prospective parents** to compare the findings. The goal was to pick **relevant feedback** from the comprehensive tests (see fig 3.1) and **implement** them in the **redesign**.

### Setup

The team was aware that aspects of the test setup needed to be considered when looking at the results. For instance, **the parent unit prototype was already on** when handed to the participant. So **the participant didn't feel confused** about having to look for the power button. Such instances, even though minor, could have impacted how the overall experience was perceived.

### Prototypes

The team created mockups of the redesign right from phase 1. It was always nice to have something physical to test and discuss aspects. There was a gradual progression in the quality and clarity of the prototypes throughout this phase. Due to practicality and technical drawbacks, the **parent unit** had **two testable prototypes**. One to experience the **portability** and one for the **touch and feel**. It would have been ideal to have it all in one prototype, but the team ensured that this disparity didn't influence the participant's overall experience during testing.



Figure 3.1 Participant using the parent unit

### Participants and locations

There were some troubles in finding participants in the user group of parents and mothers, but the team ensured that this didn't affect the project too much. **The test setup remained the same**. The initial introduction and the final questionnaire were modified to the specific user group. **Three mothers and four master's students** were the test participants. The overall group had a mix of designers and nondesigners. Some tests were conducted at the **participant's homes**, while others were at **the faculty**. To avoid any discrepancies, the setup was mimicked in both locations. The team tried to keep the test setup as similar as possible. The students were included in catering to the 'future generation' users of the product, but **there was a clear difference in how the students and mothers reacted to the scenarios**. Hence **the takeaways were carefully chosen** from the user tests to keep the findings to the point.

### Feedback

Different feedback plans were tested to check which worked best. One such plan involved a questionnaire after each of the four scenarios and one at the end and beginning. This meant that the participant filled out about five questionnaires, disrupting the test flow. It was a decision that there would be **discussions after each scenario with the moderator and a comprehensive questionnaire at the end**. To ensure the participants recalled all the tests correctly, all supporting physical material was placed on the table during the form filling.

The takeaways from the parent tests were given more importance, while some of these findings were backed by the student user tests. It was noticed that the **mothers had more real-life feedback** for the redesign while the **students had opinions about the interaction itself**. A combination of these two, while weighing out the relevance of the input, helped frame the further direction. Some changes were minor and could be included already. The other changes have been discussed in the recommendations.

## 3.1 Discussion

### 2.Medical Part

For the medical part, it should be clear that **Philips is not trying to cure any illnesses**. In the app, the team wanted to make sure to only **supply data** and some **suggestive feedback to support the user** (see fig 3.2). The team also chose to track breathing, but this can also be seen as a **liability**. To measure a young child's breathing accurately, the product will need to undergo licensing and other approvals. So, although the **feature is very friendly and valuable**, it will also **require a lot of research and practical information** to be added.

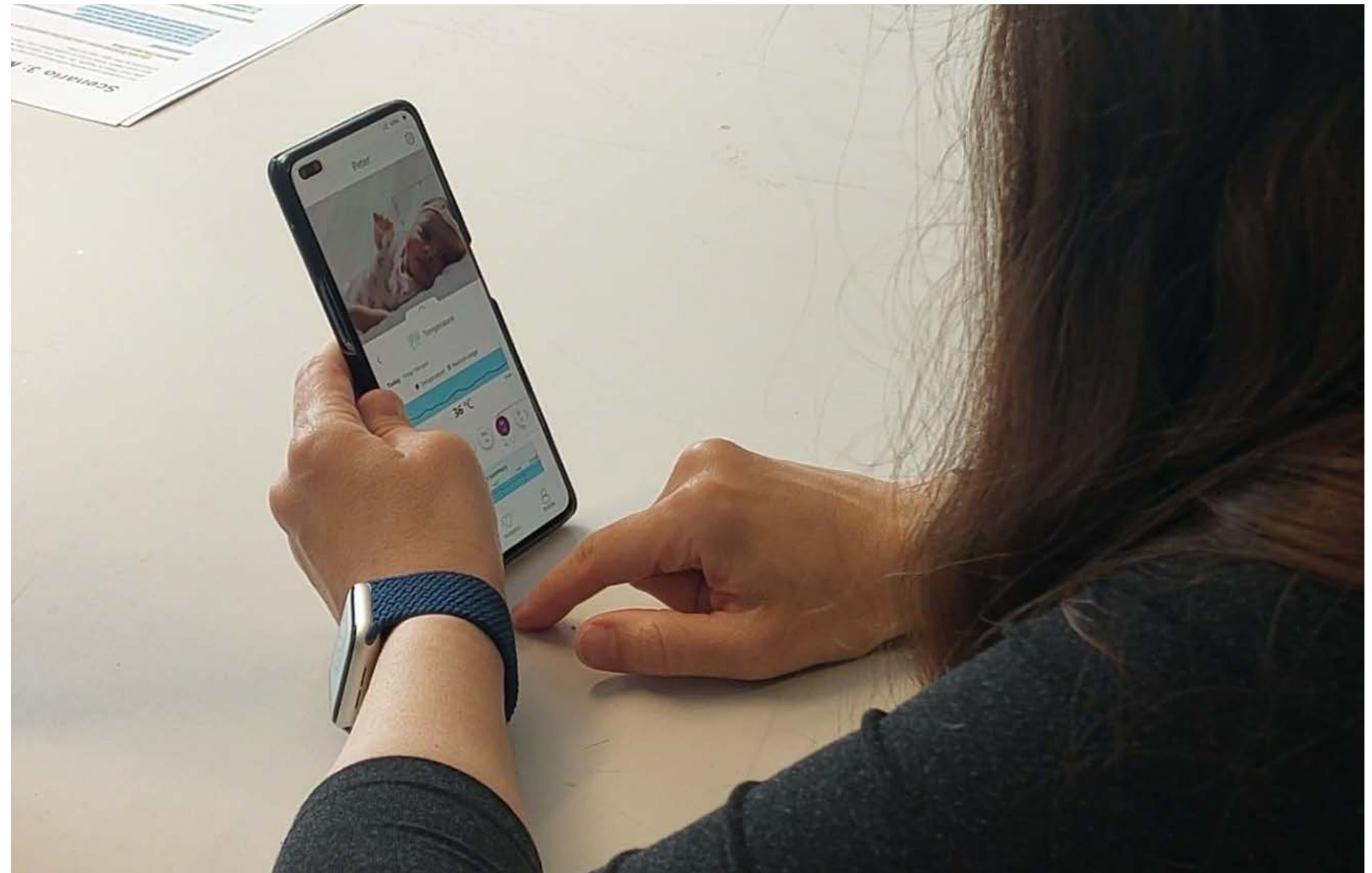


Figure 3.2 Participant using the medical features in the app

## 3.2 Phase 2 Conclusion

To take a look back at the report, the team started off with **building upon the converged strategy** from phase 1. The team started with the weaknesses of the former design and decided how to address these issues. The main issues were taken into account with implementing a **light strip, medical features, and a new onboarding process**. The team kept iterating upon the concept by **developing and testing the redesign** and eventually **detailing the design decisions into a final redesign**. In this section, the **key findings** will be compared to the design goal and the criteria to **formulate a conclusion**.

After that, the redesign was validated through user tests with the target group and students. A prototype was built to test the different elements, a questionnaire, and an interview. Through user testing, the team found **new insights into the redesign**. The key findings from which we can conclude is that:

- The **guidance at the beginning of the setup process is more clear than with a physical manual**. This contributes to the design being less overwhelming and more clear to users.
- The **LED strip makes the status and feedback clearer to the parent**. They can act more naturally to the feedback. This makes the redesign clearer, but next to that, it is more intuitive in use because the parent hears and sees the baby's status and can react to that.
- The **new structure of the menu and the placement of the buttons makes the product easy to understand and follow**. This makes it more reliable for the parents to use.
- The **feedback on the buttons** was the last thing that was found to be better during testing. With the redesign, it is more clear to the user if a function is activated or inactive, which helps with the overall flow of the device and how clear it is in the feedback to the user.

- The **clip-on is a part that needs to be looked at again to optimize it**. From testing, it was found that wearing the monitor on you would be **helpful**, but the way it was attached had some issues.
- During the setup process, it was also found that it was better to leave some functions to be explored later. The **main functions should be put in the setup process**, but it was still a bit much for the parents.
- Lastly, the **app should be less intrusive** in the parenting style of the users. The **message** and the **data collection** were found to feel like an **extra beneficial options** to the parents but how it was presented was not convincing. The team will look at these points in the recommendation section later.

To conclude, the team has redesigned the Philips Avent baby monitor, which is more reliable and supportive to the parent.

- With the introduction of a **LED strip** and a new **onboarding with new feedback**, the team made it **more intuitive** to use with **clear feedback and feedforward**.
- For the **extension** of the parenting style, the **clip-on was the biggest advantage** addressed in the recommendation section.
- With the **onboarding implementation**, the team introduced all the functions so that **the parent gets more familiar** and that it already feels more like an **extension**.
- Next, the **app** was found to be **a bit too intrusive** on the parenting style. The idea to add a **medical feature** does **benefit the feeling of extra help** by parenting and thus extension. The breathing feature is a significant liability and, therefore, a bit intrusive, so the team should look at other ways of notifying the parent and see which features bring extra value to parents.

So, by taking another look at the clip-on and the medical part of the app, the conclusion is that **the design goal has been met**.

## 3.3 Recommendation

Based on the extensive study with the user tests and usability inspection there were some clear changes that could be made to improve the overall experience of using the product.

### Package

- Even though it improved the setup process, the current package with a cut off part and the sliding compartments was not clear enough for users to understand the NFC function and the wiring information. There could be a clearer visual indication about the wired and non wired components on the cover of the package (see fig 3.3).

### Parent Unit

- Once a lullaby is played the user is made aware of this visually on the screen. In some cases this was inadequate. It would be nice to have some audio feedback to let the user know what is currently playing.
- The portable aspect was well liked and has been a part of some products in the Philips baby monitor sphere. However, there need to be ergonomic studies conducted to understand the feasibility of this. The size of the screen, position of the button, the weight of the unit and the ways in which it could be carried are some considerations that the team is aware need to be addressed. Another thing was the way it clipped onto your pants, with a redesign the clip-on can now be used as a stand as well (see fig 3.4)
- The vibrations on the portable parent unit are also good additions to the feedback system. The user tests and usability inspection also confirmed the same. Some factors on how hard or soft this vibration need to be taken into consideration.

### Personalisation

- Currently, there is an option on the app to set an alarm to update the user incase of an emergency. This felt aggressive to the users and it can be changed to a notification format instead.
- The "Analytics" on the app offers a lot of informations to the parents. In order to make it more realistic it would be nice to have an option for the user to enable what they want to see and when.
- The dynamic might change if there is more then one baby in the household and this was not taken into consideration. This will result in changes of the feedback with respect to the light and the vibration.

### LED Strip

- The led strip added a level of clarity for the user but it would be nice to have an overview of what each of the colors indicate. However this needs to be looked at from a feasibility level.

### Medical Features

- To make the features more effective it would be good to have a way to compare these statistics. For example, if the temperature and the sleep pattern are compared, any fluctuations in the sleep can be explained by the change in temperature at that given moment.
- Another feedback on the live breathing specifically was that it was too overwhelming to see a graph constantly updated. This could be redesigned in a manner to let the user know the child is breathing in a reassuring way.
- There needs to be more attention paid to the tonality of the messages on the app. Given the medical nature of the interaction it is key to comfort the user rather than cause panic.

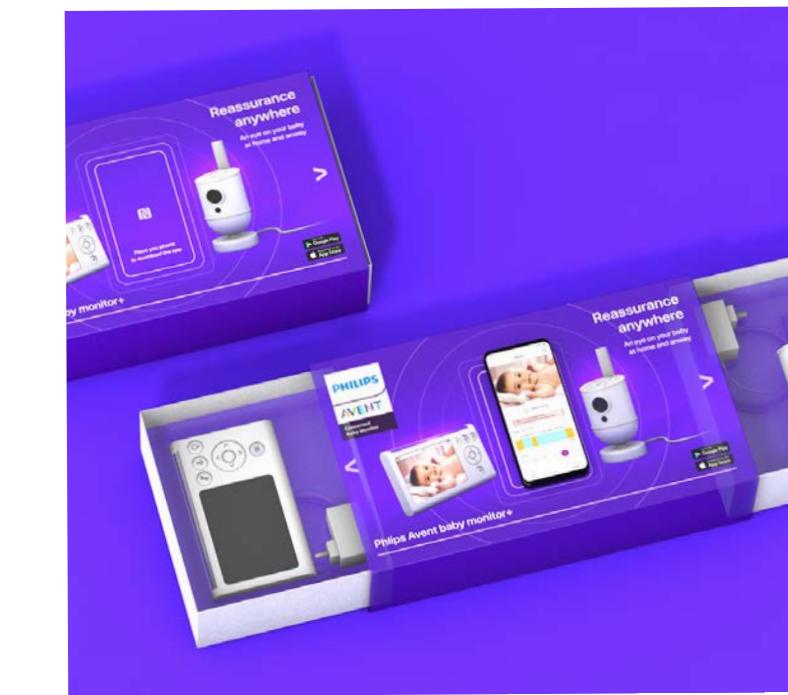


Figure 3.3 New packaging



Figure 3.4 New clip-on

**Thank you!**

# Appendix



# 4.1 Usability Inspection

The methods used for the usability inspection were both the cognitive walkthrough and the heuristic evaluation. The use case used in this phase followed the flow of the user test and protocol.

