INCLUSIVE DESIGN REPORT

ID5383
Master elective course 2022-2023

Group 1 - Young PBLV

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Philips Airfryer 5000 XXL - Project summary

As part of the course ‘Inclusive Design 2022-2023’, the team investigated the user experience of an airfryer. The target users of the project are young people, aged 15-20, who have a visual impairment (PBLV). The project had two main stakeholders: Visio and Versuni. Visio is an NGO supporting PBLV and Versuni is a company developing diverse products, like an airfryer and a mobile app Phillips NutriU. They both are interested in how to guarantee the inclusivity of the product for PBLV and how they can effectively facilitate co-design sessions with the target users for their further projects.

During the research project the team carried out three internal user tests in Amsterdam and Delft, as well as conducting one cooking session with the actual users in Grave. Across the four main sessions, the report will encompass the team's analysis of the project topic, as well as provide recommendations to ensure product inclusivity for PBLV and enhance its overall user experience.

1. Introduction

1.1. Meet the team

Gabi Verstappen

SPD, Session facilitator

Laura Franco

DfI, Session facilitator

Nayoung Jung

Media Technology (Leiden University), Session planner

Wouter Bakkeren

IPD, Session planner,

Contact person for stakeholders

1.2. The stakeholders and experts

Visio and Versuni were the main stakeholders of this project. For our project, we had close contact with Timon van Hasselt from Visio as the expert who could give us valuable feedback on our approach and ideas. We also included Ralf Habets and and Stefan Laureijssen from Visio as our additional experts when required. As our target group was young PBLV, we recruited the users from Visio Education Grave with the support of Timon. Detailed information can be found in Chapter 1.5. Set-up of collaborations with stakeholders.

1.3. Case description

According to Visio (n.d.), 355.000 people with a visual impairment in The Netherlands (2020). 270,000 people are partially sighted and 85,000 people are blind. Visual impairments are caused by diverse factors, such as eye disorders, eye diseases, a disorder in the visual processing in the brain, and as a result from diabetes.

For 10 weeks, the project was conducted as part of the elective course 'Inclusive Design 2022-2023' at the Industrial Design Engineering Faculty of TU Delft. The target group was young users with visual impairments, aged 15 to 20, and the product to focus on for the project was the Philips 5000 Series XXL Airfryer from Versuni. The project aimed to investigate how the target users experience the airfryer and come up with recommendations showing how to design the product to be more inclusive. The project aimed to include the users as much as possible in the design process.

1.4 Inclusive and participatory plan

Overall, we aimed to execute more than two sessions with the team and the experts to empathise with the users and at least one session with the actual users. Simultaneously, we planned to incorporate the inputs from the stakeholders and the lecturers throughout the course multiple times. The detailed setups and the outcomes will be discussed more in the following pages.

1.5 Set-up of collaborations with stakeholders

The team had several encounters with stakeholders during the course. On the 24th of April and 8th of May, the team went to Amsterdam to visit Visio and Versuni, arranged by the course. The team also presented to both parties on the 22nd of May. Valuable feedback was gathered from those sessions, which will be discussed in the following chapter.

Besides the pre-arranged collaboration sessions, the team met up online with Timon and his blind colleague Ralf (from Visio) on the 4th of May to discuss the progress up to that point and receive more knowledge. The following week, the team was assigned the target group of young PBLV.

Arranging the co-design session was challenging. It turns out that young PBLV are not as easily accessible as adult PBLV. Luckily for us, we had Timon as a starting point. He was able to connect us to two colleagues: Vivian van Garderen and Daniel Schober. After some phone calls, emails, and lots of patience waiting for multiple weeks, we eventually got in contact with Esmay from Kind- en jeugd centrum Grave and Roxanne from Koninklijke Visio Rotterdam, a school in Rotterdam for young PBLV. Due to time constraints, a session in Rotterdam was not possible, but the team could facilitate a co-design session in Grave.

Unfortunately, fitting in a session where all four group members were available was impossible. This was due to other mandatory availability for other elective courses, work, and the limited availability of the PBLV. The session in Grave was thus executed on the 6th of June, by Gabi and Laura.

Before the session in Grave, the initial plan was discussed with their supervisor Esmay. A consent form was sent to the parents to permit their children to join the session and for us to film and take pictures. A week before the session, the plan was discussed again, refined, and a recipe was chosen. More details of the session will be discussed later in the report.

To end the Inclusive Design process, the team met up with Timon, Ralf, and their (blind) colleague Stefan Laureijssen on the 19th of June to discuss the results of the session in Grave. The course ended with final presentations for all stakeholders on the 26th of June.

To conclude, setting up a co-design session is not easy. Being Dutch-speaking is a must (in the Netherlands) to come in contact with the (young) target group. Luckily, Gabi and Wouter are native Dutch and Nayoung has a basic understanding of the language. The target group is not easily reachable, because all contact has to go via their supervisors or schools, after the parents' permission and in the time that they are actually available at the school/facility. Nevertheless, the team made it work.

2. Participatory research and idea-generation activities with the stakeholders

2.1 Research Goals and Questions

This project focused on understanding the product and the cooking experience of the target users with/without the Philips Airfryer 5000 XXL and making suggestions on how to improve the device. Considering the request of our stakeholder, Versuni, the mobile app became part of our project scope. While the system being examined includes the Philips NutriU app, our primary focus is predominantly on the airfryer itself. As the project was initiated with an airfryer as the main product, we considered the app a support tool. Also, to amplify the effectiveness of our project, we allocate most of our resources to the airfryer. Despite the major focus laying on the airfryer, the end of the report will provide some insights and recommendations for the app.

The team believed that the priority should be placed on enhancing the physical device, as this would already guarantee a superior user experience. Based on this, we created three research questions that played as milestones throughout our research.

1) *How do the design of the chosen product, Philips Airfryer 5000 XXL, and other competitors differ?*

2) *How do people with visual impairments cook in general?*

3) *How do people from 15 to 20 years with visual impairments experience the airfryer? Do they already know how to use an Airfryer? What are their suggestions and wishes? What hinders them from using the airfryer or promotes them to use the product in the long run?*

Through these questions, our team aimed to solidify our understanding of the assigned product for the project and the target users. Benchmarking, literature reviews, shadowing, and cooking with the product were chosen as our methodologies to answer this question. The third question was designed to be answered by the co-design session with the target users.

2.2. Session 1: Visio, Benchmark & Literature Review

As it was our first time encountering the project context, we used this moment to formulate empathy towards the topic and our basic understanding of the project.

2.2.1. Session at Visio located in Amsterdam, Netherlands

The chosen method helped us find answers to the second and third research questions:

How do people with visual impairments generally cook? How do they experience the whole process starting from the grocery shopping to the preparation of the ingredients?

How do people from 15 to 20 years with visual impairments experience the airfryer? Do they already know how to use an Airfryer? What are their suggestions and wishes? What hinders them from using the airfryer or promotes them to use the product in the long run?

During the session at Visio, the team simulated the conditions of the target user cooking with the airfryer, as well as doing groceries (Figure 1). With the VR glasses showing the world from the PBLVs perspectives, we went through the entire journey to prepare a meal- grocery shopping, preparing the meal, and cooking with the airfryer. The data from this simulation was collected by taking videos and images during the session.

Figure 1: The team experienced food shopping and cooking with the Philips Airfryer 5000 XXL with a visual impairment for the first time, by wearing virtual reality glasses.

After our experience at Visio, initial insights were drawn out as follows.

- Reading the screen with low vision is challenging; more cooking time is expected.
- The icons are not clearly visible (Figure 2), which makes it hard to understand what you are doing and what you have to do next.
- Sound is an important tool to provide feedback for PBLV, however, the monotone sounds do not show a difference between different buttons. Instead, the sound feedback used at the check-out at the supermarket Albert Heijn was really helpful to understand the status of the purchase.
- Stefan told us that your brain fills in the blanks if you had the vision before, both for objects and colour.

