Coeliac disease as social disease:

design for safety during social events

Graduation Thesis

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MSc Design for Interaction

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Executive Summary

The coeliac disease is an autoimmune disease caused by the ingestion of gluten affecting people with a genetic disposition. Gluten is a protein that can be found in wheat, rye and barley but it can also be used as protein filler in ice creams and soup. The only treatment for patients is to follow a strict gluten-free diet. Due to the restrictive nature of the diet, coeliac people have to develop new habits and routines to overcome uncomfortable situations at home and social situations. Different studies demonstrated that coeliac people are affected emotionally by social events. Coeliac people have to avoid food contained food, be aware of the gluten cross-contamination and find proper gluten-free options. This might lead to the development of anxiety and stress.

This is a master report that gathers the research and the design activities to investigate how to create a safe environment for coeliac people during social events.
The project was developed through converging and diverging design approaches involving a remote user research, literature review and iterative cycles of ideations, development and testing. The project focused mainly on two areas: the perception of the gluten-free diet and the coping strategies or problem-solving skills used during social events. The research approach includes a context research as base knowledge about the coeliac disease, the challenges of the gluten-free diet, and coping strategies. The user research involved coeliac people to lead the development of a solution that would embrace their needs and values. At the end of the user research a Framework was developed to describe the context of the social events for coeliac people. The design goal of the project was identified as the project aims to enhance the feeling of security for coeliac people by increasing empathy and decreasing negative emotions. Different concepts were developed according to iterative conceptualization and evaluation tests of low fidelity prototypes with participants. The insights gathered helped to generate a final concept. The final concept is an event planner app that gives information about how to create a safe environment for coeliac people and more. The final user tests have been conducted in part in person and part remotely with participants who evaluated the possibility to create a safe environment and create empathy. The results demonstrated that by using the final concept it is possible to generate a safe environment and generate empathy. Participants had the possibility to immerse in the challenges that coeliac people face daily. Coeliac people indeed felt to be secure cause people would have the correct information about the preparation of the environment and the gluten-free food.

Acknowledgement

Table of Content

chapter 1

Introduction

This chapter describes the project brief, goals and approach, providing a structured overview of the project process.

1.1 Background knowledge

The coeliac disease is a chronic disease that affects 1% of the worldwide population. The only treatment for patients is a lifelong gluten-free diet (GFD). Following the GFD is challenging due to gluten containing food, such as wheat, barley and rye that are used in the wide food production. It is possible to find gluten in pasta, snacks, soups and processed meat. Therefore, avoiding a wide range of food that contains gluten needs changes in the eating habits and lifestyle. Dietary restrictions can be challenging to follow, especially, they might influence the social life of a person. Social situations such as traveling, dining out and family relationships have found to be problematic.

1.2 Assignment

By conducting qualitative and quantitative research, this project will investigate how celiac people can feel safe during social events. Understanding which social coping strategies and problem-solving skills that are used by the target group will allow me to explore the design space around the social restrictions of the gluten-free diet. The project aims to develop a product or service that allows to create a safe place for people affected by coeliac disease.

1.2 Project layout

The project was divided into four different phases and in each of them diverging and converging approaches.

The first one is the "Exploring emotions" that involves a literature review, identifying the existing problem and existing solutions, target group survey and observations where key insights were collected. The main focus of this phase is to investigate the emotions and the perception of the target group towards the gluten-free diet. This phase aims to be a quantitative research that will create the basis for the next phases.

The second phase is the "Exploring social events" that involves context mapping through creative sessions and interviews to understand needs, values, expectations and behavior. The aim of this phase is to examine what coping strategies or the
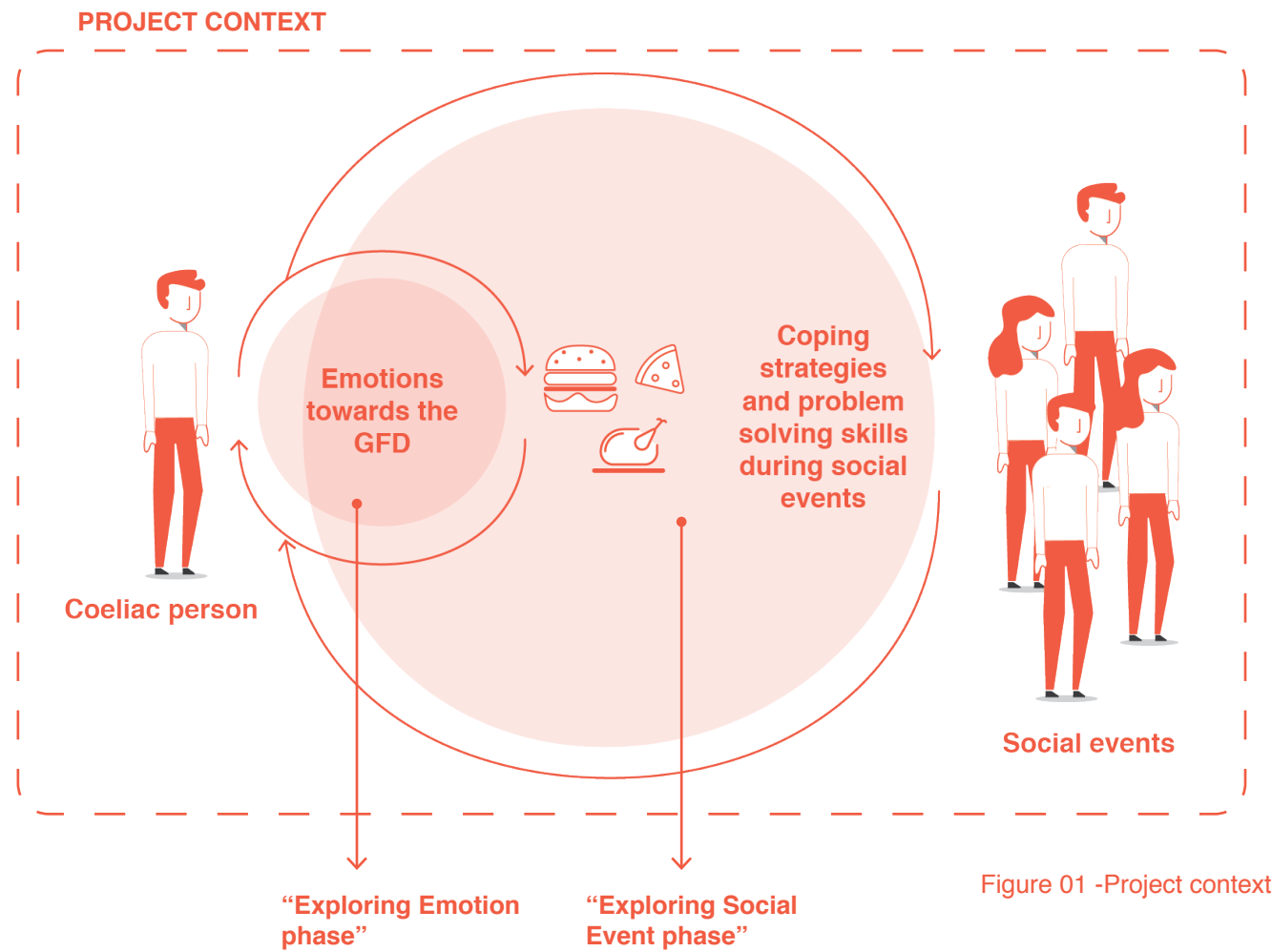
Figure 01 -Project context

chapter 2

Context Research

This chapter explores the context of the project: the coelic disease, the gluten-diet, the cross-contamination and the social aspect of the disease.

problem-solving skills are involved during social events. To have a complete view of the context and how to reach the goal of this project, small activities will be conducted such.