The aim was:

- To finalize the user test set up before the pre-pilot and the final tests with the participants
- To start the evaluation of our redesign

## Heuristic Evaluation

In the Heuristic Evaluation the team evaluated the redesign selecting 6 of the 10 Jakob Nielsen's Heuristic Evaluation. The same 6 used in the first report to keep consistency with the evaluation of the current Philips baby monitor and the redesign. Another reason is because these six are the most relevant for the evaluation because they focus on the product feedback and controlling.

1. Visibility of system and status
2. Match between system and real world
3. User control and freedom
4. Consistency and standards
5. Error prevention
6. Recognition rather than recall

## Insight:

Visibility of the system status thanks to light feedback

Different kind of feedback simultaneously to adapt to any context

Feedback on the screen when activating a function

Clear hot keys for every function

Consistency between the devices of the system camera unit, monitor and app

Helping the user when encountering an error

The buttons on the screen shouldn't look clickable

## Cognitive Walkthrough

The Cognitive Walkthrough has been conducted by one of the team members. This was a good starting point for the first evaluation of the entire flow of the test plan and to make some changes for the final user test with real users.

Main insight and problems observed:

Plan and prototype side:

- Lack in organization and confidence from the members of the team
- Prototype limitation should not affect the user test because too many technical problem
- Tell the instruction clearly to the participant and make clear the end of each task
- The different elements in the app are not always consistent

Redesign side:

- The NFC spot on the packaging make the user confused because it isn't attached to the box
- The design of the buttons (shadow) on the screen (ex. The "Next button") make the screen looks touchable
- Lack of the right feedback make the user confused about the status of the device



Figure 4.1 Usability Inspection

## 4.2 Iteration

The iterative design decision mainly took place based on the tests: the pilot test, usability inspection and the real tests (both students and mothers). The iterations are explained per section.

The first iteration are based on the usability inspection, and general flow during prototyping.

The insights from pre-pilot and real tests are implemented in the recommendations.

Flow during prototyping:

Figma design (flow)

Once the first concept was in place, some changes had to be made to guides on the visuals on the screen. Some key words were often misinterpreted and needed more explanation. The goal with the iteration was to make the visuals self explanatory to avoid any issues with the overall flow.

Button placement

By enacting the flow of use of the product we came to the conclusion that the hotkeys should not be placed on the side of the monitor. We figured that users will always first look what is up and when they are already looking they will want the buttons to be there.

Usability inspection:

Flow of storytelling

The flow of the user test is based on the insights of the cognitive walkthrough. The details will be mentioned in the next chapter. By doing the cognitive walkthrough it was found out how the user test should be set up and how the team could gather the desired data to research the stated criteria.

Figma next button

By doing the cognitive walkthrough it was also found that a lot of the buttons on the screen still look clickable. The team decided to alter the design of the buttons so the user will be directed to the physical buttons on the side. A plastic layer was also put over the screen part (see picture) to also direct the users to the physical buttons more.

Consistency between the devices of the system camera unit, monitor and app

During the heuristic evaluation it was found that often the screen between the prototypes were not consistent (different babies/colors/buttons). To create a consistent prototype everything should be kept the same to not create confusion and have the most reliable and desired data.

Helping the user when encountering an error

Often during the heuristic evaluation the user was stuck but did not have feedback why. The team therefore implemented a 'go back' function or an error message to bring them back where they need to be. This also creates a better understanding for the user that they are doing something wrong.

## 4.3 Parent Unit screen flow

### Set up flow

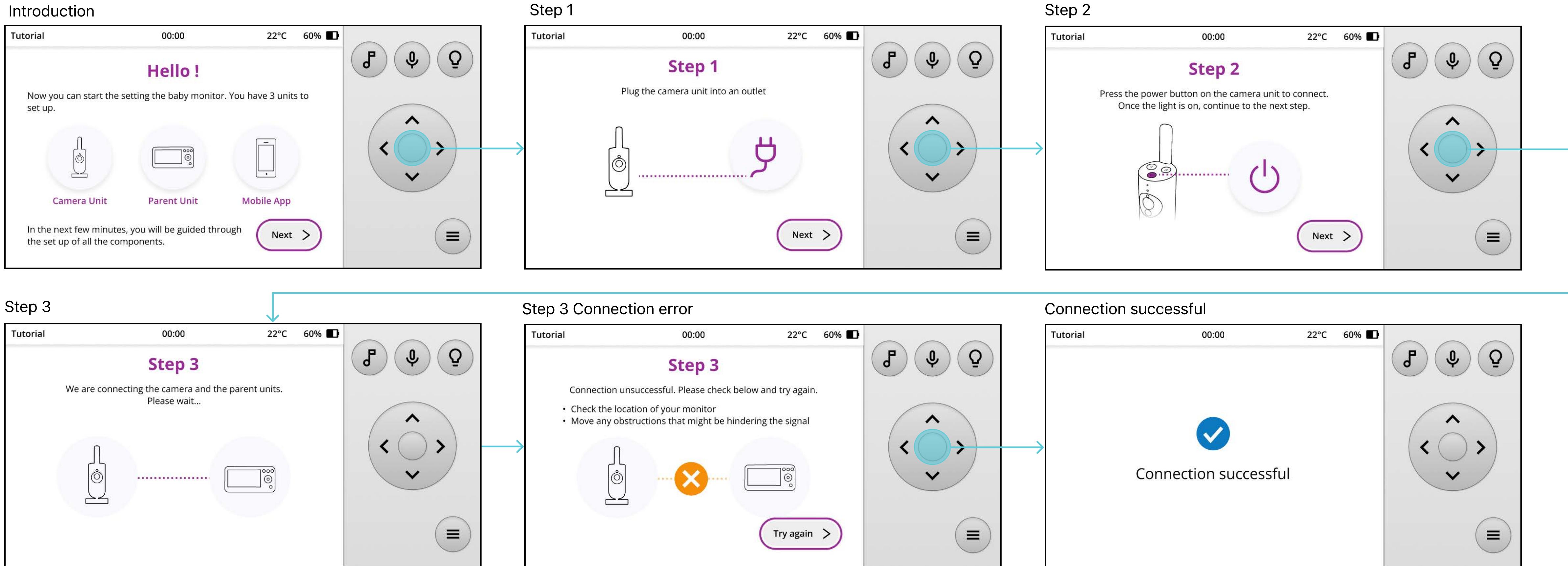


Figure 4.2 Set up flow

## 4.4 Parent Unit interaction

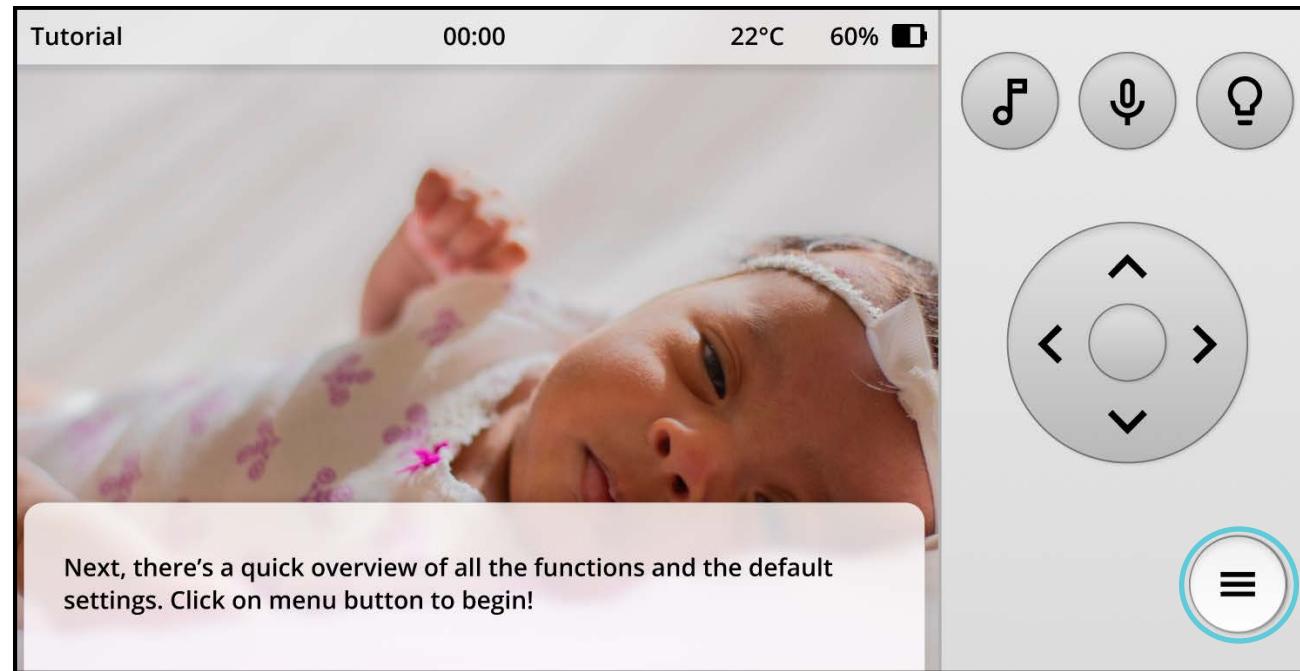


Figure 4.3 Tutorial phase example

### Tutorial phase:

The menu button will glow up to catch the user attention and it will drive the user through the feature as a digital manual

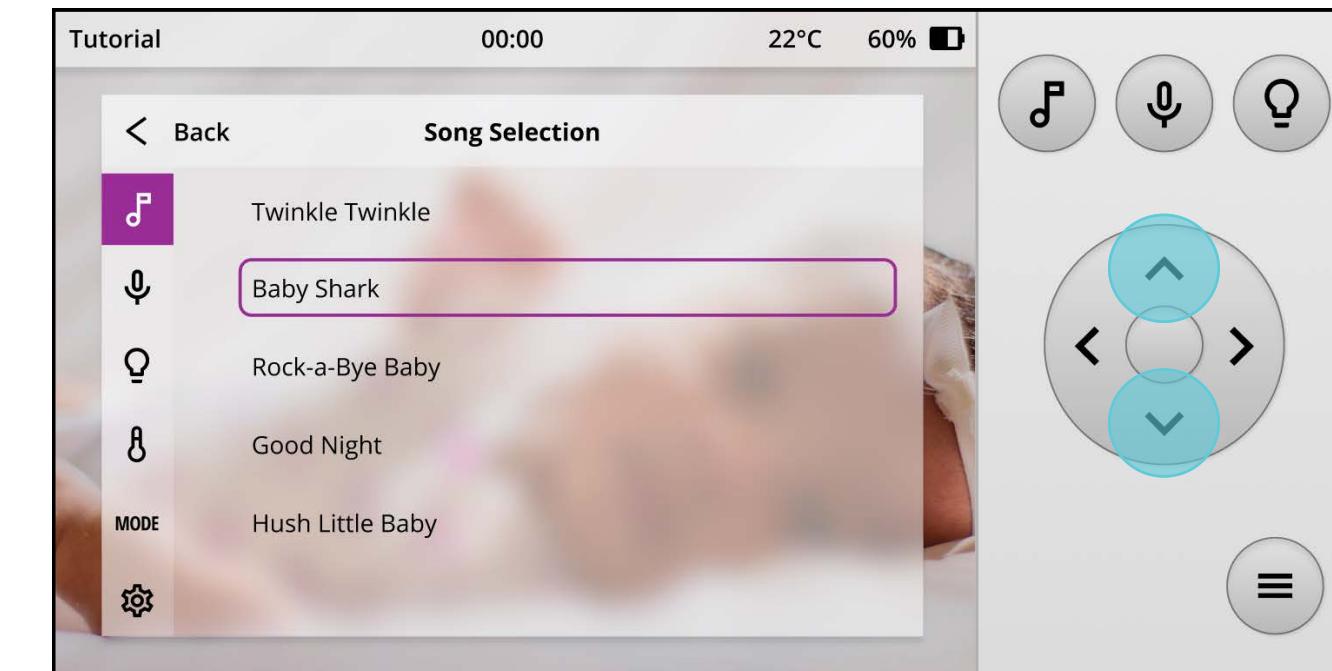


Figure 4.4 selection tab example

### Selection tab:

Once selected the area of interest the user will be able to navigate through the specific settings for each feature