Figure 2: The icons on the screen of the airfryer (Philips, n.d.) are not clearly visible with a visual impairment

2.2.2. Benchmark

Benchmarking was conducted, aimed to find answers to our first research question:

How do the design of the chosen product, Philips airfryer XXL, and other competitors differ?

The result of the benchmarking can be found in table 1.

			
Name	Philips 5000 Series XXL	Philips HD9252/70	Electrolux EAF50
Price	€249	€109	€100
Cooking volume	7.2 L	4.1 L	5 L
Time setting method	Digital	Digital	Analogue
Temperature setting method	Digital	Digital	Analogue
Menu presets	8 on the airfryer, endless options with Nutri-app	8 options	Not available
Turn on/off method	**On:** Digital power button single press **Off:** Hold the digital power button for 3 seconds	**On:** Digital power button single press **Off:** Hold the digital power button for 3 seconds	**On:** Turns on when the plug is in the outlet **Off:** Turns off when the basket is taken out or plug is disconnected
Connectedness	Yes, Nutri app	Not available	Not available
Accessories	Multiple available	Multiple available	Not available

Table 1: Benchmark of the different Airfryers

We can conclude that overall, the benchmark highlights that the Philips 5000 Series XXL offers a comprehensive digital experience with extensive cooking options and Nutri-app integration. The Philips HD9252/70 also provides digital controls and multiple cooking options but lacks the Nutri-app functionality. The Electrolux EAF50, with its analog interface

and limited information provided, may offer a simpler experience but lacks advanced features like digital controls and app integration. Ultimately, the choice of air fryer depends on the user's preferences for price, volume, control interface, cooking options, and additional features like app integration. In the insights in the section “2.5. Session 4 in Grave” more reflections about the digital and analogical operations of the airfryer are drawn.

2.2.3 Literature review

To find answers to our second research question ‘How do people with visual impairments cook in general?’, our team conducted a literature review during this phase. The literature covered PBLV’s touch screen interaction, their general cooking experience, and European design guidelines for inclusivity. The following shows the core takeaways; detailed information can be found in appendix A.

- The biggest problem is still providing enough orientation and context on the screen
    - How much of a problem this is also depends on whether they are completely blind or only partially (as the latter one usually can see some high contrast things) and whether they were born blind or have become blind (as the latter one still has some idea from memory of what something looks like).
- The flexibility of the voice output needs to be guaranteed
- Users have problems with repeated multi-touch interactions (e.g., multi-split-tapping).
- Good spatial ability is still required to have a notion of the device and its interface, as well as the need to memorise the buttons" position on the screen.
- The target users use various assistive technologies/tools to help their cooking without relying on vision. But some lack confirmation/feedback
- Using stove & time tracking are hassles for the users.
- The target users may be more willing to use airfryers for their cooking as it's easier.

2.2.4. Discussion

Overall, it was our first time to realise that the cooking experience was far from mundane through the lens of PBLV. It felt like we were excluded from the information of the world and the way we could interact with things around us felt so limited. The minimalist, modern user interface design was barely visible, and we could only rely on the small beeping alerts.

After our session at Visio, we translated our experience into two user journeys. The one presented in Figure 3 shows the entire process starting from the “Grocery shopping” to the “Cleaning of the airfryer” to give an overview of the entire process. The second one in Figure 4 focuses on the interaction with the airfryer itself. The two visualisations correlate the users’ actions with their emotions, success, and struggles. This analysis helps to pinpoint a specific moment in which the user experience is not yet ideal and gives space for design opportunities.

Figure 3: User journey, overview

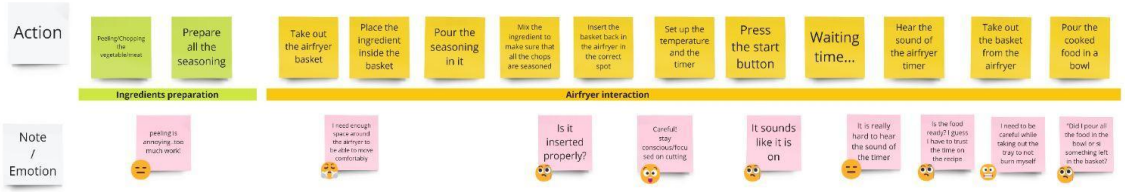

Figure 4: User journey, focus on the airfryer-user interaction

From the literature review, we found that PBLV mostly struggle with repeated multi-touch interactions and the need to memorise button positions. They also encounter issues with using a stove and time tracking when the product lacks confirmation/feedback. Reflecting on this, we noticed that providing sufficient orientation and context on the screen and ensuring flexible voice output should be guaranteed for the target users.

During the session, we cooked simple meals (‘frikandellen’) instead of a proper meal due to the limited time and resources. However, as we see the airfryer as a more-than-frituur, another round of simulation seemed to be necessary to test more complicated meals.

Also, considering the feedback we collected after the session, our team still had to add more details to our user journey and create assumptions (hypotheses) based on our experience.

2.3. Session 2 with Versuni, Interview with experts & Mid-term presentation

During the second session, we conducted another cooking session with other fellow students at the building of Versuni, another stakeholder of this project. After that, we distilled our takeaways into recommendations.

2.3.1. Session with Versuni located in Amsterdam, Netherlands

This session was conducted with another stakeholder Versuni (Figure 5), arranged by the course coordinators. Considering the age of our target group, we thought that it would be relevant to shadow how other groups interact with the product with the PBLV's condition simulated glasses as well as experiencing it on our own. In this session, the chosen menu was air-fried salmon with vegetables.

Figure 5: Session 2 with Versuni, Amsterdam

The session observations are converted into several insights shown in the following pages.

- There were differences between groups. Group 2 (Elke, Yue, Sacha) let the participant cook individually without guiding the participant (one of the group members). On the other hand, Group 3 (Prerana, Laura, Isa, Susanna, Martine) supported the participant (one of the group members) by sharing the instruction with her verbally.
- The participants immediately gave up interpreting it when they encounter icons on the display that they think they cannot read immediately. Whenever they see confusing icons, they just press anything and move on to the following steps.
- The participants used their hands to check the status of the product (while placing their hand on the device): 'Is it on or off?'
- With the simulated glasses, the participants were no longer paying attention to how the chopped or sliced vegetables look, instead they focused on how to cut the vegetables safely. Cutting takes longer time with visual impairments and sometimes others supported the participants when the way they use knives seems to be dangerous.

2.3.2. Interview with Timon & Ralf

Reflections

Some of the insights we got after the sessions and our reflection with Ralf and Timon after this can be brought down to 3 categories:

Our own experience with the VR glasses

- The switch from seeing normally to not seeing at all is really big. Ralf mentioned that this is not as extreme when slowly getting more and more blind.

Insights about having a visual impairment

- Ralf: Your brain builds a mental model of the controls. It is like a road map, knowing exactly what steps you need to take in order to reach the end goal, for example turning on the Airfryer at 200 degrees for 5 minutes.
- PBLV perform many actions from memory, making the first interaction with a new product/store is the hardest because they have not been able to create the mental model of the controls yet.

Insights about youngsters (aged 15-20)

- Young people wish to use the basic functions of devices, not an app
- The young target group has the least experience of being blind, meaning that they are as used to controlling devices without their vision as older PBLV are.

Recommendations

Product-related

- Include sound (different tones and volumes) and/or haptic feedback when pressing the controls. Not every function needs a different form of feedback, but it does need to be clear that the intended action was executed properly.
- Visual guides like the ‘temperature ring’ increasing are helpful to see the temperature, rather than just the number changing.
- A large menu with 100’s of presets does not work.
- Allowing for voice control would be a good addition

Inclusive design process-related

- Get in contact with the target group as soon as possible

Benchmarking: learn from other youngsters without visual impairment. This can be us as a team, although it would also be very valuable to receive feedback from people who are not as involved in the project and could thus provide new insights.