In the third phase is the ideation and conceptualization phase where the initial solutions will generate throughout brainstorming and storyboards.

The last phase is the development that involves prototyping phase and testing solutions generated during the ideation phase. Once analyzed and evaluated the results from the testing, the development of the final design will start. Moreover, the evaluation of the final design is planned.

2.1 What is the coeliac disease?

The coeliac disease (or celiac disease) is an chronic, multiorgan autoimmune disease caused by the ingestion of gluten affecting people with genetic disposal (Al-Toma, et al., 2019). Eating gluten causes an inflammatory reaction in the small intestine causing malabsorption of nutrients and reducing the absorbing surface (villi). The disease can be developed at any age. Most of the symptoms appear during early childhood, however, the diagnosis process is not straightforward and it could take several years until adulthood. (Caio, et al., 2019; Pietzak, et al. 2012). More than 70% of new patients are diagnosed above the age of 20 years old (Al-Toma, 2019). Because the disease is a multisystem disorder, it may present with varied clinical manifestation. Patients can present symptoms that could be both intestinal manifestations such as diarrhoea, bloating and abdominal pain, common in pediatric and adult age, or external manifestations related to chronic inflammation and nutrient deficits, for example, anaemia and osteoporosis. (Leonard, et al., 2017). Although

the coeliac disease is often misdiagnosed or undiagnosed, it is a common disease worldwide. It affects from 0.6 to 1% of the world's population but the prevalence varies among the countries, for example in Germany it is 0.3% and in Finland, it is 2.4%. (Fasano and Catassi, 2012).

Left untreated, the coeliac disease can cause the development of other several health conditions including potentially life-threatening conditions such as small bowel and intestines cancers, osteoporosis and infertility. (Green & Jabri, 2003, Rubio-Tapia & Murray, 2010)

2.2 The gluten-free diet & cross-contamination

The trigger of the coeliac disease is gluten which is a protein found in wheat, rye, spelt and barley. The only treatment is a long-life gluten-free diet (GFD) that consists of the total elimination of the gluten from all the food and medication. The diet leads to a regrowth of the intestinal villi and resolution of the symptoms. Usually, it takes from 6 months up to 5 years for the intestine heals from the gut damage caused by eating gluten. However, following a strict diet is not easy, gluten is possible to find in several food preparations and under different names. Due to its properties, gluten is used, for example, as protein filler in sausages, soups, soy sauce and ice cream (Catassi, & Fasano, 2008). It is possible to find inside non-food sources such as airborne flour workplaces and dietary supplements. Gluten can be hidden in starches used as excipients in pharmaceutical products (See et al., 2015).

According to the Codex Alimentarius (2008), gluten-free food is when the gluten level is below 20 ppm (mg/kg). However, different studies investigated on the tolerable threshold of gluten for people with CD and found that there is a variation among coeliacs. Even though there is no evidence that suggests a definitive threshold, they found that it is possible to have a daily gluten intake of 10 mg without any deleterious effects (Catassi et al., 2007; Akobenget al., 2008).

Although there are several guidelines for gluten-free food, different products may contain traces of gluten due to contamination. The phenomenon of contamination happens when gluten-free food or product is exposed to food or ingredients that contain gluten. It is possible to define two kinds of contaminations: cross-contamination and environmental contamination. The cross-contamination occurs

Safe food	Food to avoid	Food to avoid unless labeled gluten free
Amaranth Arrowroot Buckwheat Corn Cornmeal Gluten-free flours (corn, rice, soy, potato, and bean) Hominy grits Pure corn tortilla Quinoa Rice Tapioca	Barley Bulgur Durham Farina Graham flour Kamut Rye Semolina Spelt (a form of wheat) Triticale Wheat	Beers Candies Cakes/pies Cereals Cookies Crackers Croutons Gravies Imitation meats or seafood Matzo meal Oats Pasta Processed lunch meats Salad dressings Sauces (includes soy sauce)

table 01. gluten free product

during the product line from the collection of raw materials to the delivery to the consumer. Instead, environmental contamination or accidental contamination occurs during the preparation and the storage of gluten-free food (at home or restaurants) without putting attention to having different separate kitchen tools or potential gluten products. (Bascunan et al., 2017). The topic of contaminations is a serious concern for celiacs. Maintaining gluten in the diet for coeliac people can cause the development of other health conditions such as lymphomas, carcinomas and infertility.

Three studies investigated contaminations in gluten-free (GF) food preparation. Studerus, et al. (2018) examined gluten contamination through shared kitchenware on ten different scenarios. They found that gluten contamination may occur with domestic tools but may not pose a risk for people with CD. Nevertheless, cross-contamination can be avoided by cleaning kitchenware, hand and surfaces regularly. Vicentini et al. (2016) investigated the requirements that are needed to prepare safely a GF pizza and a gluten-contained (GC) pizza. They found that it is possible to cook in the same oven GF pizza and GC pizza if specific requirements are complied, such as cooking the two pizzas alternately. In addition, Miller et al.(2016) studied the condition to produce GF food in a commercial kitchen when wheat flour is used at the same time. They found that it required 2m distance from wheat flour to complete standard hygiene procedures, such as cleaning utensils and surfaces.
Nonetheless, to limit the risk of gluten contamination at home, experts suggest having a separate toaster, thoroughly clean kitchen counters, use clean or separate tools for serving and cooking and avoid "double-dipping" in common condiment jars (Leonard, et al., 2017).

2.3 Coeliac disease as a social disease

Coeliac disease can be managed by avoiding food that contains gluten. In the last few years, the availability of gluten-free products increased dramatically due to the development of two other health conditions related to gluten consumption: the wheat allergy and the non-coeliac gluten sensitivity. Moreover, to assure that people who have gluten disorders are adequately informed about the preparation, production and process of food, the European Union Regulation 609/2013 established guidelines for labelling gluten-free products.

However, following the gluten-free diet is not that easy as we think. Conducting a strict gluten-free diet results in challenges and requires efforts and motivation (Leinonen et al. 2019, Wolf et al. 2018). Once the diagnosis is made, coeliac people need to be educated to a new diet. They need to reorganize their daily schedule and social life, understand what foods they can eat and how to avoid cross-contamination. The creation of new routines and coping strategies, such as looking at labels of food, can affect the patient's adherence towards the diet causing stress and backlashes. (Leinonen et al. 2019).