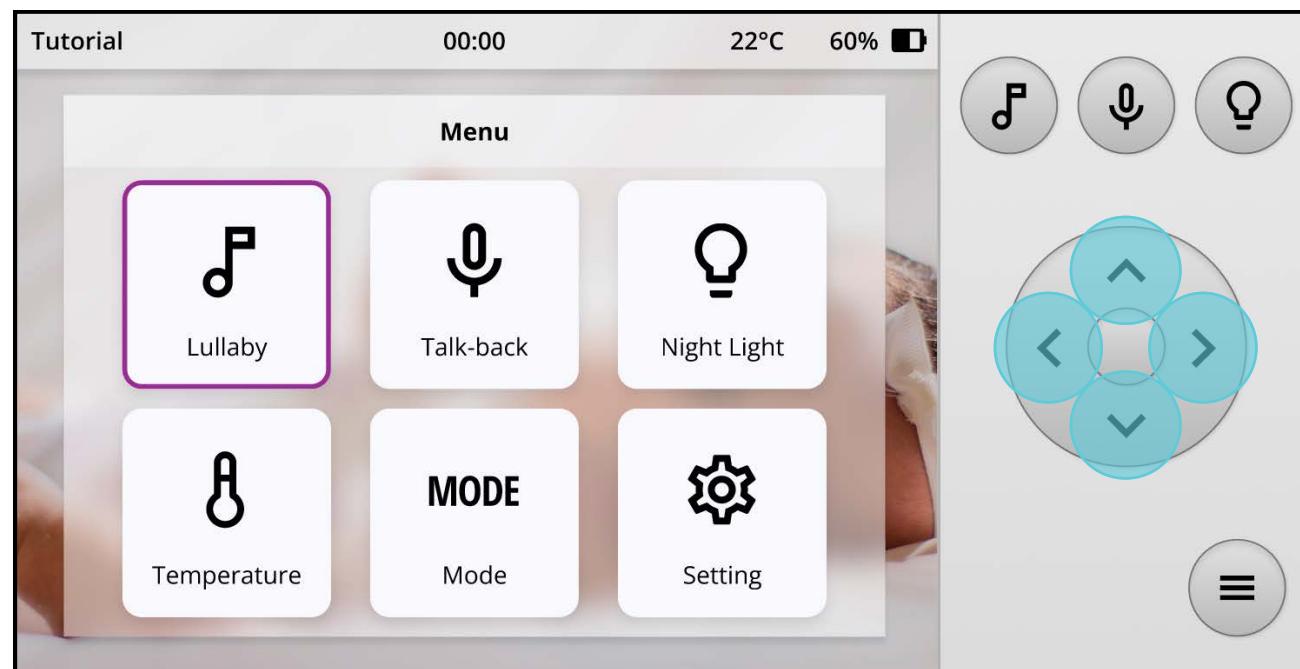


Figure 4.5 Menu button

### Menu button:

All the feature will be visible and selectable through the buttons on the right

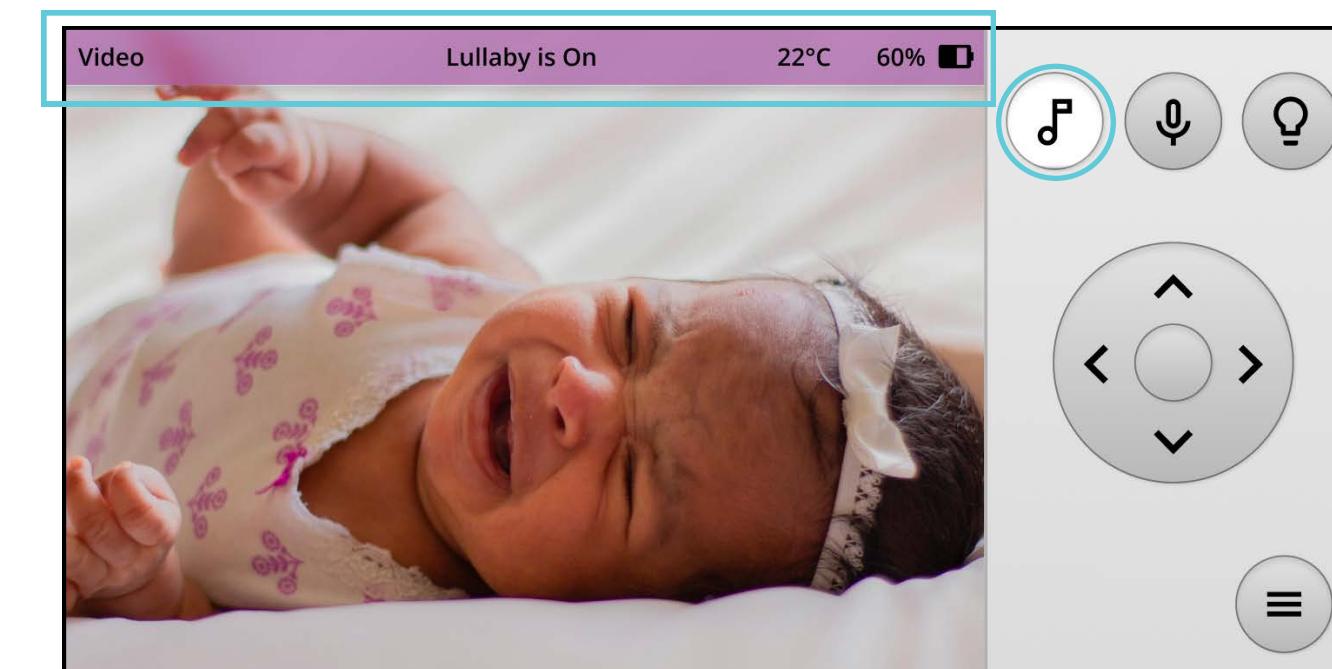


Figure 4.6 Feedback

### Feedback:

Once enabled the chosen function, two feedback will compare on the screen they will indicate the status of the system:

1. Status bar change color and the text appear
2. The glowing button on the right Will be enough for the user to click again on the glowed button in order to unable the function