2.3.3. Mid-term presentation (Discussion)

At the end of this phase, our mid-term presentation covered the assumptions we created so far and those are mainly about the target users' general cooking behaviours and the cooking with airfryers. The assumptions are shown below, listed in categories.:

User's knowledge of technology and cooking

- The young user has basic knowledge of using voice commands and is comfortable with technology.
- The user has basic knowledge of cooking techniques and understands cooking times and temperatures.

Interaction of the user with the Philips Airfryer 5000 XXL:

- The user may see the airfryer allowing them to cook a proper meal, but may not use it for those meals often.
- **Confusing icon:** The users may get confused with those icons. They may press anything in the middle of confusion and continue cooking.
- **Text-heavy display:** The users may not use detailed features. They may tend to rely on easy-to-cook recipes. They may make mistakes in cooking due to heavy text.
- **Check if it's working:** The user may go through uncertainty until they make sure the airfryer starts cooking from visual/audible/tactile cues.
- Voice commands will support the user's cooking experience nicely.

Motivating users:

- Active communication motivates the users to cook something more complex.

Besides the assumptions, we presented our brief plan (Figure 6) for our co-design session with the target users in Grave. Overall, the feedback we got from this presentation was that our assumptions seemed to be more solid than before and the competitive cooking setups seem to be motivating for the target users.

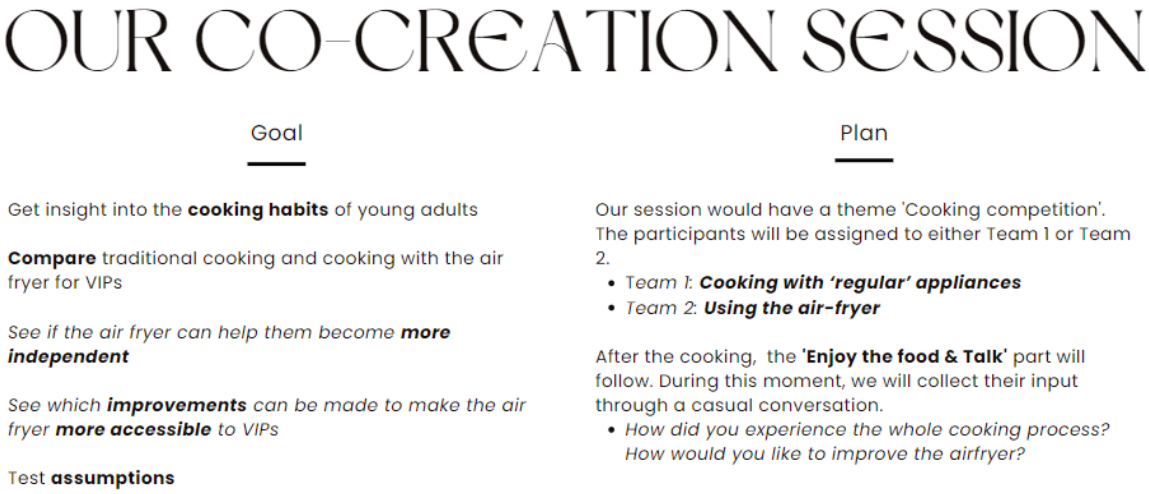

Figure 6. Mid-term: co-design session plan

2.4. Session 3 at TU Delft

After taking part in the lecture on the 5th of June, our team took care of preparing some snacks for the rest of the class. The session and the insights are discussed below.

We made the most of this opportunity to test the pilot session. The performances of the airfryer were tested as well as the menu selected for the teenagers. The recipe we proposed was fried garlic bread.
During the preparation of the food, the team made extra assumptions and observations to check with the young participants during the official session in Grave that would have happen the day after.

Figure 7: Session 3 at TU Delft

2.4.1. Main takeaways of the session

During the session we realised that the kind of recipe that we selected was not really the most appropriate for the participants in Grave. For this reason, we opted to select a different kind of meal for them. Below, more considerations about the session are presented:

- For a NON-blind user, the touchscreen is pretty intuitive and easy to use.
- Even for NON-blind users the pre-sets provided by the device are not really useful, they do not get selected often but instead, the users prefer to select the temperature

and the timers themself. This is caused by the overwhelming list of possibilities, not knowing exactly what would match closest to the recipe and ease of selecting the temperature and time.

- It is very easy to burn yourself while taking out food by touching the inside of the airfryer basket.
- Improvised recipes are hard: you do not know what works, how long it takes to cook. For a NON-blind user, this limitation can be easily overcome by looking at the exterior aspect of the food. But for a PBLV, this is not possible. How would users feel if it is ready? This requires help.

2.5. Session 4 in Grave

This session was designed to answer our third research question:
How do people from 15 to 20 years with visual impairments experience the airfryer? Do they already know how to use an Airfryer? What are their suggestions and wishes? What hinders them from using the airfryer or promotes them to use the product in the long run?

Despite leaps and bounds while organising the session with stakeholders, our team had an opportunity to facilitate a co-design session with young people with visual impairments (Figure 8). A suitable set-up was made, which will be described in section 2.5.1. The assumptions that were formed beforehand, based on the previous sessions, presentation, interview and research, were checked and can all be found in section 2.5.2.

Figure 8: Session 4 at Grave

2.5.1. Activity set-up

The types of collected data were notes, videos, photos, and voice recordings. Whenever the users interact with the product or use a tool for cooking, one of us captured their performance by taking photos or videos and sometimes asked them questions as the participants were encouraged to think out loud. Considering research ethics, our team created a permission form (Appendix B) to capture images and videos beforehand and shared it with the caregivers and stakeholders. After the session, the data was processed by pointing out relevant remarks and translating them into insights and recommendations.

Goals:
- Get insight into the cooking habits of people aged 15-20.
- Compare traditional cooking and cooking with the airfryer for PBLV
- See if the airfryer can help PBLV become more independent
- See which improvements can be made to make the air fryer more accessible to PBLV
- Test assumptions

Plan:
Our session consists of a few PBLV, assigned to either Team 1 or Team 2:

- T*eam 1: Cooking with 'regular' appliances*
- *Team 2: Using the airfryer*

Initially, we had the idea to turn it into a cooking competition. However, after discussing with their caretaker Esmay in preparation for the session, we concluded that it would be best to leave out the competitive aspect, since there will already be lots going on. After the cooking, the 'Enjoy the food & Talk' part will follow. During this moment, we will collect their input through a casual conversation and ask them how they experienced the cooking process and what they found difficult/not yet ideal.

The session involved four users ranging in age from 16 to 18, consisting of three male participants and one female participant.

While the session aimed to facilitate a comparison between traditional appliances and the air fryer in terms of cooking experience, the team took great care to ensure that the participants did not feel pressured during the cooking process.

Table 2 shows our activity setup:

Location & Date Jan van Cuykdijk 1, 5361 HM Grave June 6, Tuesday at 14:45		
Time	**Activity**	**Note**
14:45 - 15:00	**Arrival & Setup** The team arrives at the building and sets up the necessary equipment.	Prepare the airfryer and any additional tools or ingredients required for the cooking session. Check where we can place a recorder to record the session (if needed)
15:00 - 15:15	**Arrival of the participants** 1. The team warmly welcomes the PBLV and caretakers and provides a brief introduction about today's session (purpose & structure) 1. Formulate the teams 2. Introduce the recipe	Research Ethics 1. Inform 'the session will be recorded' Ice-breaker 1. Introduce the name & tell what they like to eat the most these days (to check the user's eating habits in a simple way) Team division: 1. Team 1 (with airfryer) 2. Team 2 (without airfryer)

15:15 - 15:20	**Before Cooking** 1. Let the participant get familiar with the setup (normal cooking/airfryer) 2. Emphasise that the 'flavour of your dish matters'	The team explains the aim of the cooking session again & reminds them of think-out-loud while cooking. Ensure everyone feels comfortable and supported throughout the process. They encourage participants to ask questions and provide additional clarification whenever necessary.
15:20 - 16:20	**Cooking session** 1. The participants are cooking with/without airfryer for 45-60 min	**Menu:** Chicken satay skewers and baked vegetables
16:20 - 17:10	**Enjoy the food with casual conversation** The talk will be about their experience cooking with the airfryer. The team encourages participants to share their thoughts, challenges they encountered, and any suggestions for improving the usability of the airfryer for the user	
17:10 - 17:30	**Wrap-up: the conversation and discussion** The team thanks the participants for their valuable insights and contributions to the project. The participants conclude their involvement in the project and are free to return home.	
Until 18:00	**Leaving** 1. The team ensures that all equipment and the cooking area are cleaned and organised for future use.	**Raw data from this session:** 1. Behavioural data (image, video) 2. Interview data

Table 2: Plan of the session with the users

2.5.2. Assumptions and answers

Based on our previous experiences and the collected data, our team created a series of assumptions and placed them into three different phases: before cooking (preparation), while cooking and after cooking. All assumptions and the answers to their assumptions can be found in Table 3.