Approximately one out of four patients deal with either dietary compliance or social problems when they have to participate in social events or while travelling (Lee & Newman, 2003). Avoiding foods with gluten becomes a cause of stress and/or anxiety (Wolf, 2018) when, for example, a patient decides to dine out but it is not possible to find proper gluten-free options. Furthermore, dining with other people might involve the risk of gluten cross-contamination which potentially further complicates social interactions and can interfere with the dining habits of others and families. For example, some families decide to avoid social events such as gatherings and going to eat out in restaurants to reduce the risk of gluten intake (Bacigalupe & Plocha,2015). Studies in both adolescents and adults (King et al.,2019; Arnone, J. 2012) demonstrated that, as a consequence, patients are affected emotionally by social situations. According to these studies, it is common for patients to experience fear, shame, isolation, feelings of being neglected/forgotten and unwanted visibility.

2.4 Coping strategies

Few studies assessed the coping strategies related to the management of the gluten-free diet. Zarkadas et al. (2013) quantified the strategies used by people with CD and the emotional impact of following a GF diet. This study identified 25 different adaptive strategies (Figure 02). Reading labels, enquiring about the gluten-content of all food and having snacks were the most common strategies used by participants.
Bacigalupe and Plocha (2015) conducted a qualitative study families with coeliac members have to face identified two main coping strategies: planning ahead and bringing their own food to social events. These strategies were used mainly by mothers. They would do research on the food available in different situations and

provide their children with gluten-free food at school, birthday parties, sleepovers and parties.

A study on the perception of the health-related quality of life of women and men with CD found as major coping strategies acceptance and control. (Hallert C., et. al., 2003) For women, following a strict GFD meant to control every meal cooked by someone else, actively seeking for information. The control strategies were found as a result of feeling forced to plan everyday activity. Instead, in men, the level of acceptance was found higher than in women. Participants talked about the disease as part of their life without focusing on it.

Other studies assessed the coping strategies related to the adherence to the GFD in adults and adolescence based on the Lazarus and Folkman theory of stress and coping (Smith, M., et al. 2011, and Wagner, G., et al. 2016).

The theory of stress and coping define stress as the imbalance between the demands of the environment and the coping resources. The process that determines if a person-environment event is stressful, is the cognitive appraisal. The process is composed mainly of two evaluation moments: primary appraisal and secondary appraisal. The primary appraisal is focused on the evaluation of the event if it is irrelevant, benign-positive or stressful. Instead the secondary appraisal is the assessment of the resources available to cope or help to combat the stressor. (Folkman S., et al., 1986) Coping is considered as a dynamic process and it depends on a specific context. Lazarus and Folkman (1984) defined coping as *"constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person"* (p. 141).

Coping has two functions: *regulating stressful emotions (emotion-focused coping) and altering the troubled person-environment relation causing the distress* (Folkman S., et al., 1986, p. 993). Through primary and secondary cognitive appraisal, people affected by CD determine whether their health is threatened by not adhering to a GF diet.

Smith M., at al. (2011) considered stressors difficulties in dietary compliance, lack of disease and dietary education, and lack of support for people diagnosed. The study identified as problem-solving-focused strategies active coping, planning and

acceptance. Whereas, positive reframing, humor, disengagement, self-blame, venting, denial, and substance use were found as emotion-focused coping. The study provided evidence that emotion-focused strategies affect the quality of life negatively.

Wagner et al. (2016) considered ten coping strategies divided in three different groups. Cognitive restructuring, problem-solving, emotional regulation, and social support were identified as active coping strategies, while distraction, social withdrawal, wishful thinking, and resignation were found as avoidant coping strategies. Self-blame and blaming others were considered as negative coping strategies. It was found that adolescents who adhere to the GFD use less emotional regulation and distraction than non-adherent patients.

Strategies used often/very often	Overall (%)	Strategies that increased or decreased significantly over time on a GF diet
Purchasing gluten-free foods		
Read every ingredient list*	96.1	
Use the CCA pocket dictionary	55.3[†]	↓
Ask local grocery store to carry certain GF products	24.6	↑
Purchase GF food by mail order	13.7	
Gluten-free food preparation		
Label all GF flours*	83.8[†]	↑
Store GF ingredients in a separate area *	74.9	↓
Cook only GF foods for the whole family	48.8	
Make and freeze extra GF foods	47.6	
Eating with family/friends		
Check ingredient lists on the foods I eat*	55.1[†]	
Bring my own food when visiting	46.5[†]	
Share my best GF recipes	46.3[†]	↑
It is easier to take charge of meals	38.8[†]	↓
Invite friends/family to eat at my home	34.3[†]	↓
Eating in restaurants		
Enquire about gluten content of all foods*	74.5	
Call ahead to enquire about GF menu choices	33.7[†]	↓
Ask for printed information about gluten content	32.9[†]	↓
Use the internet to find restaurants that serve GF foods	24.3[†]	↓
Eating at school/work		
Have snacks on hand*	78.1[†]	
Talk to others about coeliac disease and the GF diet*	68.2[†]	↑
Offer to bring a GF dish to events involving food*	61.8[†]	
If an event involves food, remind people about my GF diet*	58.0	
Travelling		
Take translated information about the GF diet when abroad	43.7[†]	
Research restaurants on the internet before I leave home	27.5[†]	↓
Contact local Coeliac Society about sources of GF foods	15.7[†]	
Carry a doctor's letter indicating that I require a GF diet	15.3[†]	

*Indicates the strategy is used often/very often by ≥50% of respondents after 5 years on the diet.
[†]Indicates that the strategy is used significantly more often by women.
CCA, Canadian Celiac Association.

Figure 02 - Strategies found by Zarkadas, M., Dubois, S., MacIsaac, K., Cantin, I., Rashid, M., Roberts, K. C., ... & Pulido, O. M. (2013). Living with coeliac disease and a gluten-free diet: a C anadian perspective. Journal of Human Nutrition and Dietetics, 26(1), 10-23.

2.5. Social support

The dietary restriction of the gluten-free diet might be hard to accept. Due to this, different studies highlighted the importance of social support from physicians and dietitians after the diagnosis of the coeliac disease. (Leffler et. al., 2008, Ciacci, et al. 2002, Ukkola et al. 2012) Planning a follow-up strategy with a physician can be beneficial for the patients affected by coeliac disease.The aim of follow-ups meetings is to monitor the adherence and histological recovery of the intestine (Caio et al. 2019). Additionally, physicians can consult, motivate and support patients during changes of their lifestyle. Studies demonstrated that a good physician-patient interaction is a factor that can influence in part a good adherence to the GFD(See et al,. 2015, Ukkola et al. 2012).

Another element that can facilitate the experience of CD is the Coeliac Societies. The Coeliac Societies wants to improve the quality of life of people affected by coeliac disease and their families. They provide information and support to people who need it. In Europe, it is needed to mention the AOECS (Association of European Coeliac Societies), an independent non-profit organization that is the umbrella organization of European national coeliac societies. The Association is actively involved in several international activities to raise awareness of the coeliac disease and promote research into the diagnosis and the management of the illness. (AOECS, n.d.)