## 4.5 App download screens flow



Figure 4.7 NFC connection

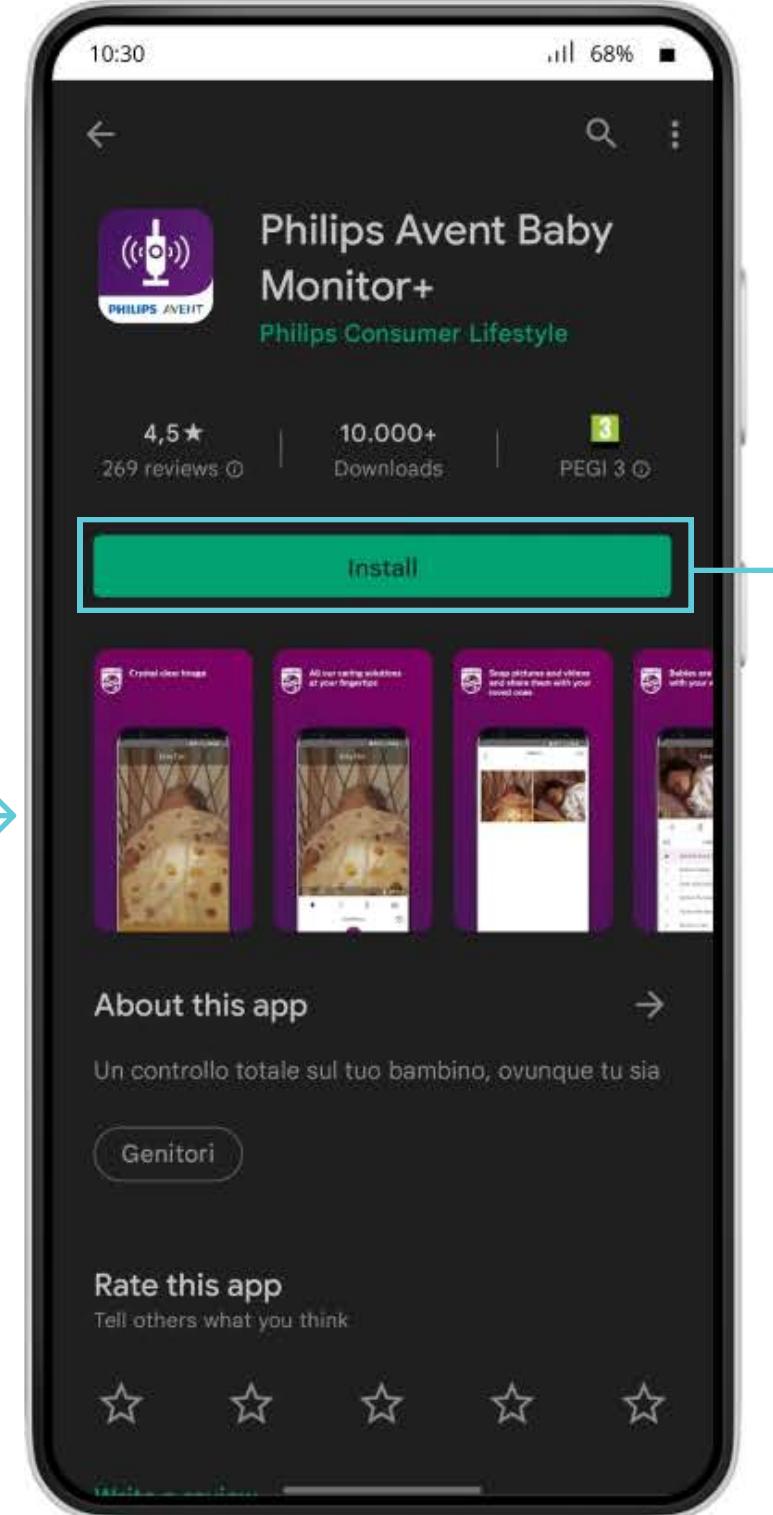


Figure 4.8 Playstore for the download



Figure 4.9 Loading screen

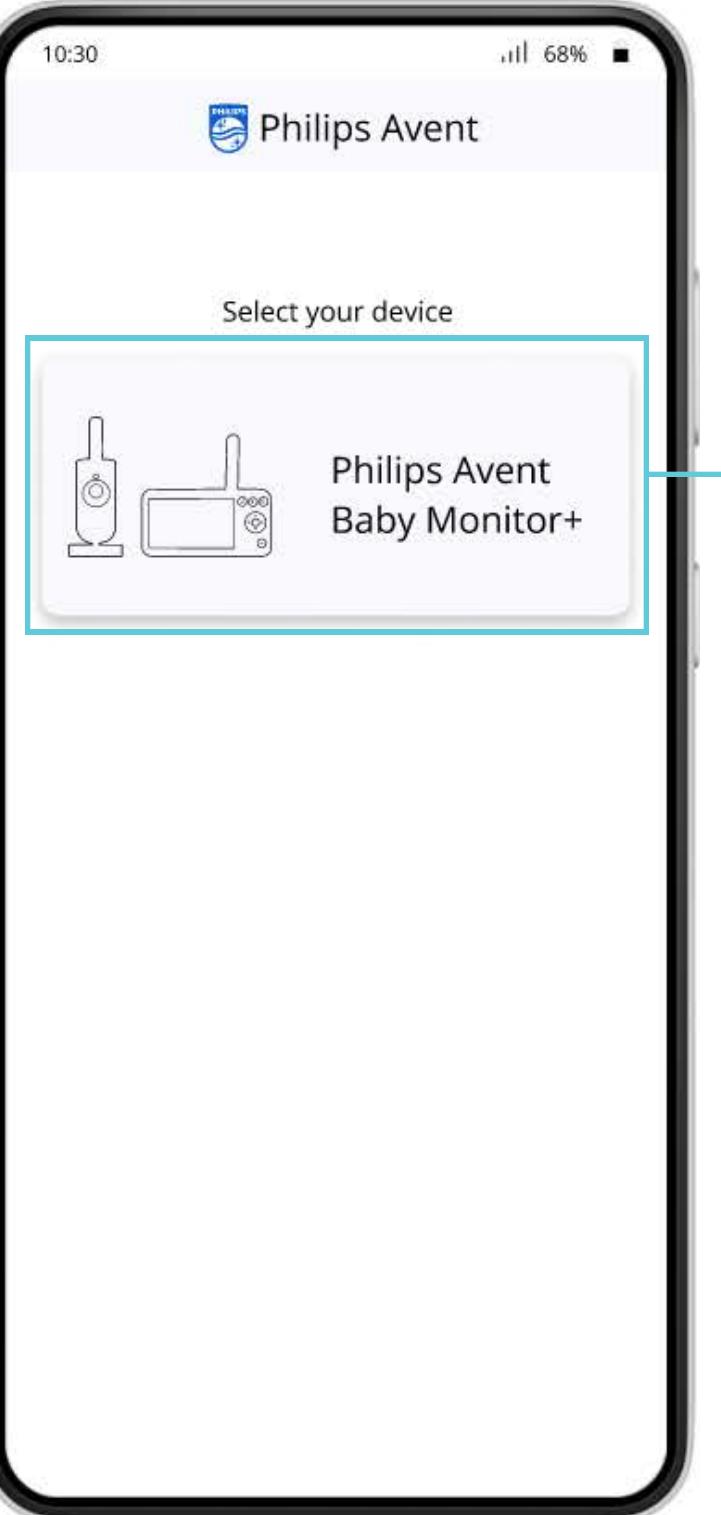


Figure 4.10 Selection of the device

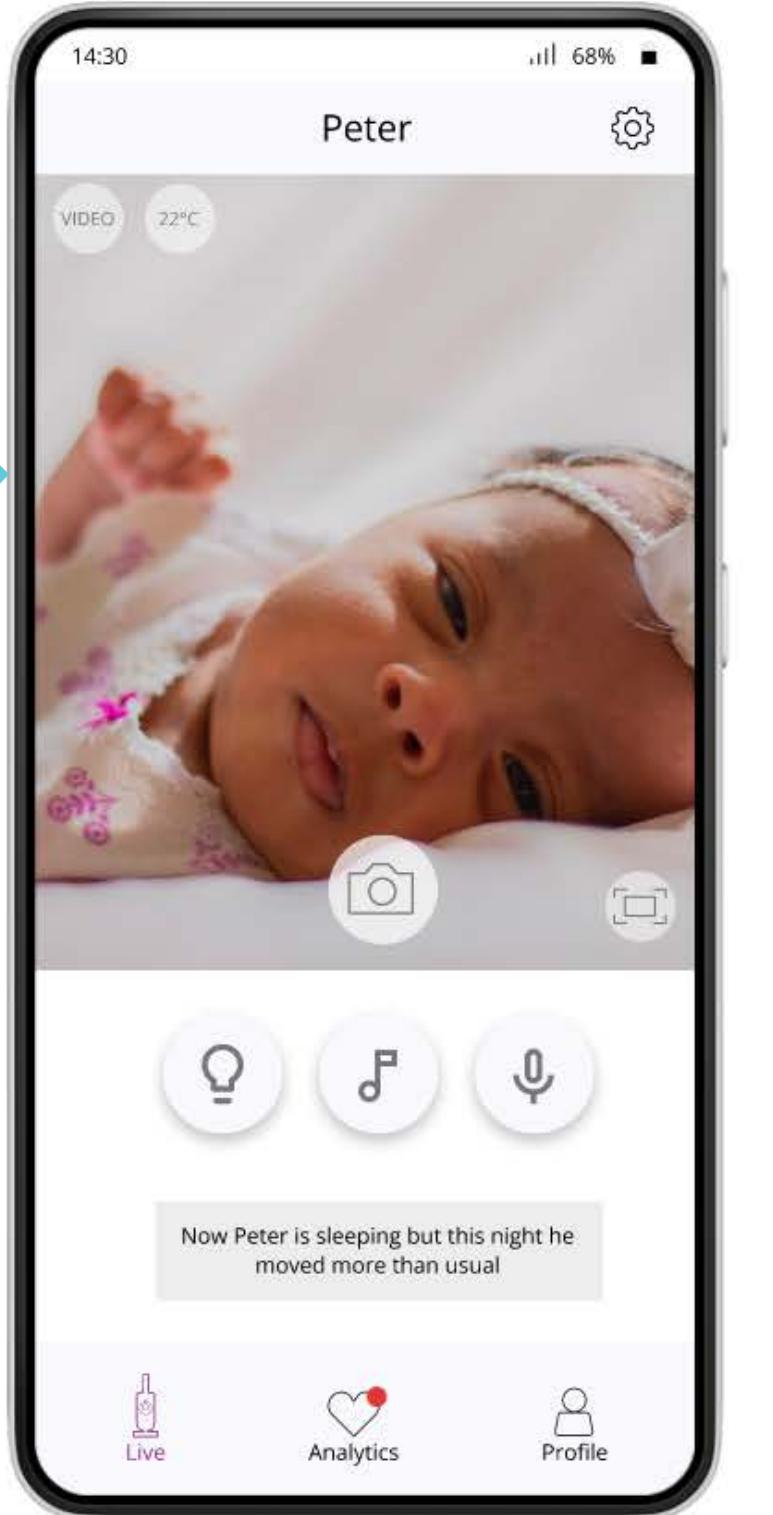


Figure 4.11 Live view

## 4.6 App screens flow

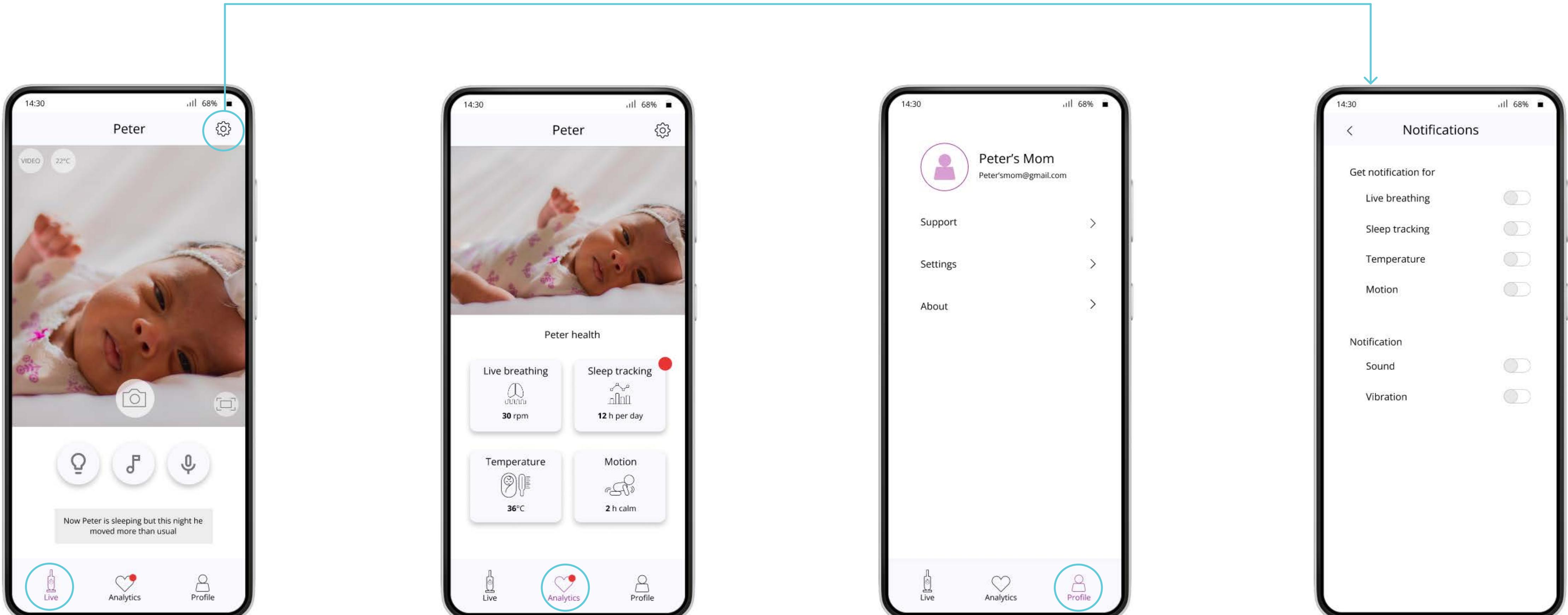


Figure 4.12 Live view

Figure 4.13 Analytics

Figure 4.14 Profile

Figure 4.15 Settings

## 4.7 Medical feature screens flow

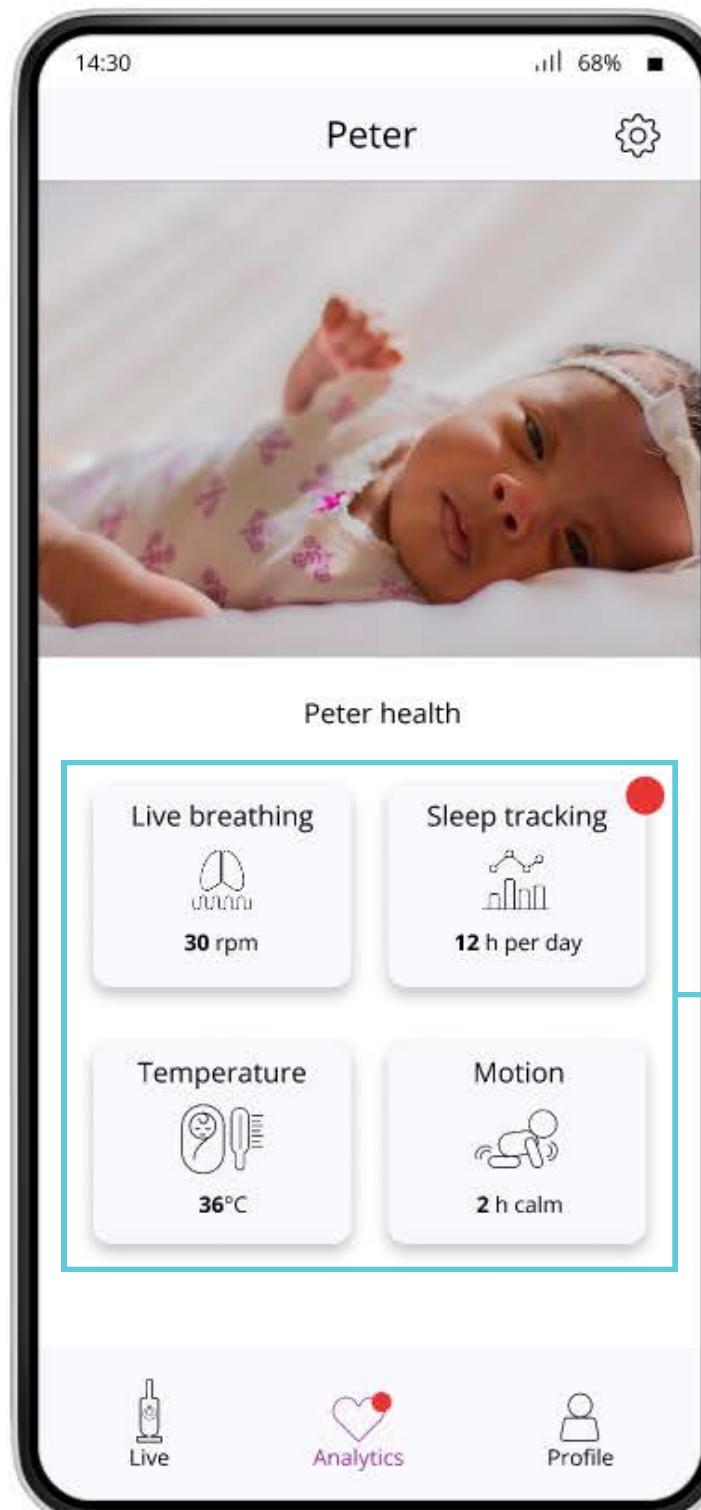


Figure 4.16 Analytics

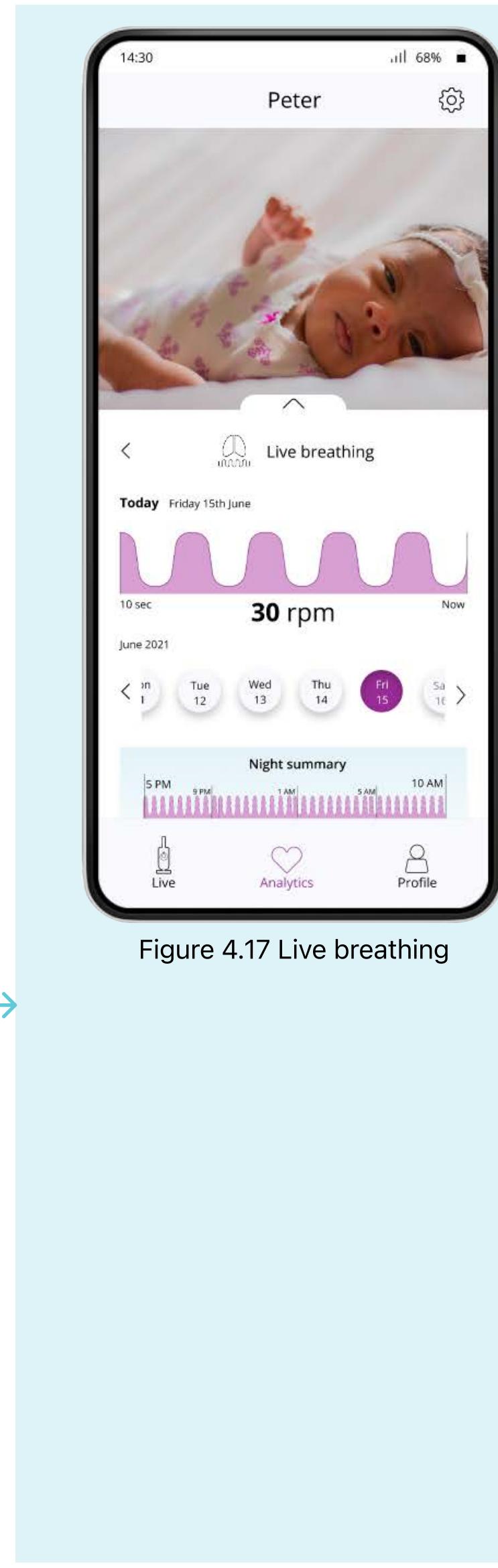


Figure 4.17 Live breathing



Figure 4.18 Baby's temperature

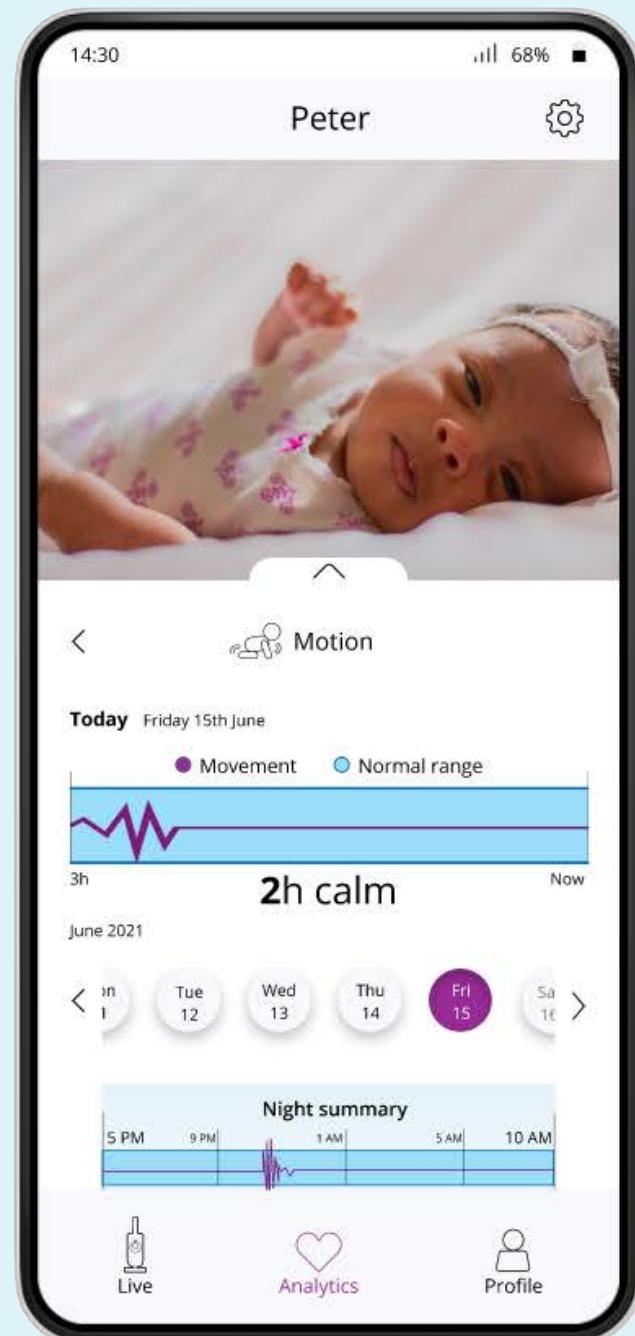


Figure 4.19 Motion tracking

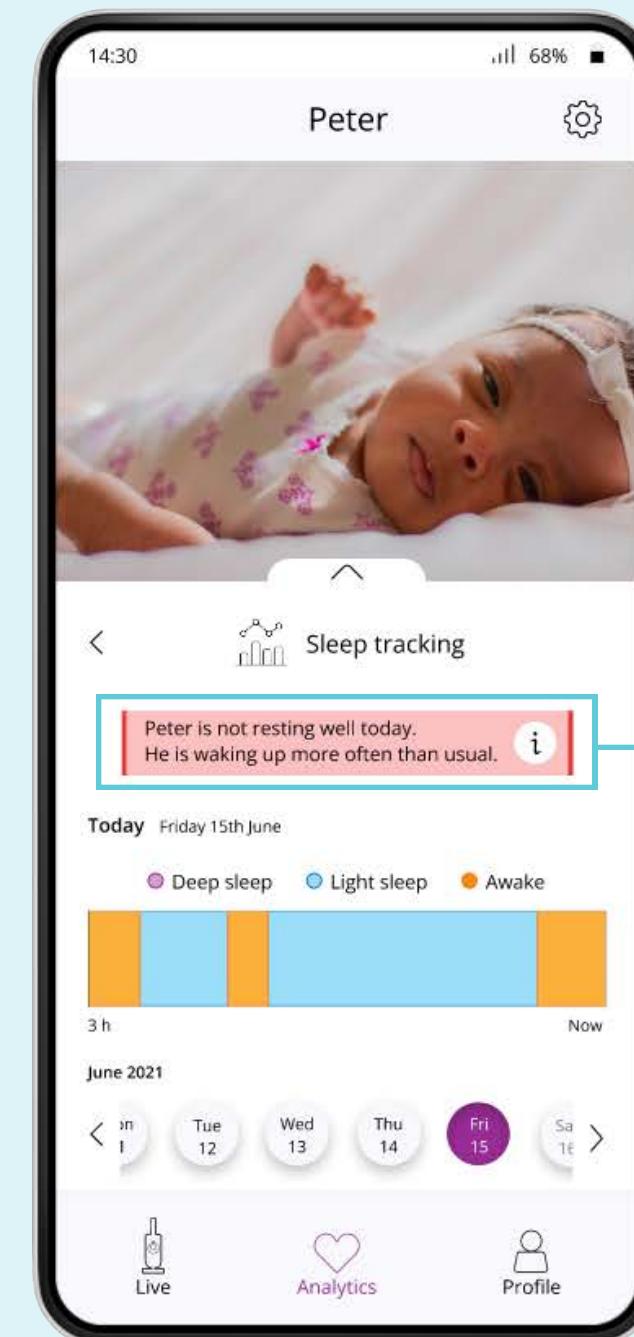


Figure 4.20 Sleep tracking

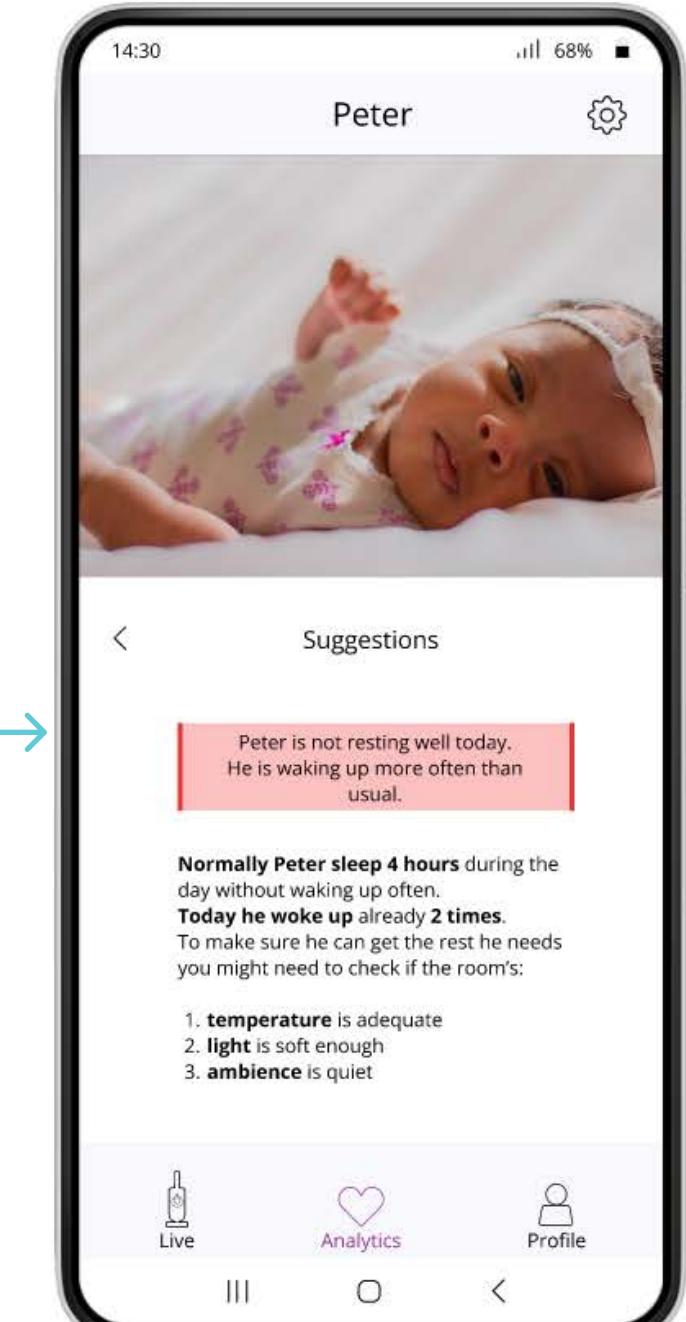


Figure 4.21 Suggestions

## 4.8 Prototypes

The following units were prototyped and used during the tests: the packaging, a portable parents unit, a static parents unit and a application for the smartphone.

Part of the current version of Phillips Avent's product, was also involved in this process. The wires and the camera unit have been used, the latter with extra prototype elements attached to it (LED strip). This decision was made because this was more realistic than printing a new (similar) version. The app was redesigned in Figma, with an opening screen from the current version. The prototype of the static and portable units were designed on solidworks and 3D printed.

The following section will go into detail about the function per unit during the test.

### Parent unit (static) and camera:

The other prototype functioned as the static monitor. This unit was designed to place a phone in the case that would function as the monitor screen. The screen was designed in Figma, resulting in an interactive screen display. The display would show enough instructions to go through the digital manual and a skip option if necessary. In the Figma display the buttons of the enabled function(s) would light up when they were in use, so that the user would automatically turn them off when necessary.

Besides the phone, the led strip could be integrated in the static unit. The lights were connected to an Arduino unit with a button, which would manually be controlled by one of the teammates. There would be another LED strip connected to the camera unit (for the test we used the real camera of phillips), which would have the same colors and patterns as the monitor.

The congruention would indicate a connection between the two units. The following colors were used during this phase: purple stripes (finding each other), blinking orange (connection error), solid blue (connected).

The LEDStrip would also be used to visualize the baby's crying. A blue volume bar starts from the centre of the light strip (symmetrical from every orientation) (SEE SECTION FINAL DESIGN).