Phase	Assumptions to check	Check after test
Before cooking (preparation)	1. The target user has basic knowledge of **cooking techniques** and understands cooking times and temperatures. 2. The young user has basic knowledge of using **voice commands** and is comfortable with technology.	1. They have basic knowledge due to the fact that they are taking the cooking course once a week every week. 2. They are really comfortable with technology, they use their phone to send voice messages and set the timer through the voice assistant.
While cooking	1. **Active communication between others in the room** will motivate the users to cook something more complex. 2. **Voice commands** will support the users' cooking experience nicely. 3. The cooking time with the target users may take 1.5- 2 times longer than the suggested cooking time in the recipe. 4. The users may **get confused with the icons** on the device**.** They may press anything in the middle of confusion and continue cooking. 5. The users may **not use detailed features**. They may tend to rely on easy-to-cook recipes. They may make mistakes in cooking due to heavy text. 6. The user may **go through uncertainty** until they make sure the airfryer starts cooking	1. The interaction with the rest of the group is crucial for them to learn and to keep the motivation. 2. The coaches do really important work by supporting and providing them with tips. 3. Completing the tasks indeed took much longer than expected, roughly twice as long. 4. The placement of the icon is impossible for them to predict and it is overwhelming to have multiple options of pre-sets. 5. The recipe they normally cook is not very complex and they do not cook the entire meal by themselves but each of them takes care of a different phase of

	from visual/audible/tactile cues.	the recipe. 6. They were pretty confident in telling when the airfryer was cooking and when not. Other options such as the timer or the temperature instead were really hard to control. They had a hard time selecting the correct setting
After cooking (during conversation)	1. The target users may be **more willing to use airfryers** for their cooking as it is easier. 2. The user may see the airfryer enabling them to cook a proper meal, but **may not use it for those proper meals often.** 3. The user **might not be sure about using the app to support** their user experience of airfryer.	1. The airfryer is a really good alternative to the "Traditional" way of cooking. 2. The user we tested with is learning how to cook a proper meal with the different tools, which might be depending on the specific context, we are not sure about how they would do it at home. 3. Especially for young people, this easy way of cooking, where they do not have to constantly check, can help them gain independence.

Table 3: Assumptions that were checked at Grave

2.5.3. Main takeaways of the session

This session was very helpful for the team to confirm some of the assumptions derived from the previous sessions. The analysis of the data collected from this session generated a finalised user journey and insights which were then clustered into main categories. In Figure 9-12 the entire process starting from the “Grocery shopping” to the “Cleaning of the airfryer” is presented, with a specific focus on the interaction with the airfryer. The journey map is divided into two lines. The first one reflects the experience of PBLV and the second one of NON-PBLV. This way the team aims to compare the experiences of both groups. The grey boxes define the steps common for both groups while the yellow boxes highlight the specific steps faced by PBLV. The two visualisations correlate the users’ actions with their emotions, success and struggles. This analysis helps pinpoint a specific moment when the user experience is not yet ideal and gives space for design opportunities.

Detailed user journey:

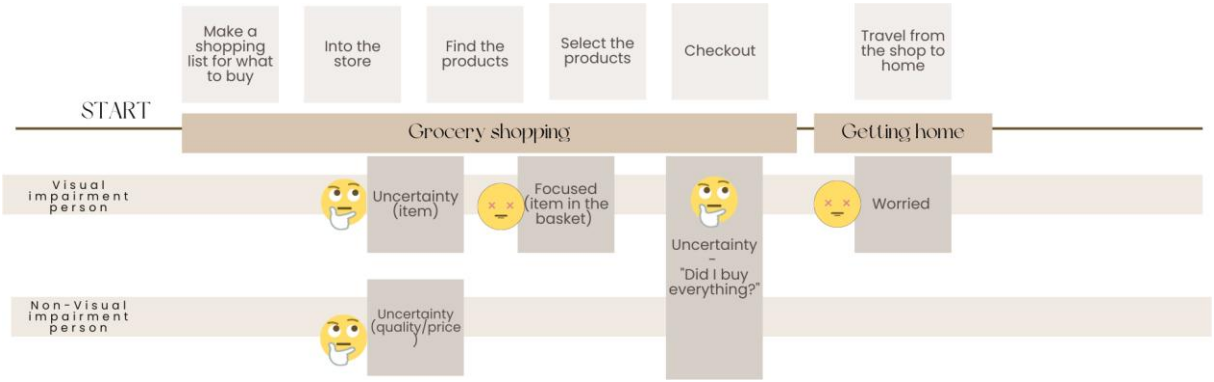

Figure 9: User journey, overview of grocery shopping and getting home

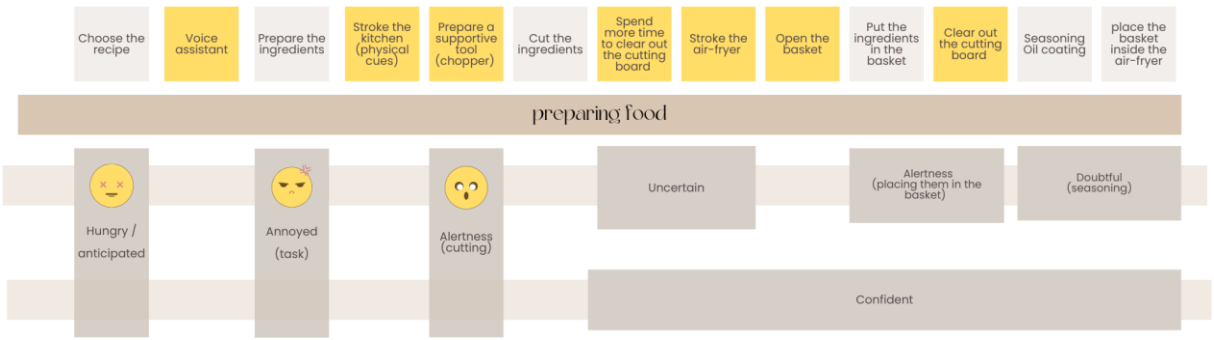

Figure 10: User journey, overview of preparing food part 1

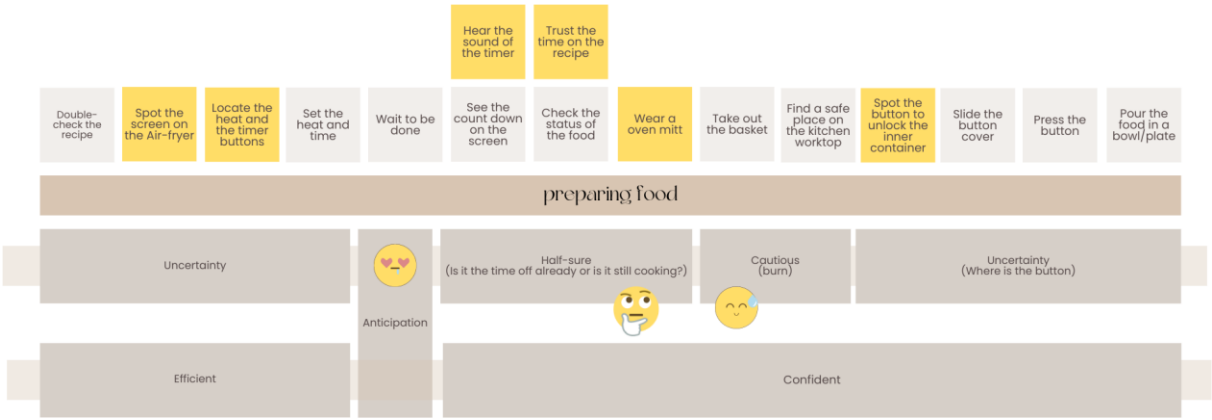

Figure 11: User journey, overview of preparing food part 2

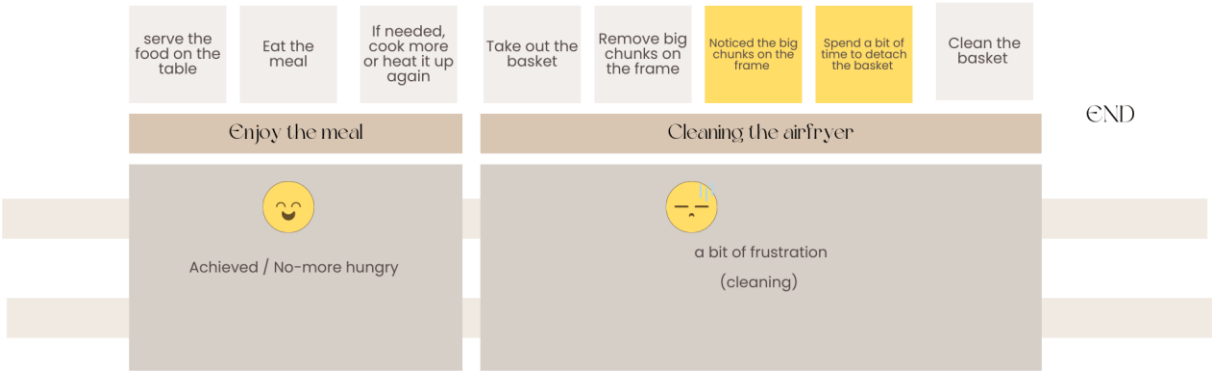

Figure 12: User journey, overview of eating and cleaning the airfryer

Insights about feedback:

- The clicking feedback when the basket is closed correctly is really helpful for PBLV.
- The "Beeping sound effect" for time adjustment helped the PBLV.
- In a crowded kitchen it is really hard to hear the feedback noises from the airfryer. To prevent this the PBLV tend to set the timer on their phone. They rely a lot on the time suggested by the recipe for making sure that the food is well cooked.
- Sound is a must; it gives confirmation to their actions so that the PBLV can continue the same behaviour (for example adjusting the temperature).

Insights about application

- The target group is very confident and open about the use of technological devices to support them in accomplishing tasks (Smart vocal assistants, applications, et cetera).
- The app has the potential to support the user's cooking experience.

Insights about the tactile experience

- Using hands is important for users. The very first interaction is touching/stroking the entire device all around to know the context.
- Burning themself is the scariest thing for PBLV. They need sensibility in their hands and fingers. When the basket is not inserted, there is nothing that prevents them from inserting their hands inside the hot airfryer.

- The touch screen does not provide any type of reference to the user. An analog airfryer instead can help a lot of the users to orient themselves in the space, like the airfryer they are used to using in Grave (Figure 13).

Insights about retrieving the food from the airfryer

- The inside of the airfryer is really hot and can be dangerous for them.
- The inside basket must be fully tilted to get rid of all the food inside (but it is a bit hard to detect).
- Taking out the food from the airfryer can be hard because the gripper button is not easy to spot (even harder if they are wearing kitchen gloves).
- They use kitchen gloves while extracting the basket from the airfryer, this helps them to prevent burning themself but at the same time lowers their ability to feel the buttons et cetera (Figure 14).
- Inserting the tray in a traditional oven is much more complicated, the airfryer simplifies this phase.

Insights about session set-up

- On the organisational level, the session plan could have considered the current situation of the participants. The team did not know about the tea time or the involvement of the caretakers (Figure 15).
- Overall the session went pretty smoothly but it is wise to consider in the time planning that to complete each task the participants might need more time. Co-designing the session with a young PBLV would have helped here to prepare better.
- Think-out-loud while cooking gave informative insights but it can be a bit too overwhelming for the participants to express while completing the tasks. To mitigate this is suggested to plan a cognitive walkthrough phase after the active session in which Post-tasks questions can be asked

Figure 13: The analog airfryer that is normally used in Grave, with extra buttons added to support them in setting the right temperature and time.

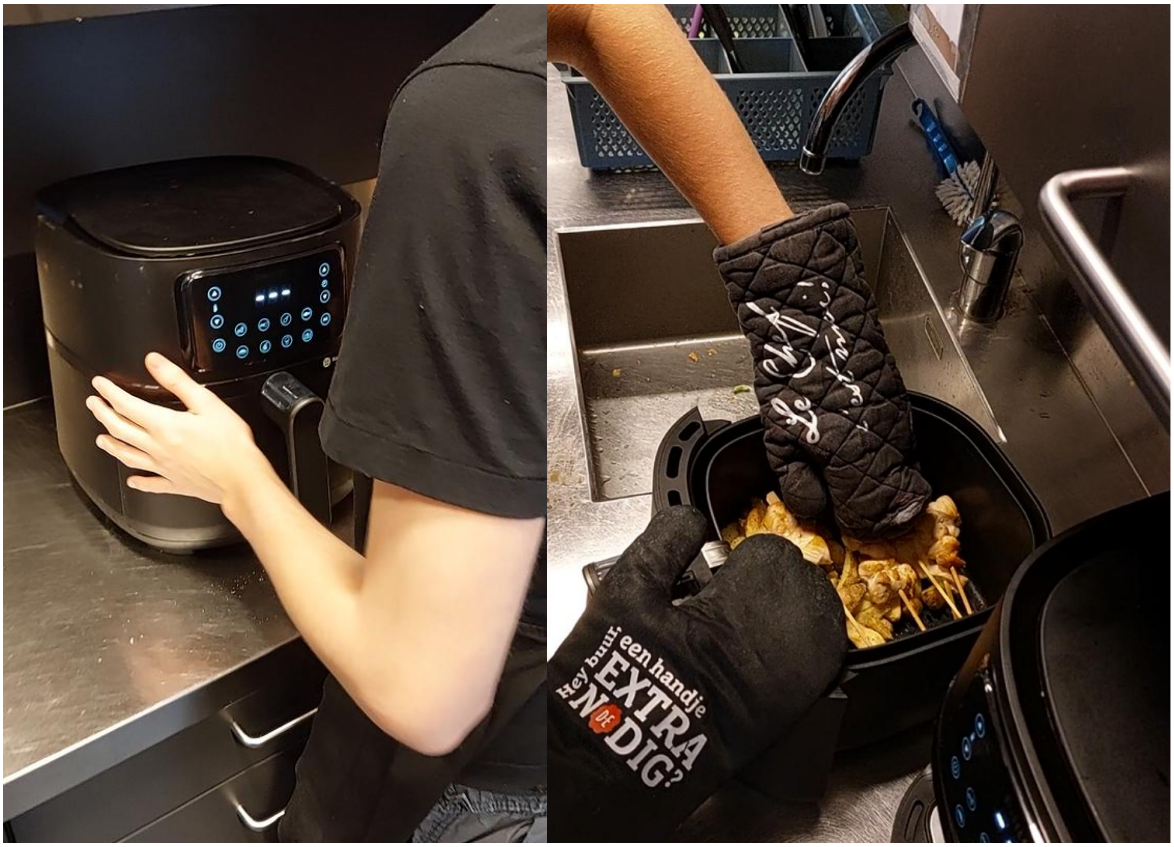

Figure 14: The user's first interaction with the device and the user extracting the food from the airfryer

Figure 15: Users during the tea time before the cooking session and the cognitive walkthrough after the cooking session

3. Final advice

After the session with our target users in Grave, our team created a draft of the recommendations and had a discussion with the experts, Timon and Ralf, to check the validity of our ideas.