For this study, the AIC (Italian Coeliac Society) is taken into consideration. The AIC aims to allow people with celiac disease to live their life in calm and aware. The main objectives of the AIC are the improvement of the living conditions of people affected by coeliac disease and support them in the acquisition of full and correct understanding of their condition (Associazione Italiana Celiachia, n.d.). The AIC is involved in different activities of research and programs to raise awareness on the territory. One of these programs is the "Alimentazione Fuori Casa". Different catering activities (for example: restaurants, hotels, bars and canteens) can adhere to this program. Adhering to the program means participating in educational courses on the coeliac disease and the GFD, following guidelines for the preparation of gluten-free dishes avoiding the cross-contamination, and using only gluten-free ingredients. This program allows to create a network of businesses informed about the coeliac disease that can offer a service sustainable for the dietary needs of coeliac people

(Associazione Italiana Celiachia, n.d.).

2.6. Conclusion

This chapter wants to give a general overview of what the coeliac disease is, the challenges that people affected by CD might face. The main finds are possible to summarize in:

- Coeliac people have constantly evaluate social situations in order to avoid the gluten intake;

- Coeliac people experience fear, shame,isolation, feelings of being neglected, forgotten and unwanted visibility during social events. (King, J. A. et al.,2019; Arnone, J., et al. 2012)

- Few studies researched about the coping strategies used by coeliac people.

Following the findings from the Context Research about gluten cross-contamination, the quality of life, and the challenges that coeliac people might face, it was time to understand the current user context. The user research was conducted in order to investigate in-depth different aspects about the experience of the gluten-free diet, how this might influence the perception of the social life of coeliac people and what coping strategies or problem-solving skills are used by coeliacs. The methods used in this study was an online survey and user interviews combining them with generative / context mapping techniques. As a result, a framework that aims to summarize the insights gathered in this study and the literature study was generated.

3.2. User survey

According to Barberis et al.(2019), once the coeliac disease is diagnosed individuals have to make changes influencing their social life and habits. These adjustments can provoke anxiety and depression symptoms and affect the individuals' emotional balance. I assumed that the more time the patients know that they are coeliacs, the more they know or develop efficient strategies to manage the gluten-free diet. This should lead to having a lower emotional impact on the lifestyle of the patients. Moreover, the perception of the gluten-free diet might influence the strategies and the problem-solving skills that are involved during social events.

Method:
Two online surveys were created with Google Forms one in Italian and one in English in order to compare different lifestyles in different countries. The aim of this survey was to have a better understanding regarding the emotional impact, the perception and the influence of the gluten-free diet on coeliac people in their everyday life. The survey was published on Facebook groups where coeliac people share their experiences, news and advice. (Appendix II)
Moreover, the survey was used to recruit participants for further activities.

Analysis
Due to the lack of answers from the English survey, and also, because participants

chapter 3

Exploring the target group

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This chapter includes the reasearch on the target group exploring the perception of the gluten-free diet and the generation of coping strategies during social events.

claimed themselves to be gluten-intolerant, it was only considered the results from the Italian survey. Therefore, it was not possible to compare the outcomes from the two different surveys. The survey can be considered both qualitative and qualitative because of the structure of both methods. The questionnaire contains several open-ended questions to have a better understanding of the effects and the experience of the gluten-diet. To not lose the richness of the responses, the answers related to the perception and the experience of the gluten-free diet were analyzed with the method statement cards and clustered together finding topics and themes by the researcher. In addition, the quotes to formulate the statement cards were left in Italian to not summarize them in English.
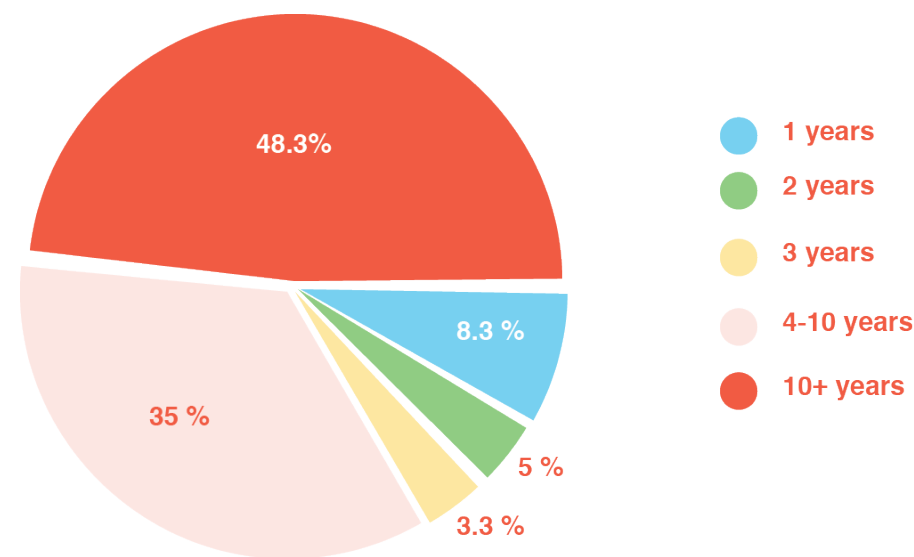
- 🔵 1 years
- 🟢 2 years
- 🟡 3 years
- 🌸 4-10 years
- 🔴 10+ years

Results

In total there were 60 participants from Italy (3.3% between 10-15 years old, 3.3% between 16-21 years old, 38.3% between 22-30 years old, 23.3 % between 31-40 years old, 16.7% between 41-50, 10% between 51-60 years old and 5% 60+ years old) and 48.3% recieve the diagnosis 10+ years ago. The 88% of the participants follow a strict gluten-free diet.

The follow-ups with GPs or specialists

The follow-ups with the GPs are for monitoring the level of antibody and the nutrients in the blood but not helping the daily management of the gluten-free diet. As described

in the Context Research, meetings with GP or specialists are considered important to receive social support and to learn coping strategies. However, only 40% of the participants have annual meetings with their GPs or specialists and a small number of participants stated that they are not interested in meeting with their GPs. On the other hand, participants explained that meetings organized by the Italian Coeliac Association (AIC) help to manage the gluten-free diet.