To test:

Support during the connecting phase

The intuitiveness of the use of the setting up manual

The value and meaning of the presetting menu (to their parenting style)

The meaning of the feedback of the LEDstrip

Reminder to turn off the enabled function when needed (indicated by the lighting of the buttons)

Guidence of the blinking light in the function buttons

Easily interpret the audio and visual communication of the monitor



Figure 4.22



Figure 4.23



Figure 4.24

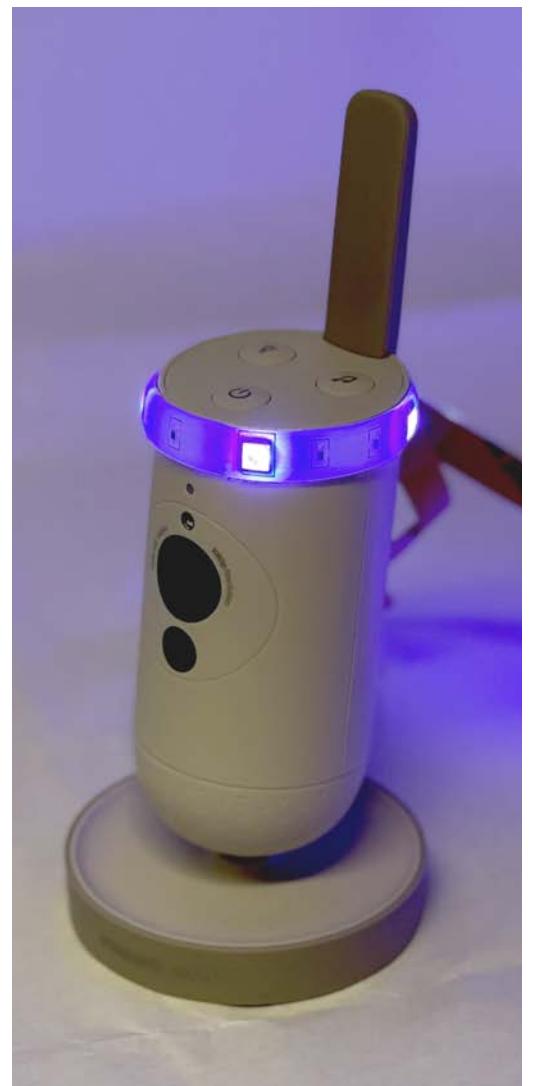


Figure 4.25

### Parent unit (portable):

The two physical prototype of the monitor were designed in solid works and 3D printed. One of the prototype functioned as a portable monitor: with this unit we tested the portability of the baby monitor. This unit has a clip on possibility. In this prototype a phone could be placed to test a vibrating feedback of the crying of the baby. The button placement was tested: With multiple button layouts the team could design the placement of hotkeys and other buttons.

To test:

The comfort of the portability option

The placement of the buttons when the monitor was portable

The vibration feedback of the crying



Figure 4.26



Figure 4.27



Figure 4.28

## 4.8 Prototypes

The following units were prototyped and used during the tests: the packaging, a portable parents unit, a static parents unit and a application for the smartphone.

Part of the current version of Phillips Avent's product, was also involved in this process. The wires and the camera unit have been used, the latter with extra prototype elements attached to it (LED strip). This decision was made because this was more realistic than printing a new (similar) version. The app was redesigned in Figma, with an opening screen from the current version. The prototype of the static and portable units were designed on solidworks and 3D printed.

The following section will go into detail about the function per unit during the test.

### Application:

The prototype for the app has also been built in Figma. The features and the wireframe are based on insights from the previous report. The app follows the parent unit design and structure. It presents three main sections: live (camera view with the hotkeys, settings, screenshots), analytics (check medical aspects) and profile (personalize).

The main difference between the app and the monitor is that the app has an entire section dedicated to the baby's health that we decided to call "Analytics". In this section they won't be able to control the features such as talk back, night light, etc. The camera view in this section will not disappear but will be more compact to give space to medical menu: Live breathing, sleep tracking, baby's temperature and motion tracking.

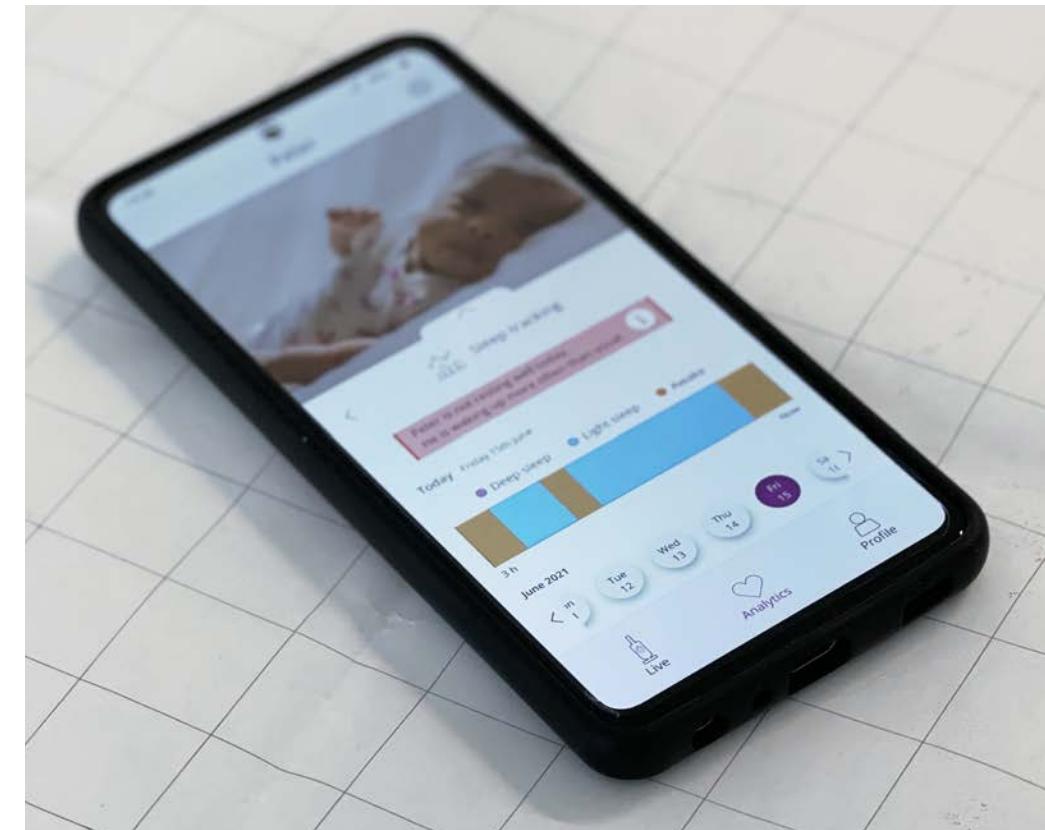
In each section it is possible to view the live data, an overview of the day and the night and also the data history of the previous days so that the user can keep track of the parameters. The activation of the sensors and the notifications are customizable making the app adaptable to any context, situation and parenting style. The notification have to be on the background as an extra help to keep an eye on the baby. During the test the participant downloads the app with the assigned mobile phone.

#### To test:

The usefulness of the medical features for their parenting style (on a longer term)

The supportiveness of the additional medical information

Interpretation of the information



In the pictures (Fig. 4.29) is visible the prototype of the smartphone application

Figure 4.29

### Packaging:

For the prototype of the packaging the emphasis was put on 2 elements; sliding compartments and the phone section. In the prototype the box was made with two compartments which fit the components of the product. Next, it should be slidable and have use cues to indicate how you open it.

The phone section drops down to indicate a space for the phone to be placed by the user. With the use of this movement and the NFC logo the intuitivity could be tested.

#### To test:

The experience of the box and its two compartments

Division in set up requirements

The intuitive placement of the phone while unboxing

Intuitive first experience



In the pictures (Fig. 4.30) is visible the prototype of the Packaging

Figure 4.30

# 4.9 Pre-pilot test

## Observation team-side during the test:

Introduction and first scenario:

- explain the system clearly: introducing all the different devices of the system
- the tester had some problem with opening the box from the side
- when the scenario is over and the task is completed the conductor should stop the user (es. when the app is downloaded)

Second scenario:

- explain that the buttons are on the left and for the prototype they are touch screen but they would be physical in the redesign otherwise the tester would click "Next" on the screen and not on the buttons on the right
- the tester said "old fashioned to use micro USB"
- lack of feedback when you click on the on button of the camera it is not clear that if the camera switched on correctly
- the setting up steps should progress automatically when the function worked without asking the user to click on "next"

Third scenario:

- The start didn't go as we expected. We probably have to explain it better or might make it more connected to the second scenario
- it doesn't make sense to ask the participant to set the fake camera into the room at this point, it makes the users confused, it is not consistent with the monitor prototype. We should wonder: should we do it in a different moment of the user test (es. start,...) what do we want to get from it?
- Explain better that the screen is turned around because of the scenario but the user can grab it when feels it time to do it
- technical problems with playing the lullaby
- leave the user free to use the different functions, not only the lullaby should be available but also the talk back function and the night light

Fourth scenario:

- the vibration didn't work at the beginning and also the users didn't know what was going on

Medical scenario on the app:

- the info in the app are contradictory make them consistent
- make the notification clear the users don't see it or explain the scenario differently letting the user explore the app
- the notification doesn't look like a notification, is that our aim?

## Observation coach-side during the test:

- make clear when the task is done by saying for instance "Normally you will continue with the bla bla bla but with the prototype it is not possible..."
- Too much noise and stuff going on during the test, we should be present as observer but we should be "invisible" to the tester. We must control what the user sees and make sure it is not distracting for him. It would be better to not see what is going on behind the prototype
- design the journey from the start to the end, prepare everything, every word has to be the same for each participant. Be confident
- Never say: "This is going to be very easy", "just",...don't make it feel super easy and emotional otherwise it will influence the tester and it will lead to performance anxiety, always use the right words
- the questionnaire in between each scenario will probably influence the next scenario, by talking and reasoning about the design you become more aware of it so think about if it is a good idea to submit the survey after each task or after the whole test
- to make the user more into the mood we could use technique as for example for the fourth scenario make some mess and make the user clean without having the focus on the monitor,...

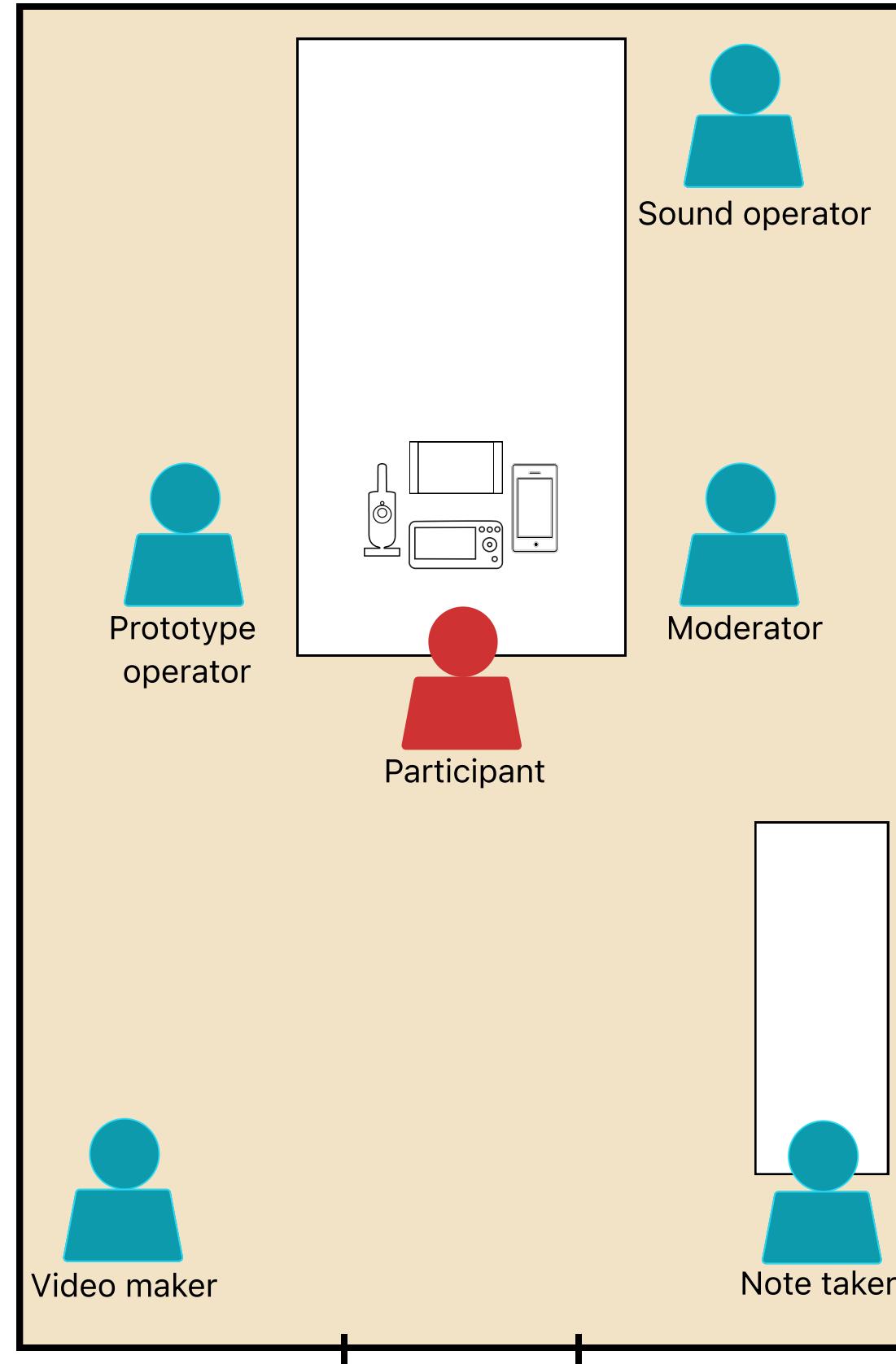


Figure 4.31 Pre-pilot test set up

## 4.10 User Test

### The two different location

All student participants did the test at the faculty in the same room. Almost all mothers conducted the test at their own homes at the dining table (in order to empathize with the scenarios) except for one (which took place in the same room as the students). The inconsistency in location could affect the results a.o. in attention flow and reaction speed. A test setup was made in order to keep the consistency in the test between the two groups. The set up used during every test. In figure 4.32 the set up can be found.