3.1 App side

During the user session, we found out that the participants were already using an analog airfryer. To simplify the process of selecting the time and the temperature, their coaches have placed some markers on the most used temperature (180°-200°) and time (0-5-10-...)	→	The app could support the use of the Philips Airfryer 5000 XXL by saving the user's cooking preferences (such as time and temperature)

The kitchen can be a very crowded environment when many people are present and a lot of activities are going on at the same time. Hearing audible feedback can be tricky sometimes, while it plays as an important trigger for the target users to guide further actions. Plus, the users tend to bring their phone around all the time in case it is needed.	→	The app could be used as an extra source of feedback, the airfryer could send a notification on the user's phone when the food is ready (for example acting as a timer).

If the device is well designed for inclusivity then everyone could use it without encountering many issues. The tools and many other home appliances are working pretty well in supporting the user activities in the kitchen without requiring an app.	→	This implies that making the basic functions of the device work properly should be the priority. We should not expect to fix a poor design with a good app, the app should only act as an add-on and never as a replacement.

3.2 Airfryer side

The target group the project focuses on is young users. During the session with the participants, we got to know that most of the time the parents are taking care of household chores like cooking, not leaving much room for children to learn through hands-on experience at home. This is primarily due to the lack of time during the hustle and bustle of everyday life and to the fear that they might get hurt. This behaviour leads the young to lose motivation in seeking independence and adapting to a comfortable situation.	→	Enable youngsters without experience, with a passion for cooking, to cook with the airfryer in a safe way. This can be done by making it playful, adding a gamification aspect and keeping it fun and interactive. Make it something they can be proud of. The opinion of others also really matters, especially for youngsters. It is a fine balance of guiding vs. challenging them. Allow for both simple and easy-to-follow recipes, as well as experiments.

Whilst talking with Ralf and Stefan, they express their thoughts about making mistakes while selecting the settings of cooking and how they would like to be able to: - notice when something is not going as expected - fix the problem themselves	→	For this reason, the design should not be too protective towards PBLV, it is okay to make mistakes but in order to fix them the user should be able to start the process of selecting the set-up from the beginning and not just go one step back. This might be easy for a NON-blind person but requires a lot of work for the visually impaired person, since they have to memorise all the steps.

The target users rely on other senses while cooking. During the session, we noticed that they began stroking the device when they encountered the product and got informed by the sound feedback; digital sound effects from touching a display and physical sounds occurring when they arranged the device's components.	→	Add audible feedback, which is not just for PBLV but also for a larger audience. Haptic feedback (could also use small vibrations as is the case when typing on their mobile phone). Allows for adjustability in the functions, being able to turn up the volume and change the sound.

4. Evaluation of final advice with stakeholders (Visio & Versuni)

4.1 Suitability of the advice for Visio & Versuni, future steps

After the presentation we gave about our advice, we shortly spoke to people from Visio and Versuni. Both stakeholders were very pleased with the presentation and the insights that we found. Versuni found it an interesting insight that first the product itself should be accessible before focussing on the app. We explained that this opinion was shared by both the young PBLV and the older PBLV like Stefan and Ralf. It also makes a valuable business case since it could also increase the user experience for other users that do not have a visual impairment. Other than that, partly due to time constraints, they had no further comments on the presentation.

From the people from Visio, we heard that they really recognised the story we were sketching. This shows us that we have understood the people we have talked to in the right way and were able to express their opinions and ideas accordingly in our presentation. We believe that it is very valuable that we have understood their perspective, since it is very hard to comprehend when you do not share the same perspective.

4.2 Reflection on their involvement

We believe that from Visio's side, there was a good collaboration. Even though we could have met them a few times more, all sessions were fruitful and we learned a lot from them. The session at Grave was very helpful too and might have even been more helpful if we could have gone more than once. This was unfortunately not possible though due to the time constraints.

As for the collaboration with Versuni, it was very nice to be able to actually use the airfryers. It greatly helped to understand what we were working towards. The session we had at their office was also good and well prepared. As an advice for Versuni, we would suggest they also start co-creating with the important stakeholders, mainly the PBLV, when they want to learn more.We can write it up in a document, but nothing is as powerful as experiencing and seeing it with your own eyes.

5. Conclusion & Discussion

5.1. General conclusions on the research

Throughout the past 10 weeks, our team delved into designing a product for inclusivity. The aim of the project was to provide the main stakeholders, Visio and Versuni, with guidelines and design ideas to improve the Philips Airfryer 5000 XXL with a more inclusive direction. The specific target group was young people (15-20) with vision impairment.

5.1.1 Recommendation for the sessions with the users

The course criteria mandated active engagement from the user throughout the entirety of the project's lifecycle. For this reason, much time was spent by the team planning the sessions with the users. Despite presenting challenges, this aspect proved to be fundamental in deriving crucial insights for identifying design opportunities and generating a valuable outcome.

- **Iterative pilot test:**
  Throughout the pilot test and the session with the young user, the team learned that each organisation and its activities have different conditions to test (the setup, the background of users, etc). Every time the designers may notice unexpected things from the setup and the user behaviours. Conducting pilot tests iteratively across diverse types of users and organisations will allow the designers to identify issues in planning and guarantee efficiency in the long run.

- **More time to cook, but keep it strict:**
  The target users tend to spend 10+ minutes longer than the general cooking time. In the plan, make sure you calculate those times. Simultaneously, keep the time plan strict. When considering testing with individuals with a visual impairment, it is important to factor in adequate time for task completion due to potential delays in the schedule.

- **Improvisation**:
  During the session in Grave, we had to adjust the planning according to the available space and the users' needs. The team facilitators need to be flexible and prepared to adapt and change the activities set-up if needed.

- **Communication with the users (language):**
  Throughout the project, communication with stakeholders was bound by language barriers. Language constraints can be a source of struggles through the session and the collection of insights. It is wise to keep in mind that in order to make the most of the user session and really get to know their needs and thoughts it is advised to speak the user's language. Check whether the project focuses on a localised product or an international product. International users may have different lifestyles than the local culture.

- **Co-design with users & the experts:**
  Involving the experts during the co-design can provide valuable insight into the project. The experts can support the team to formulate a basic understanding of the users, explain the behavioural patterns of the users during the session and validate their insights at the end of the session. By including the users or their caretakers in designing the co-design session, many unknown issues can be resolved before executing the session.

- **Research: Sound**

Research on sound is essential considering the conditions and the needs of the target users. As a design team, make sure there is a designer specialised in sound prototyping. Pay attention to the lab setup to test the sound.

5.1.2 Recommendation for the Product and the Application

In relation to the redesign of the Philips Airfryer 5000 XXL, the team has put forth several guidelines and suggestions in the aforementioned chapters. There are some recommendations that we consider crucial to bear in mind when designing for inclusivity on a broader scale.

Philips Airfryer 5000 series XXL:

- **Enhancing user experience**
  Designing for inclusivity does not solely involve catering to the more vulnerable user groups; it also contributes to improving the overall experience for all other users of the product.

- **User-centric Design**
  The design does not have to be excessively protective when it comes to the target group. It is acceptable for users to make mistakes. Instead, the design should offer an accessible and intuitive approach for users to address the challenges they encounter.

- **Sensory inclusive design**
  Feedback and feedforward are crucial aspects to consider when designing for inclusivity. They should not only be appropriate and aligned with the intended message for the user but also engage multiple levels of perception at the same moment. (for example by combining haptic feedback and sounds.)
  Furthermore, they should not only be audible and haptic but also allows for adjustability in volume, frequency, et cetera.