The worst moment of the day

One of the main challenges that participants faced in managing the gluten-free diet is finding gluten-free options when they dine out. Among the participants, the lack of presence of fresh gluten-free products or places that offer gluten-free options influence the experience of three meals during the day. 43% of the participants consider breakfasting the worst moment of the day. A participant stated:

- 🔵 Snacks
- 🟢 Dinner
- 🌸 Lunch
- 🔴 Breakfast
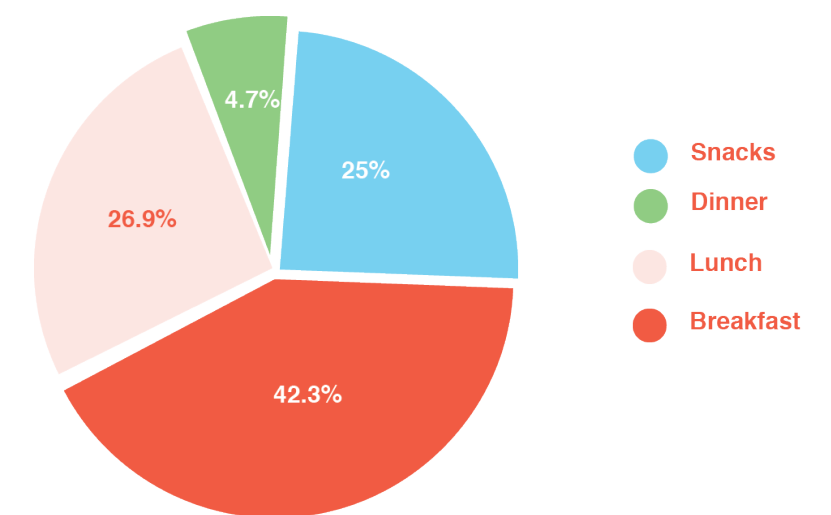
"Every moment has its negative side, I chose breakfast because I miss products with gluten and when I dine out I don't find anything that allows me to do a big beautiful breakfast, but I always try to be satisfied "

Insted, lunch is considered as the worst moment of the day by 26.9% of the participants. Participants highlighted the lack of presence of places that offer a

quick lunch, especially during the working hours. Another moment of the day that is considered difficult for coeliac people is the snack break. 25% of the participants complained about the absence of gluten free products that are joyful or fresh.

Home as the safest place

Home is considered the safest place to eat gluten-free because participants know that they can certainly avoid gluten cross-contamination. 69% of participants admitted that at home they can control all the preparation of the meals. However, participants mention that they "trust" restaurants that are certificated by the AIC. The association provides courses about how to cook and prepare a safe environment for coeliac people to the staff of restaurants. This allows restaurants to be recognized as certificated. Therefore, according to participants, certificated restaurants have more education on coeliac disease rather than other restaurants. Only a small number of participants feel safe from any gluten contamination in places that offer gluten-free options but they are not certificated by the AIC.

The perception of the gluten-free diet

Gluten-free is perceived by the participants both in a positive and negative way. They associated the gluten-free diet as part of their well-being and the cure for their health conditions before the diagnosis. They adapted to new routines and eating habits after discovering to be affected by the coeliac disease. They explained that the gluten-free diet is not "that drama".

"[My life]It hasn't changed, I immediately adapted to the gluten-free diet, without thinking about the diversity or the non-freedom of eating gluten."

However, 30% of the participants stated that their social life was penalized by it.
"I no longer have the freedom to go out without organizing myself for where / what I will eat, meals out, even going to friends have become a source of complications and problems. I have obviously changed my eating habits at home but that was the simplest part."

"[My life] It has changed mainly with regard to eating as a social and shared act and in organizing out-of-the-ordinary situations such as holidays, trips, temporary transfers (fewer outings, only if well organized previously, and

mainly with people sensitive to the issue."

Moreover, 50% of the participants described the diet with a negative connotation. The words sacrifice, restriction, being alert and loss were used.

The majority of the participants (86.7%) stated that the diet restrains their freedom. However, a small number of participants explained that they felt free because they can easily find what they need or they can easily adapt themselves to different situations. To have a better understanding of the factors that influence the perception of the gluten-free diet as a limitation, 9 different themes were formulated by using statement cards (Appendix II). The themes were clustered in 4 different topic. (Figure 03)

TOPIC	🍔 GF PRODUCTS	💃 SOCIAL ASPECTS	🔍 COPING STRATEGIES	💥 WORRIES
THEMES	Lack of availability of GF produtcs Unpalatable GF products	A restricted social life No-freedom of dining out	Planning ahead Researching	Risk of cross-contamination Untrustworthy people without CD Worries and stress
DESCRIPTION	Participants did not usually find GF options or places when they decided to dining out. Additionally, There was the perception that the quality of the GF products is poor.	Participants experienced that socializing activities are limited. They experienced that they cannot take freely decisions to dine out	Partcipants plan ahead all the activies and try to be always prepared for different situations. Therefore they research where to find GF options.	Participants were always vigilant about contamination provoking stress and concerns.Addiaionally, they do not trust people without CD and they are afraid to be misunderstood.

Figure 03 - Topic generated analyzing the survey

3.3. Generative Session

The generative session activities aimed to explore the coping strategies and problem-solving skills, identifying which kind of approaches are used in specific situations. During the session, participants were able to express their feelings, needs, desires regarding the gluten-free diet. Additionally, the diagnosis process and the emotions related to it were investigated to have a better understanding of the generation of the coping strategies.

Method:

Nine participants were recruited through the previous survey to participate in a one-on-one session with the researcher. The sessions took place online via zoom. To create a similar environment to the generative session, participants were asked to use Mural as their workplace. The Mural page was used as a sheet where participants could complete three different activities (Appendix II). The first activity consisted in an Emotion Scan where participants mapped their emotions before, during and after the diagnosis. The second one was an association of images and words regarding the gluten-free diet. During the last activity, participants were introduced to different scenarios and they were asked what they would do and felt.

Analysis:

For the analysis of the sessions, statement cards were used to find common themes and topics. Moreover, the wall method (Convivial Toolbox, 2012) was used to identify coping strategies and factors that influence the experience of coeliac people during social events.

Results:

By using the method of statement cards, It was possible to identify 13 different themes that are possible to summarize in four main topics: the coping strategies, the factors that might influence them, unhealthy behaviors and emotions. Most of the themes were overlapping with the results from the survey. (Appendix II)

The sessions highlighted the mixed feelings that participants have towards the gluten-free diet. The diet is the only tool that allows participants to "feel good" and

to not have any symptoms. However, participants were concerned about the opinion of other people or people around them. A participant said the *"[...]If I find someone that does not consider me as a bothering person and they are available to cook for me ... "*.

These worries and concerns increase when participants decide to dine out. The dining out experience is considered a joyful moment that allows participants to interact with other people feeling relaxed and "good". On the other hand, participants have to be aware and vigilant of what they want to eat, while they want to enjoy the experience of dining/ eating out. During the sessions, the desire of being free from the diet emerged. A participant stated: *"I would like to take something that allows me to be free to choose what I want to eat."*