### Roles of the team during the test:

- Moderator: Leads the test and interviews the participant.
  - = Hannah
- Prototype operator: Fixes the Arduino (manually controlling the lights of the LEDstrips) and controls the audio during the test
  - = Min
- Note taker: Taking notes (on paper to reduce sound) about everything that happens during the test
  - = Laura
- Video maker: Is making sure the videos are rolling, both in front of the user (facial expression and body language) and on the back (the screen displays of the prototypes)
  - = Shruthi

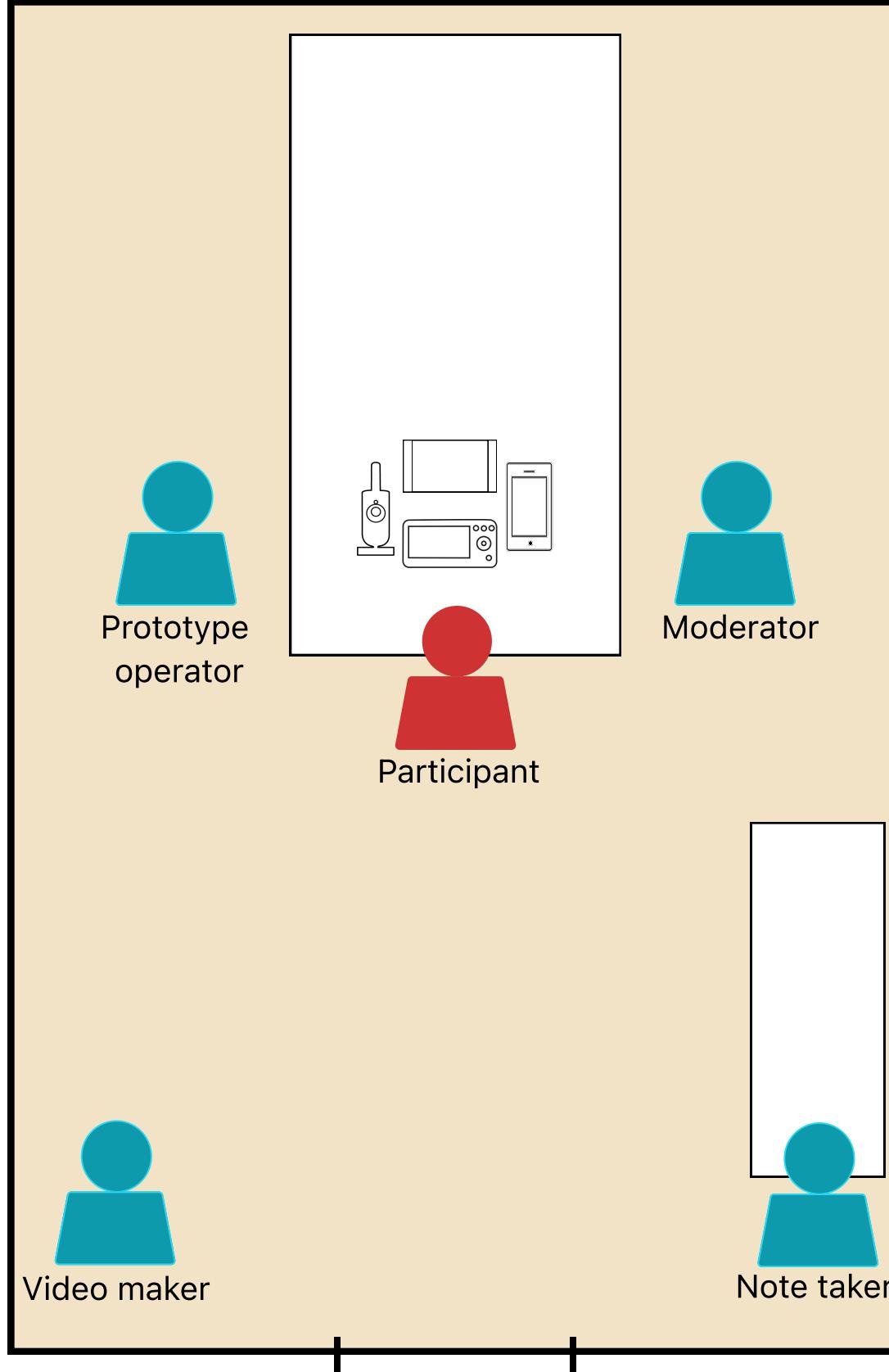


Figure 4.32 User test set up

## 4.11 Test with real users

### Test plan:

The usability tests and the pre-pilot test formed the basis of the following test set up.

- 1 The test starts with an introduction of the project, the team, their roles during the test, the prototypes and the test itself. The consent form is introduced and signed by the participant.
- 2 We started the test with a questionnaire about the experience of the participant with baby monitors and about their family/children. These questions were meant to warm them up about the subject and refresh their memory. The students were asked about their baby aspirations and goals as future parents. In order to get them excited about the subject and try to imagine their principles as a parent.
- 3 Next the participants were explained 3 scenarios in which they had to fulfill a relevant task with either the parent unit, camera unit or app. The participants were asked to speak out loud during the test. After each scenario a few questions were asked about their experience of the prototypes. On the next page you can find the questions we asked after the scenario's.
- 4 After the test the participants were asked to fill in a questionnaire. This provided us with direct data for evaluation of the redesign. We asked the participants to speak out loud while filling in the forum in order to understand their answers. This would later help with validating the data and understand their reasoning to ensure their experience met the three main design goals of the redesign.

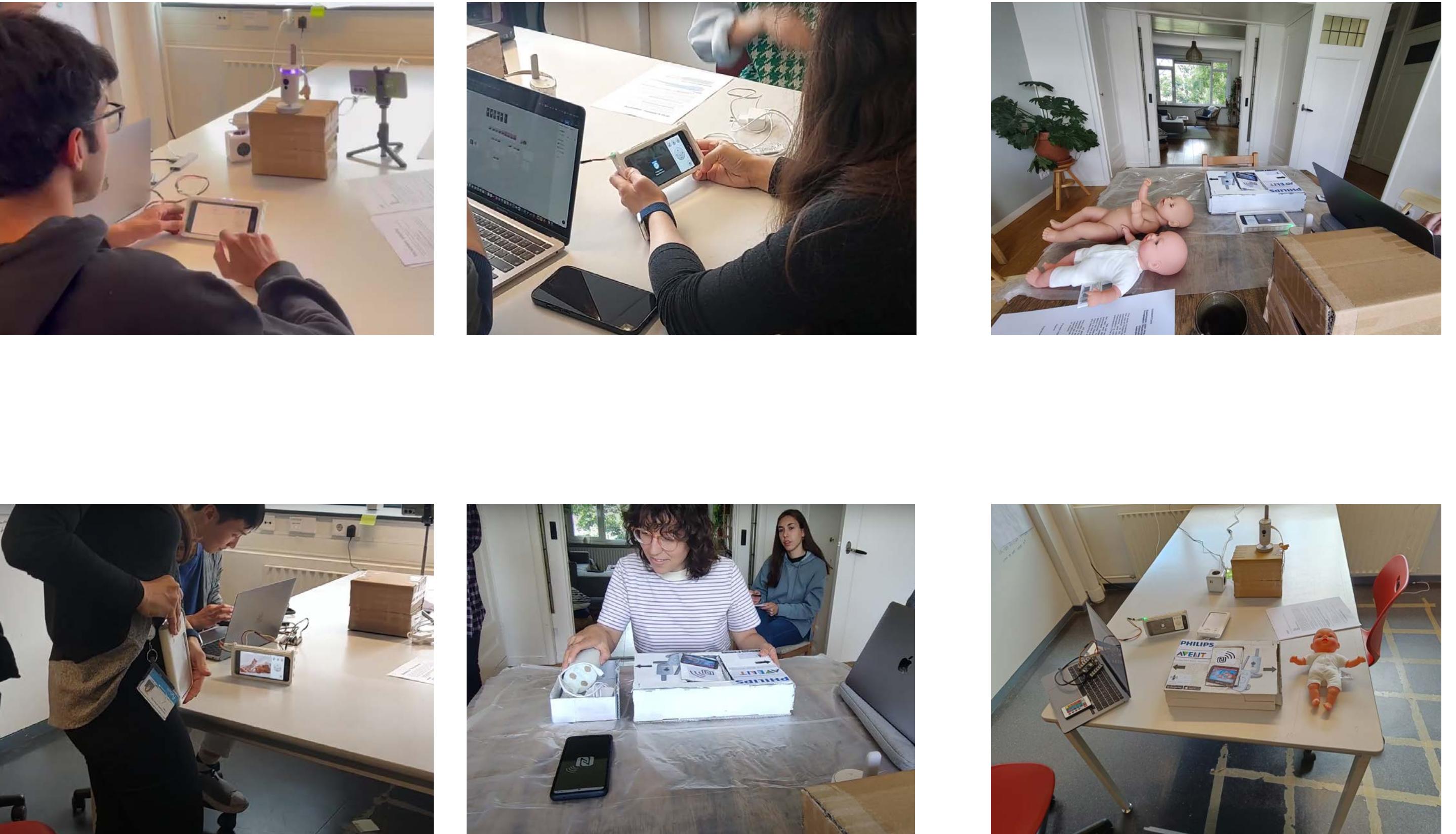


Figure 4.33 User tests

## 4.12 Questions during the test

BEFORE TESTING	IN BETWEEN	AFTER TESTING
<p>BEFORE THE TEST FOR MOTHERS</p> <ul style="list-style-type: none"><li>• How many children do you have and what is their age?</li><li>• Do you have any experience with a baby monitor?</li><li>• Do you have a baby monitor yourself?</li><li>• If yes, why did you decide to buy one?</li></ul> <p>BEFORE THE TEST FOR STUDENTS</p> <ul style="list-style-type: none"><li>• Do you have any experience with a baby monitor?</li><li>• Are you thinking about having kids in the future?</li></ul>	<p>SCENARIO 1: UNBOXING, CONNECTING, PRESETTING MENU</p> <ul style="list-style-type: none"><li>• Can you explain what you thought about the unboxing?</li><li>• Was it clear that not both units have to be wired?</li><li>• Did you have doubts during the connecting phase? about what?</li><li>• How was it to go through all the functions of the monitor beforehand? and was it the right timing to do so?</li></ul> <p>SCENARIO 2.1: FEEDBACK and FEEDFORWARD</p> <ul style="list-style-type: none"><li>• Was it clear what the light meant while you were doing the vacuum cleaning?</li><li>• Did it catch your attention?</li><li>• Do you think it is easier to use the monitor or walk up to the room?</li><li>• Can you explain your choice of function? Was it clear the monitor helped you with your choice?</li><li>• Did you feel confident during this scenario? also about how the monitor worked?</li><li>• Was it clear to stop the function at the end of your task? (or would you rely on the timer you set at the beginning?)</li></ul> <p>SCENARIO 2.2: PORTABILITY</p> <ul style="list-style-type: none"><li>• Would you hang it on you while you are doing the vacuum cleaning?</li><li>• How would you interpret the crying as a vibrating feeling?</li><li>• What button would you use when it hangs like this and you want to turn on for instance the lullaby?</li><li>• On the side or on the front?</li><li>• Would you pick it up and click the right function or leave it hanging and find the right button?</li></ul> <p>SCENARIO 3: MEDICAL</p> <ul style="list-style-type: none"><li>• Could you easily find what you thought you were looking for?</li><li>• Were all the functions of the app clear?</li><li>• Did you understand the value of the app?</li><li>• What would you do with the information?</li><li>• Did you have the feeling you were missing something?</li></ul>	<p>AFTER THE TEST FOR BOTH MOTHERS AND STUDENTS</p> <ul style="list-style-type: none"><li>• What did you think about the unboxing and set up process? (scale: 'Felt guided' and 'Overall clarity of the setup')</li><li>• How was the order of instructions to set up the lullaby? (clear/unclear)</li><li>• Do you see yourself using these features? (temperature, breathing, sleep tracking, motion tracking)</li><li>• How do you feel about using this product now? (confused/confident)</li><li>• (Will the product fit in easily into your style of parenting?)</li><li>• Which of these words would you use to describe the experience of using the product? (pick any 3)<ul style="list-style-type: none"><li>• (easy, personal, helpful, frustrating, reliable, supportive, stressful, pleasant, difficult)</li></ul></li></ul>