- **Sound effect**
  Have more obvious, intuitive sound effects; for example changing sound notes, volume, etc. Both the digital sound and physical sound from the device matter.

- **Gamification**
  To enable youngsters without experience, with a passion for cooking, to cook with the air fryer in a safe way, an aspect of fun/challenge should be added.

Philips NutriU application:

- **Cooking preferences**
  The app could support the use of the Philips Airfryer 5000 XXL by saving the user cooking preferences (such as time and temperature)

- **Extra feedback**
  The app could be used as an extra source of feedback. The airfryer could send a notification on the user's phone when the food is ready (acting as a timer).

- **Add-on**
  This implies that making the basic functions of the device work properly should be the priority. We should not expect to fix a poor design with a good app, the app should only act as an add-on and never as a replacement.

- **Gestural interaction**
  Keep the gestural interaction as simple as possible (tapping once!).

5.2. Reflection

During this project, we worked with two main stakeholders Visio and Versuni, and a specific target group, young people (15-20 years old). The collaboration with the stakeholders and the sessions with the users were crucial in order to answer our initial research questions and to confirm or refute our initial assumptions.

1. ***How do the design of the chosen product, Philips Airfryer 5000 XXL, and other competitors differ?***

Philips is embracing touchscreen-based interaction, which is easily understandable considering its relative affordability compared to analog products. Moreover, the use of plain surfaces facilitates cleaning and contributes to a sleek design. Market research, including benchmarking (Table 1) and observation, reveals a growing trend toward touchscreen options for airfryers, while acknowledging the potential challenges regarding inclusivity due to the lack of spatial reference. Although it is inevitable to halt the transition from analog to digital, Philips should aim to enhance the user experience and remain competitive by incorporating additional supports that ensure optimal inclusivity.

2. ***How do people with visual impairments cook in general?***

During the many meetings and sessions with the users, we got to know that visually impaired people do like to cook for themself and they can walk around the kitchen and make use of the tools with confidence. They often do not use devices specifically designed for them but they select products designed more inclusively.

For blind people the sense of touch is essential to discover the world they have around them. For this reason, one of the biggest fears for young users is getting burnt while cooking. The airfryer can break down this dread giving them the opportunity to experience cooking on their own.

3. ***How do people from 15 to 20 years with visual impairments experience the airfryer? Do they already know how to use an airfryer? What are their suggestions and wishes? What hinders them from using the airfryer or promotes them to use the product in the long run?***

If we reflect in specific on our target group we could conclude that they have variable attitudes towards this topic. They often tend to stay in their comfort zone with their parents, caregivers, or family members cooking for them but for different reasons such as moving out to study at some point, they start to grow the need for independence. This can be a big motivation for them to start stepping out of their comfort zone and learning some skills.

4. ***How do the stakeholders you worked with want to be involved in the design process?***

We encountered eager stakeholders who were enthusiastic about being involved in the process. The youthful users displayed curiosity and a willingness to collaborate, readily sharing their thoughts and experiences. Meanwhile, Versuni and Visio demonstrated a keen interest in delving deeper into our process and gaining insights from the various activities conducted by our team.

The involvement of the stakeholders has been possible but only partially due to time constraints. We managed to have some co-research sessions with the young PBLV and experts. Besides, we noticed that there would be more constructive communication if the team invites the stakeholders in the co-creation phases.

5. ***How did you personally experience the stakeholders' involvement?***

Reflecting on the session in Grave, the team could collect many insights, but it was very challenging to stick to the schedule. Overall, involving stakeholders in the project can be time-consuming, particularly when it comes to communication and organising various activities. On the flip side, comprehending the needs, desires, and experiences of both users and stakeholders can significantly enhance the quality of the final outcome.

6. ***Inclusivity analysis: how could the final design concept be useful to others beyond the stakeholder group?***

The recommendations outlined in sections 5.1.1 and 5.1.2 not only enhance the overall experience of PBLV using the Philips Airfryer 5000 XXL, but they also have the potential to improve the product itself and the usability of the app “Philips NutriU” for non-PBLV users. By implementing these recommendations, the team aims to enrich the experience of all users, regardless of their familiarity with PBLV. These improvements would result in a more robust and user-friendly product, benefiting both PBLV users and those who are new to the app.

6. References and appendices

6.1. References

Buzzi, M. C., Buzzi, M., Leporini, B., & Trujillo, A. (2017). *Analyzing visually impaired people's touch gestures on smartphones.* Multimedia Tools and Applications, 76, 5141-5169.

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Krajnc, E., Knoll, M., Feiner, J., & Traar, M. (2011). *A touch sensitive user interface approach on smartphones for visually impaired and blind persons*. In Information Quality in e-Health: 7th Conference of the Workgroup Human-Computer Interaction and Usability Engineering of the Austrian Computer Society, USAB 2011, Graz, Austria, November 25-26, 2011. Proceedings 7 (pp. 585-594). Springer Berlin Heidelberg.

Kutintara, B., Somboon, P., Buasri, V., Srettananurak, M., Jedeeyod, P., Pornpratoom, K., & Iam-cham, V. (2013). *Design and evaluation of a kitchen for persons with visual impairments*. Disability and Rehabilitation: Assistive Technology, 8(2), 136-139.

Li, F. M., Dorst, J., Cederberg, P., & Carrington, P. (2021, October). *Non-visual cooking: exploring practices and challenges of meal preparation by people with visual impairments*. In Proceedings of the 23rd International ACM SIGACCESS Conference on Computers and Accessibility (pp. 1-11).

Oliveira, J., Guerreiro, T., Nicolau, H., Jorge, J., & Gonçalves, D. (2011, October). *Blind people and mobile touch-based text-entry: acknowledging the need for different flavors.* In The proceedings of the 13th international ACM SIGACCESS conference on Computers and accessibility (pp. 179-186).

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6.2. Appendices

Appendix A. Literature Review

The following show the core takeaways from each literature.

Krajnc, E., Knoll, M., Feiner, J., & Traar, M. (2011). **A touch sensitive user interface approach on smartphones for visually impaired and blind persons.** In *Information Quality in e-Health: 7th Conference of the Workgroup Human-Computer Interaction and Usability Engineering of the Austrian Computer Society, USAB 2011, Graz, Austria, November 25-26, 2011. Proceedings 7* (pp. 585-594). Springer Berlin Heidelberg.

- With advanced frameworks, it should be possible to modify applications in a way to support the usage of touch screens for the visually impaired.
- Blind people have to guess from the current context what a button is for.
- For people with impaired vision modern smartphones provide different accessibility technologies such as screen readers and physical feedback. The biggest problem is still providing enough orientation and context on the screen.
- The speed of the voice output was sometimes too fast, but the speech rate could be changed.
- 5. Future and Outlook: the force feedback (vibration) and audible output (fait or loud sound in low or high frequency) will be used as feedback to users. With different shake gestures, users can provide input (acknowledge or reject the current selection).

Li, F. M., Dorst, J., Cederberg, P., & Carrington, P. (2021, October). **Non-visual cooking: exploring practices and challenges of meal preparation by people with visual impairments.** In *Proceedings of the 23rd International ACM SIGACCESS Conference on Computers and Accessibility* (pp. 1-11).

- We present a content analysis of 122 YouTube videos to highlight the cooking practices of visually impaired people, and we describe detailed practices for 12 different cooking activities (e.g., cutting and chopping, measuring, and testing food for doneness). Overall, our findings provide guidance for future research exploring various assistive technologies to help people cook without relying on vision.
- Jones et al. [26] revealed that people with visual impairments tend to have poor nutritional status.
- For example, people with visual impairments could use voice commands to set timers or use a speaking kitchen thermometer to check the temperature of a steak.

<VIDEO ANALYSIS>

General Safe Cooking Practices

- start everything with gentle actions (cooking on low to medium heat to avoid injury, putting all food and ingredients in a cold pan first before putting the pan on the burner)
- use hearing and hand-feeling to compensate for vision needs during cooking.