However, social support helps to positively increase the perception of the diet. Participants supported by family or friends described the diet using the words community, relaxed, wellbeing.
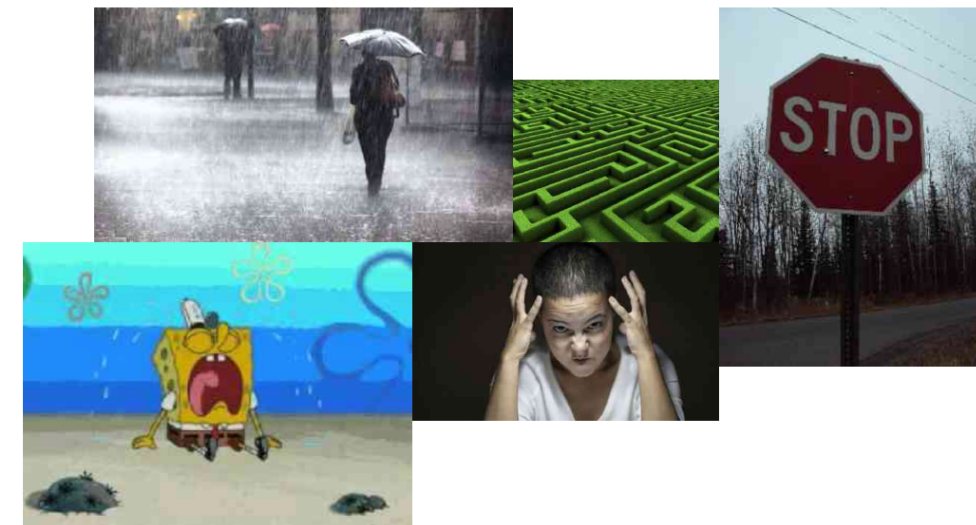

Figure 04.A - Images chosen by the particpants to describe the experince of dining out in a negative way.

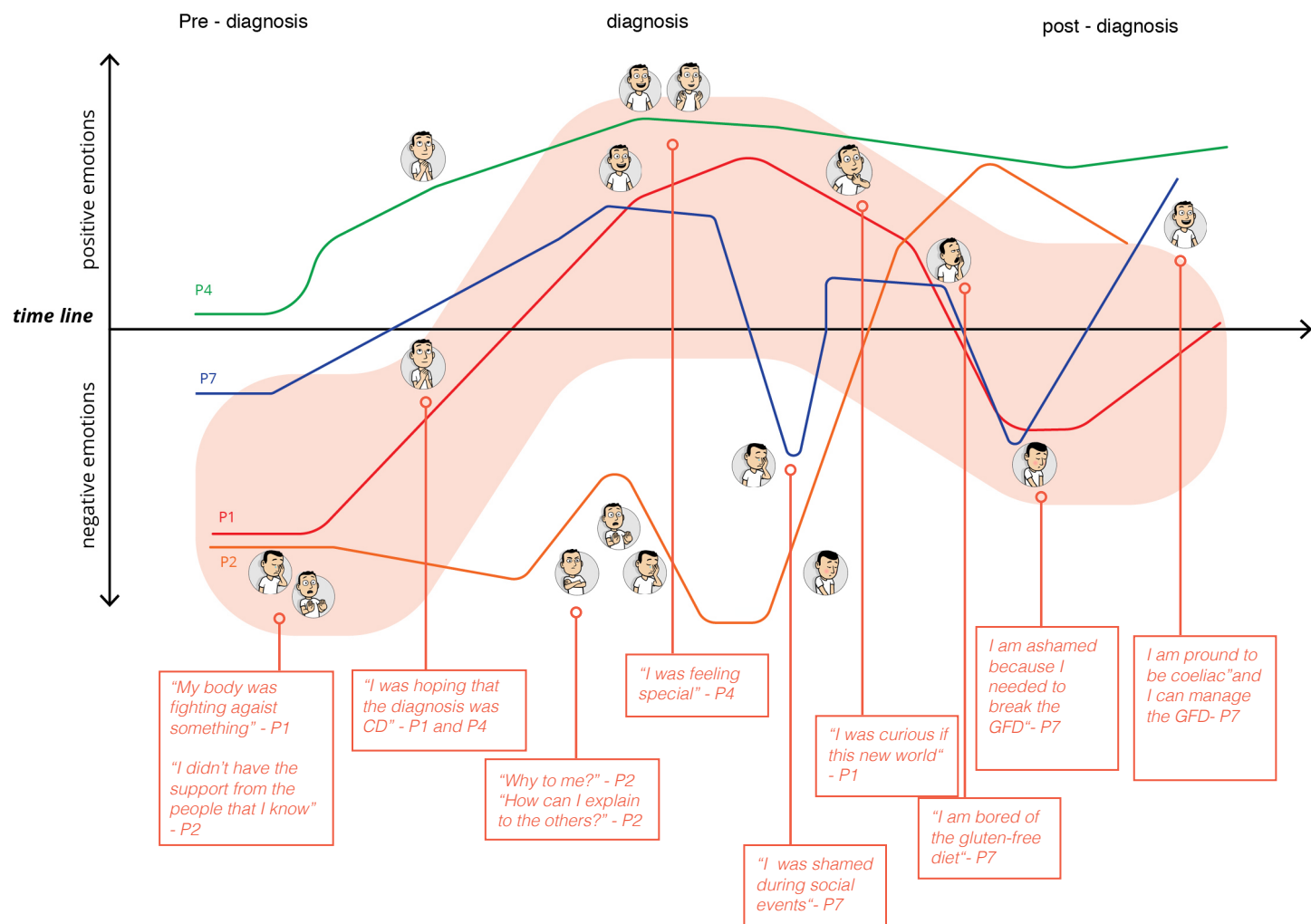Figure 04.B - Images chosen by the particpants to describe the experince of dining out in a positive way.

positive emotions

time line

negative emotions

P4

P7

P1

P2

"My body was fighting agaist something" - P1

"I didn't have the support from the people that I know" - P2

"I was hoping that the diagnosis was CD" - P1 and P4

"Why to me?" - P2
"How can I explain to the others?" - P2

"I was feeling special" - P4

"I was shamed during social events"- P7

"I was curious if this new world" - P1

"I am bored of the gluten-free diet"- P7

"I am ashamed because I needed to break the GFD"- P7

"I am pround to be coeliac"and I can manage the GFD- P7

The Emotion Scan (Figure 05) was made to have a better understanding of how the experiences related to the diagnosis process influence the development of coping strategies. The activity highlighted that the coping strategies used during social events depend on the severeness of the immune reaction and the experience to arrive at the diagnosis. Most participants with a big immune reaction and with a negative experience of the diagnosis process were constantly concerned during social events. For example, they tried to be always prepared in every social situation. This means that they would bring their own food, lead the conversation about choosing the place to eat, and check that all the participants to the social event know how to prepare a safe place.

"I always have to repeat several times that I am coeliac to make sure that everyone understands how to not contaminate my food. "

Moreover, they often felt the sense of being in danger during social events that led

Figure 05 - Emotions scan. The experiences of P1, P2, P4 and P7 are highlighted in order to show diffentent experiences of the diagnosis process.

them to be hypervigilant or to have unwanted behaviour. For example, they would skip a meal if there are no gluten-free options. This led participants to have a negative perception of the gluten-free diet describing it as a sacrifice or a waiver.

Instead, participants who did not have a big immune reaction or were asymptomatic might not lead a strict gluten-free diet. Even if they eat a small intake of gluten they do not have any symptoms or any feedback that would alarm them. Therefore, for example, during social events, they would not say that they are coeliac and they would try to cope without asking if a food is contaminated or not. However, asymptomatic participants were vigilant and aware of the risk that was taken.