## 4.13 The results Students

	<ul style="list-style-type: none"> <li>age group: 20-30</li> <li>no experience with a baby monitor</li> <li>want to have children in the future</li> </ul>	<ul style="list-style-type: none"> <li>age group: 20-30</li> <li>no experience with a baby monitor</li> <li>want to have children in the future</li> </ul>	<ul style="list-style-type: none"> <li>age group: 20-30</li> <li>no experience with a baby monitor</li> <li>want to have children in the future</li> </ul>	<ul style="list-style-type: none"> <li>age group: 20-30</li> <li>no experience with a baby monitor</li> <li>want to have children in the future</li> </ul>		
UNBOXING	<p>The middle part was confusing; is there something in there?</p> <p>not clear that the middle could be placed on the box</p> <p>sliding the compartments on top of each other</p> <p>pulling out the compartments (instead of sliding)</p> <p><b>both wired</b></p> <p>NFC was not clear</p>	<p>sliding compartment, without very smooth</p> <p>feels like there was more in the box</p> <p><b>both wired</b></p>	<p>sliding back the compartments in the box</p> <p><b>both wired</b></p> <p>also taking out the middle part</p>	<p>it is nice to have already the division of the two compartments</p> <p>a bit confused about the middle part</p> <p><b>both wired</b></p>	<p>NFC was not recognized</p> <p><b>both wired</b></p>	
CONNECTING	<p>It is nice the manual is on the screen</p> <p>lets the manual stay on the table. Eventually like a middle screen</p> <p>following the task very precise</p> <p>did not read the instructions of why the connection must work</p>	<p>did not read the reason for misconnection</p> <p>not clear why it did not work, but it was clear what I had to do.</p>	<p>letting the monitor stand vertically</p> <p>makes the light of the camera which makes him go back to the monitor</p> <p>looks on a laptop in between in order to have a connecting work again</p> <p>looks confused because he does not have to do anything himself</p>	<p>Very clear, because of the lights and the description</p> <p>I clicked too fast sometimes, did not ready everything</p>	<p>Connecting was easy and clear</p>	
PRESETTING GUIDE	<p>the presetting guide is too guiding</p> <p>clicking both on the middle button and the right button</p>	<p>what does timing stands for?</p> <p>seeing all the possibilities is quite nice of an overview</p> <p>clicking through very fast</p>	<p>Nice to see what I can do with it, and nice to see how I can preset this</p> <p>clicking on the function itself in order to go to the individual presenting menus</p> <p><b>very clarifying</b></p>	<p>you already get news about what is going on, you are not finding out on the way</p> <p>instructions are very clear</p> <p>I will forget my input</p>	<p>clear set up instructions</p>	
FEEDBACK & FEEDFORWARD	<p>lights were not comfortable, combined with a lot of sounds</p> <p>she did not notice the buttons were blinking</p> <p>The status bar changes</p>	<p>stopped the function</p>	<p>intuition is looking at the baby monitor, but then considers going to the bathroom anyway</p> <p>uses talk back function</p> <p>it feels stressfull to help a baby crying</p> <p>he noticed the change in the light bar as the function was enabled</p>	<p>did not notice the flickering of the light at first</p> <p>wanted to go for the lullaby but then saw the other button blink as this was what he had to do</p> <p>hesitated a bit</p>	<p>did not stop the function</p> <p>the lights immediately caught attention</p> <p>than saw the options of the hotkeys</p> <p>the blinking was an assumption to click on</p> <p>did stop the function</p> <p>does it automatically stop?</p> <p>I heard it first than the light indicated a seriousness</p>	<p>overall the stopping of the functions went well</p>
PORTABILITY	<p>The front buttons are best because it feels comfortable</p> <p>feels comfortable, until I have to bow down</p> <p>hang it on the pants</p> <p>vibration</p>	<p>it depends on the hand which buttons I would use</p>	<p>would show some kind of robustness</p> <p>hang it on the pants</p> <p>no vibration, would not notice</p>	<p>wanted to go to the baby room</p> <p>than clicked on the buttons a few times to turn it off</p> <p>hang it on the pants</p> <p>no vibration, would not notice</p>	<p>talk back function</p> <p>no vibration, would not notice</p> <p>I would look before using a button</p> <p>using the buttons in the front</p> <p>hang it on her chest</p> <p>no vibration, would not notice</p>	<p>Portability is appreciated and used in the right manner</p>
HEALTH APP	<p>I can analyse what I did during the night</p> <p>understand the tips are meant for her to think about improvement options</p> <p>clicks on the info to find tips</p> <p>how to turn off the notification you just read?</p>	<p>goes directly to the notification, due to the red dot</p>	<p>there is a lot to discover for yourself</p> <p>when is the temperature good or bad?</p> <p>hang it on the pants or in the back pocket</p>	<p>did not scroll down enough to see the other information</p> <p>clearly separated sections</p> <p>it is easy to grasp what you can do with it as a user</p>	<p>could easily find everything</p> <p>can I change the functions in here?</p> <p>still see the baby</p> <p>sleep tracking most interesting</p> <p>can I change the functions in here?</p>	<p>it is easy to grasp what you can do with it as a user</p>
RECOMMENDATIONS	<p>what if I have two babies?</p>				<p>manually compare the health functions</p>	

## 4.14 The results Mothers

Mother 1 • Age: 36 • partners age: • Children: Oliver (5), Luc(1) • experience with baby monitor h	Mother 2: • Age: 34 • Partners age: 36 • Children: Maes (2) Gijs (0) • experience with baby monitor (audio)	Mother 3: • Age: 41 • Partners age: X • 1 sun • experience with the baby monitor	
<b>UNBOXING</b>			
<p>easily sliding out the two sides of the box</p> <p>does not place the phone on the holder, gets it out</p> <p>She thinks there is more in the box</p> <p>Connecting the devices went easy; following the tutorial</p>	<p>She took out from the box the NFC area and checked if there was something under</p>	<p>if you put the box on the side everything will fall out</p> <p>She thought she would slide the whole thing, not the two parts separately</p> <p>Indicate more use cues that the phone should be placed there, words or visuals</p> <p>She would like to charge both units immediately when she opens up the box</p>	<p>The sliding part of the box distinguishes the two units already (also integrate the app in this interaction)</p>
<b>CONNECTING</b>			
<p>easily going through the steps</p> <p>experiences the light as working together</p> <p>connection: Is this between the devices or the power?</p> <p>didn't push any extra buttons</p> <p>she did not really read the instructions</p> <p>Ensuring the connection status with the light in both the monitor and the camera and it is super helpful and works really well</p>	<p>It wasn't clear that both units are wired/not.</p> <p>from past experience knows their camera unit usually has buttons</p> <p>the light feedback was a little confusing and disturbing</p> <p>didn't went well during this test</p> <p>Would be better to use traffic light colors</p> <p>did push an extra button</p>	<p>She uses the menu button as a 'next button'</p> <p>She likes that there is feedback between them, with the same lights.</p> <p>That was easy!</p> <p>She would be nice that the light on the camera is also showing that it is connected by making it flicker. By doing so the user sees that the feedback was successful.</p>	<p>The light feedback is very helpful and prevent the parents from clicking all buttons</p>
<b>PRESETTING GUIDE</b>			
<p>did not read the whole presetting menu</p> <p>trying to open the lullaby hotkey</p> <p>the menu needed enough attention due to the blinking</p> <p>I mostly play a lullaby until it is finished</p> <p>She would not set the lullaby at first, she might do later in another moment</p>	<p>Settings lullaby was clear and easy</p> <p>She wanted to learn about the functions later at a more relevant moment</p>	<p>A ok/enter buttons would be nice to be more clear</p> <p>The timers are all very long, I don't think I want one</p>	<p>There is a better moment to introduce the functions, now you preset but don't know what for</p> <p>Clicked on the hotkey when trying to open the presetting menu</p>
<b>FEEDBACK &amp; FEEDFORWARD</b>			
<p>depends a lot on what kind of cry she hear how she will react</p> <p>the light visualizes the kind of cry</p> <p>nights shouldn't be too silent otherwise she would wake up many times even without an urgent reason</p> <p>The combination of the LED strip with the sound in the end</p> <p>She would go to the baby normally</p> <p>She would not really use any of the features because she doesn't think that would calm her down</p> <p>led strip feedback really helps but only what you can see the video and hear the sound at the same time</p> <p>different light for different situation but there are too many kind of crying</p> <p>did stop the function</p>	<p>Useful to know that the light are with the sound</p> <p>also if the audio is muted you can see the light feedback</p> <p>did not notice the blinking of the suggested functions</p> <p>She did not notice the lullaby because she does not have that on her own monitor</p> <p>It would be nice that the lights on the camera is also showing that it is connecting by making it flicker.</p> <p>It was nice that the feedback was consistent.</p> <p>if you are in a meeting and you have earphones you can still see the baby, now you can also see it.</p> <p>She really likes that you can see it from a distance and see what is going on.</p> <p>do stop the function</p>	<p>The feedback of the enabled hotkeys were noticed and deactivated</p> <p>The activation feedback was noticed and the function was deactivated at the end</p> <p>The blinking of the hotkeys (as suggestion) was hardly noticed</p> <p>The LEDstrip gives a lot of new opportunities; like mute it (during meetings)</p>	
<b>PORTABILITY</b>			
<p>She would use the vibration on the front in order to see the video at the same time</p> <p>Vibration would be nice also while sleeping in order to wake up only one parent and not both of them</p>	<p>She would not really use the buttons she will directly go to the baby</p> <p>She tried to put the monitor in every pocket</p> <p>leaving it in her back pocket because than she is able to move free!</p>	<p>Not very flexible</p> <p>it depends on how heavy it is</p>	<p>portability is difficult when you want to move freely, maybe a shoulderbag model</p>
<b>HEALTH APP</b>			
<p>Notification is too strong, too alarming</p> <p>We should give more examples to the parents, by not giving dos but asking for example How is Peter sleeping today?</p> <p>Maybe it would be nice to have a section to indicate the breathing in and out mode and a real section for the app</p> <p>the features are clear</p> <p>impression could be useful but she wouldn't use it</p> <p>if feels like you are getting too many information, it is important to know what is necessary but without being too noticeable</p>	<p>Impressed by the app</p> <p>show correlation</p> <p>notification is interesting to see, for example in the monitoring after the night</p> <p>sleep tracking is also good to have</p> <p>there's too much info sometimes which is necessary needed but not in daily life</p> <p>breathing has a lot of liabilities and is therefore dangerous to use</p> <p>don't think would use the temperature tracking, the humidity sensor and record at the doctors without using the app</p> <p>not sure how reliable it is to show to the doctors</p> <p>What elements do we use to measure these variables?</p> <p>Why do I need a separate monitor?</p>	<p>She tries to click on the graph to access more data.</p> <p>Humidity and temperature is also nice to know for dressing them.</p> <p>She does like the flow of the app</p> <p>Connecting some parameters would be nice but the parent would not do them themselves</p> <p>Not that much confidence</p> <p>Call an alarm, notification because that is less impactful and scary.</p> <p>The mothers want to have the control over the information</p> <p>Correlation between different health graphs would be handy and autonomous information gathering</p>	<p>The information should not be alarming</p> <p>The information should be reliable enough, there is a little bit of disbelief</p>
<b>RECOMMENDATIONS</b>			
		<p>when there is motion, Motion is timed so the parent can look back at it and then you can check up</p> <p>With the light sensor you should be able to switch between night and day mode.</p> <p>The buttons layout and possibilities on the smartphone should be consistent.</p>	