● we found that it is important for people with visual impairments to memorize the environment in the kitchen

Cutting and Chopping
● using alternate ways to avoid knives (such as using a garlic masher)
● sort cut and uncut food into different specific locations on the cutting surface
● different practices of using the knife to cut objects

Measuring
● use hands to weigh meat and measure spices
● rely on using measuring cups with hand assistance to measure liquids
● prefer using existing containers or utensils to measure food

Placing Pans on a Burner
● prefer using traditional electric stove top to modern glass top or gas top.
● use listening or feeling to know whether the pan is on the burner

Baking
● use their hands to feel batter texture, check the batter readiness, and shape dough

<INTERVIEW STUDY>

Utilizing Tools
● In the interview, we found that 8 participants struggled with having too many tools for different purposes than are necessary.
● 5 participants mentioned that existing tools lack confirmation and feedback

Information Access
● 3 participants mentioned the lack of details for guide manuals and instructions of kitchen appliances.
● our participants complained that recipe content does not correspond to how people with visual impairments cook. This includes cookbooks that have too many pictures. wording or cooking language, Many figures, etc.

Organizing and Tracking
● We also realized people with visual impairments have a hard time tracking the status of tasks in progress.

Oliveira, J., Guerreiro, T., Nicolau, H., Jorge, J., & Gonçalves, D. (2011, October). **Blind people and mobile touch-based text-entry: acknowledging the need for different flavors.** In *The proceedings of the 13th international ACM SIGACCESS conference on Computers and accessibility* (pp. 179-186).

● Good spatial ability is still required to have notion of the device and its interface, as well as the need to memorize the buttons" position on the screen. Herein, we present a study with 13 blind people consisting of a touch screen text-entry task with four different method- QWERTY, MultiTap, NavTouch, and BrailleType.

● Results showed that text-entry interfaces with a large number of onscreen elements, like QWERTY and MultiTap, are more demanding to what concerns spatial ability. Users with low spatial skills are likely to perform poorly or even be unable to use those methods.

● NavTouch and MultiTap, are more demanding to what concerns to memory and attention, as the user has to keep track of the evolution within a selection.

- Users with low pressure sensitivity have problems with repeated multi-touch interactions (e.g.,multi split-tapping).

Buzzi, M. C., Buzzi, M., Leporini, B., & Trujillo, A. (2017). **Analyzing visually impaired people's touch gestures on smartphones.** *Multimedia Tools and Applications*, *76*, 5141-5169.

- We then examined their touch-based gesture preferences in terms of number of strokes, multi-touch, and shape angle, as well as their execution in geometric, kinematic and relative terms.

- They are more likely than low-vision people to go outside the bounds of the display in the absence of its physical delimitation of, especially with multi-touch gestures.

- In the case of more complex gestures, rounded shapes are greatly preferred to angular ones, especially by blind people, who have difficulty performing straight gestures with steep or right angles.

Gesture suggestions

- Avoid multi-touch gestures

- Prefer single-stroke gestures

- Favor short gestures

- Assign cardinal directions to gestures when possible

- Prefer rounded angles for more complex gestures

Overall, visually impaired people generally prefer simple gestures: one finger, one stroke, preferably in one direction or with round angles otherwise. More research needs to be done involving younger visually impaired people, especially because they are more likely to already use touchscreen mobile devices.

Kutintara, B., Somboon, P., Buasri, V., Srettananurak, M., Jedeeyod, P., Pornpratoom, K., & Iam-cham, V. (2013). **Design and evaluation of a kitchen for persons with visual impairments.** *Disability and Rehabilitation: Assistive Technology*, *8*(2), 136-139.

- Before designing the kitchen, interviews and an observation were carried out to obtain information on the needs of blind and low vision persons. Consequently, a kitchen model was developed, and it was evaluated by 10 persons with visual impairments.

- Persons with visual impairments participate in every step of the design process to ensure that the kitchen fulfills their needs.

- They preferred sliding cabinet doors.

- They would like to have hanging cabinets which were not too high to reach.

- Shelves inside the hanging cabinets should have a border on the edges to prevent dropped items.

- A kitchen for persons with low vision should have special features including high contrasting colors between the top and the side of cabinets, a contrasting bright reflective colored strip on the edges of countertops and cabinet doors, cabinet pulls in a bright reflective color, and contrasting bright reflective colored stickers on appliance controls, and lighting switches.

- The kitchen for persons with visual impairments still has limitations in some features; for example, contrast colors are not clearly visible for participants with low vision.

EU Guideline - provided by the course

- When the product provides for communication, including interpersonal communication, operation, information, control and orientation, it shall do so via more than one sensory channel; this shall include providing alternatives to vision, auditory, speech and tactile elements;

- When the product uses colour to convey information, indicate an action, require a response or identify elements, it shall provide an alternative to colour;

- When the product uses audible signals to convey information, indicate an action, require a response or identify elements, it shall provide an alternative to audible signals;

- When the product uses visual elements it shall provide for flexible ways of improving vision clarity;

- When the product uses audio it shall provide for user control of volume and speed, and enhanced audio features including the reduction of interfering audio signals from surrounding products and audio clarity;

- When the product requires manual operation and control, it shall provide for sequential control and alternatives to fine motor control, avoiding the need for simultaneous controls for manipulation, and shall use tactile discernible parts;

- Making the information content: available in text formats that can be used to generate alternative assistive formats to be presented in different ways by the users and via more than one sensory channel;

- Electronic communications services, including emergency communications: providing real-time text in addition to voice communication; providing total conversation where video is provided in addition to voice communication;

Appendix B. Permission Form

Permission for Filming/Photographing Teenage Participants

Dear Sir/Madam,

We kindly request your permission to film or photograph your teenage child as part of our project on designing an airfryer for visually impaired individuals.

This project is conducted by a team of students from TU Delft's Faculty of Industrial Design Engineering as part of the course 'Inclusive Design.' The purpose of filming/photography is to observe how teenagers, including your child, cook with and without an airfryer, specifically focusing on the challenges faced by visually impaired individuals in the kitchen. Our goal is to develop an airfryer design that effectively caters to their needs.

Rest assured, all captured footage and images will be handled with utmost care and confidentiality. They will be solely used for academic purposes, such as analysis, presentation, and documentation for the design project. We will maintain strict confidentiality of your child's personal information and identity, ensuring anonymity through the use of pseudonyms or face blurring in any public presentation or publication.

Your permission is crucial for your child's participation in this project. If you grant permission, please complete the attached permission form and return it to us at your earliest convenience. Should you have any concerns or questions regarding the study or our research procedures, feel free to contact us using the provided contact information.

We sincerely appreciate your understanding and support for this research project. Together, we can make significant contributions towards the development of more inclusive and accessible products for visually impaired individuals. See the permission form for filming/photographing teenage participants on the following page.

Thank you for considering our request.

Sincerely,

Gabi Verstappen, Laura Franco, Nayoung Jung, and Wouter Bakkeren
Industrial Design Engineering at TU Delft

PERMISSION FORM

I, _____ (Parent/Guardian's Name), hereby grant permission for the filming or photographing of my teenage child, _____ (Teenage Child's Name), for the purpose of the project on designing an airfryer for visually impaired individuals, conducted by the team of students at the Faculty of Industrial Design Engineering at TU Delft.

I understand that the purpose of this filming/photography is to observe how teenagers cook with and without an airfryer, with a particular focus on understanding the challenges faced by visually impaired individuals in the kitchen. I am aware that the footage and images captured during the study will be used for academic purposes, including analysis, presentation, and documentation for the design project.

I acknowledge and agree that the material obtained will be treated with the utmost care and confidentiality. I understand that my child's personal information and identity will remain strictly confidential, and any public presentation or publication will ensure anonymity through the use of pseudonyms or blurred faces.

I understand that my permission is essential for my child's involvement in this project.

Parent/Guardian's Name: _____

Parent/Guardian's Signature: _____ Date: _____

Teenage Child's Name: _____

Contact Information

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