It was possible to identify four different groups of active coping strategies (Figure 06) and the factors that might influence them. Throughout these strategies, participants can adapt to different social events without feeling threatened by the risk of gluten intake. However, the most coping strategies were not successful on an emotional level. Shame, frustration, fear of not being understood and disappointment was commonly felt by the participant during social events. Figure 07 summarizes the flow of coping strategies used during different social events.

COPING STRATEGIES

ORGANIZATION	SELECTION	RESERACH	STATING TO BE COELIAC

DESCRIPTION

| Participants are oftern prepare in case they cannot find gluten-free options. They bring their own food to the event or they take part of the organization of the social event deciding where to go and what to eat also for others. | Participants select which kind of social situation particpate depending if they feel threatened or harm by the cross-contamination. | During social events participants research gluten-free food or places that can offer gluten-free options. | Participants usually say, explain and remind to be coeliac to the host before the social event. |

Figure 06 - Coping strategies found during the generative session

Context: Bars

Not Say to be coeliac

I only ask for a drink — I will eat later

Eat chips and nuts with the risk of gluten contamination

No

No

Look for chips and nuts that are in packages

State to be coeliac coeliac and ask if there is something gluten-free

Yes

Yes
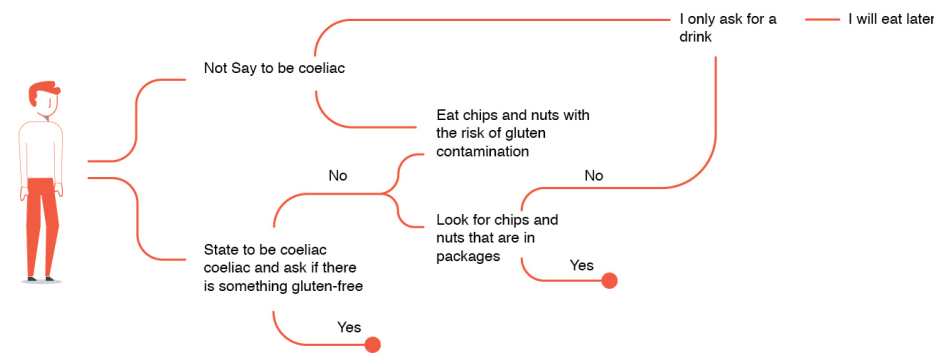
Context: Dinner at friends's house

Say to be coeliac before the dinner

My friends knows how to deal with the coeliac disease

No

Bring my own food already cooked

Cook with my friends to control if it is everything fine

Plan the whole dinner (where and what we will eat)

Yes

Everythings goes well — Eat what they cooked

Notice that they are not careful with the gluten contamination — Ordersomething from a close resturants

Bring food in anycase such as pasta or bread. — Don't eat anything

Context: Worklunch

Say to coeliac before

Ask to secretary/boss of changing the place

Yes

No

Yes

Call the resturant asking if they have gluten-free options

Do not eat anything

Do not go to the worklunch

Not Say to be coeliac

No

Looking for natural gluten-free options such as salads or meat

Come for the coffe

Context: Big family's events

Say to be coeliac

Not Say to be coeliac

I bring my own food

I do of a selection of food that I can eat

I ask who prepared the food — I ask what contain gluten or not
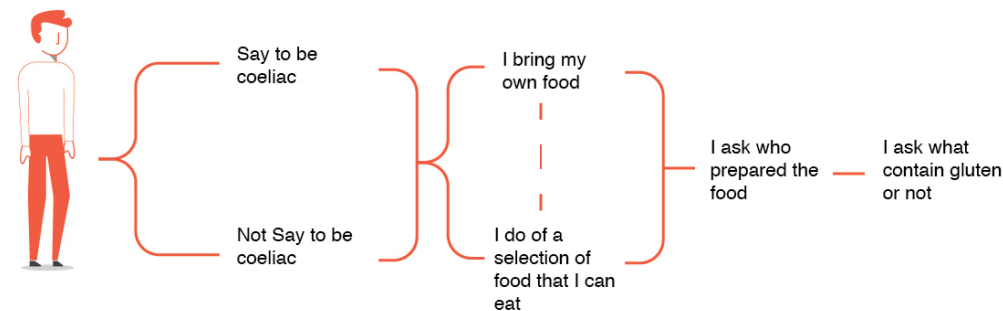
Figure 07 - Flow of coping strategies used in four different contetx: bars, dinner at friends' home, worklunch, big family's events

3.4 Conclusions:

The online survey and the generative sessions highlighted different factors of the perception of the gluten-free diet influencing the perception and the experience of social events. During both the survey and the generative sessions, mixed feelings and emotions towards the GFD emerged. Coeliac people see the diet as the tool that makes them feel better while it is limiting their social life. Dining at home is perceived as the safest place where to dine because coeliac people can control that everything is gluten-free, instead, dining out generates worries and concerns. Before participating in a social event, coeliac people usually have to plan ahead and research, looking for gluten-free options.The diagnosis process and the severeness of the symptoms of the coeliac disease can influence the worries and the development of coping strategies. Therefore, coeliac people feel the need to do advocate activities to avoid the risk of gluten intake. The development of the coping strategies requires a high level of motivation and it is energy-consuming. Due to this, the study demonstrated that, to maintain adherence to the GFD, support from the people close to coeliac people is needed.

3.5. Framework

To summarize all the results from the survey and the generative sessions and to have a better understanding of the project context, a framework was created. (Figure 08). The framework aims to describe what are the factors that might influence the perception and the experience of a social event. The selection of the coping strategy to use is identified as the optimal outcome of this framework. However, the User research has demonstrated that in different occasions coeliac people might choose to avoid social events, eat something with gluten or sustitional food and skip a meal. These strategies were identified as "Unwanted Behaviour". It is possible to summarize the flow of the framework in three different steps:

1) The coeliac person establishes a sort of relation/connection with the gluten-free diet. This relation is influenced by the perception of the coeliac person towards the diet, his/her emotion and his/her desire. Moreover, this relation is formed before the social event.

2) During social events, the relation between the coeliac and the gluten-free diet is influenced by several factors, such as the support from friends, family and the coeliac association or the physical reaction if gluten is ingested.

3) The two relations described above (1&2) push the coeliac person to use at least one of the coping strategies or un-wanted behaviour.

SOCIAL EVENTS

GFD

(1)
perception of the
gluten-free diet
emotions
desires

FACILITATORS

(2)
Family
Friends
Associations
Other people
Coeliac disease
GF products and places

(3)

COPING STRATEGIES

Selection
Organization
Taking initiative
Research
Identification
Stating to be coeliac

**UN-WANTED
BEHAVIOUR**

Skip a meal
Eat sostitutional food
Avoid social events
Eat something with gluten

Figure 08 - Framework

The Framework helped in giving a better understanding of the aspects that might influence the experience and the perception of a social event for a coeliac person. As shown in the user research, the process of choosing a coping strategy might be affected by different factors such as motivation, social support and the diagnosis process of the coeliac disease. Moreover, the knowledge acquired by the literature research and the user research allowed the researcher to identify what safety is for a person affected by coeliac disease. Safety involves not only the act of avoiding food that contains gluten but, also, being able to create an environment that allows coeliac people to be accepted and secure. Desmet and Fokkinga (2018) described security as one of the fundamental needs: *"feelings that your condition and environment keep you safe from harm and threats."* The results of the user research (chapter 3) resonate with this definition.

In order to create a safe environment during a social event, it might be necessary the involvement of people present at the social event. By creating a relation between celiacs and people without any food or diet restrictions might be possible to generate empathy. People without any food restrictions might understand the challenges that coeliacs have to face daily. Experiencing challenges that coeliac people have to face in their daily life, especially, during a social event. At the end, this process would lead people to generate empathy ensuring the creation of a safe environment for people affected by coeliac disease.

Therefore, design goal was described as follow:
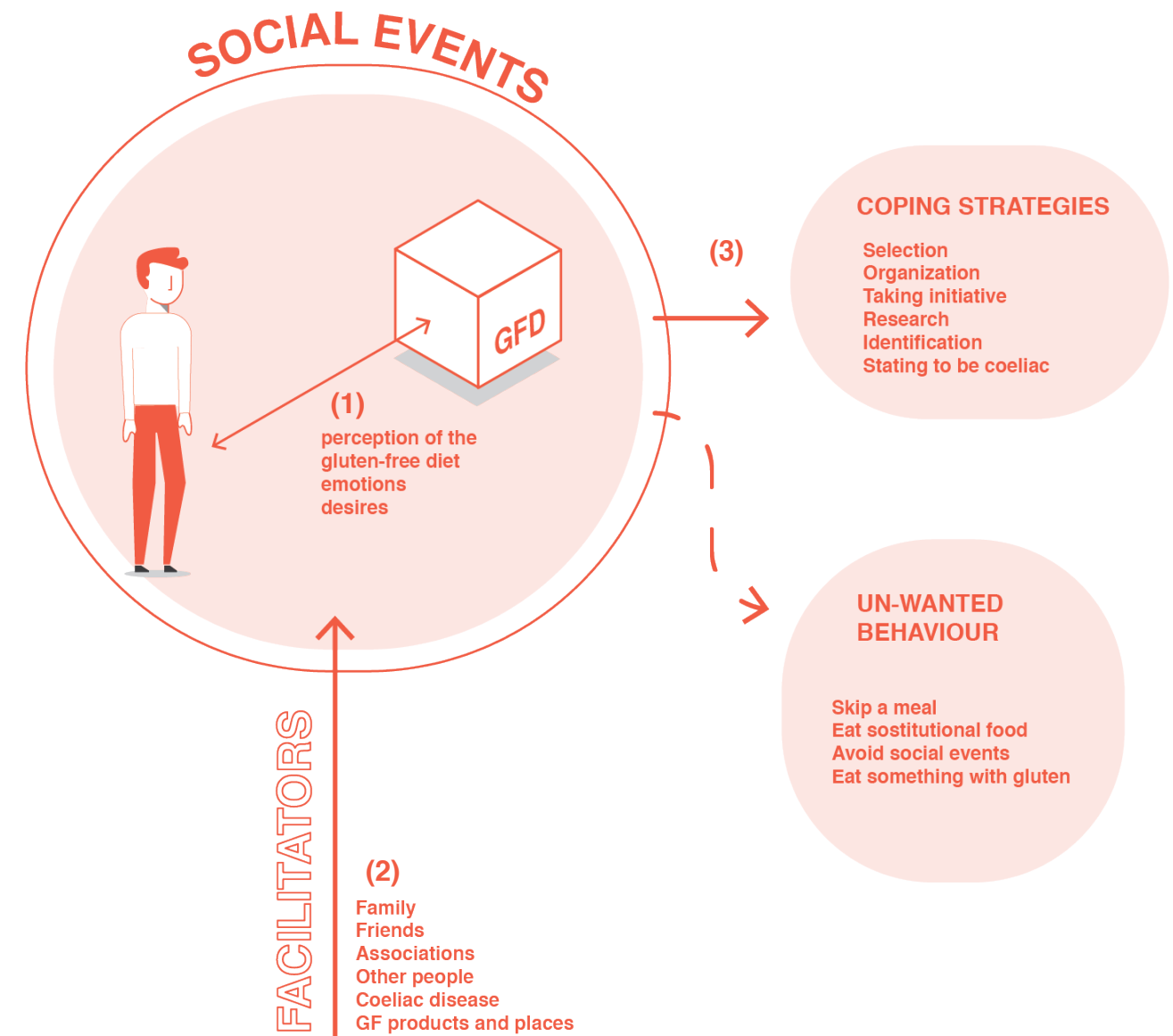**This project aims to enhance the feeling of security for coeliac people by increasing empathy and reducing negative emotions during social events**

chapter 4

Formulating the design goal

Based on the insights collected during the User Reserach, this chapter will elaborate the on the design goal of the project.

chapter 5

Ideation and conceptualization

This chapter consists of all the creative process starting from the creative session with master students to the iterative conceptualization phases. The chapter concludes with the final direction.

Figure 09 - Participants during the creative session

5.1 Introduction

In this ideation phase, several design directions and draft ideas were generated and evaluated. Through an iterative process of ideation, prototyping and testing, concepts were constantly evaluated with coeliac people. As the starting point of this phase, a creative session was organized in order to be sure that results from this phase were not biased by the researcher's point of view. In a second moment, the concepts generated from the creative session were evaluated and iterated. As a result, a final concept that would meet user needs and values was designed.

5.2 Creative session

At the beginning of the Ideation phase, a creative session was organized with 6 master students. The session aimed to generate several ideas that can fit the design goal of this project. Since the researcher is a coeliac person, the project direction might be biased by the researcher's experience. Therefore, the creative session was organized to explore different directions to overcome biased results. Moreover, the creative session aimed to understand which directions fitted the design goal.

Method:

The session was facilitated by the author of this project and the method used for the session refers to "Creative Facilitation" (Tassaul, 2004). The participants were given a short introduction of the method and the explanation of the design challenge as problem-as-given. After the explanation of the topic, participants were guided into the Problem Finding phase to elaborate the problem-as-give to the problem-as-perceived.

Participants:

Six students from TU Delft participated in the creative session: 2 students from Aerospace, 2 students from Design for Interaction, 1 student from Strategic Product Design and 1 student from Integrated Product design. All the participants had already knowledge of coeliac disease as they are in contact with coeliac people during their daily life.

Results:

All the possible design directions generated during the session were summarized in picture 02 and clustered into 10 themes (Figure 10). Many ideas were repeated and popular among the participants during the session. The session finished with the generation of 17 ideas. The ideas generated were mapped according to a horizontal axis, generatio of knowledge-empathy potential interaction with the final product, and vertical axis, related to the creation safe-threat environment for a coeliac person (Figure 11).

In order to match the design goal of this project, the concepts, potentially considered "safe" and generate empathy, were used as a starting-point for the conceptualization

There is no more gluten free

Stop worrying about what to eat or not

Everything is gluten free always

Having everything gluten-free during a social event is the safer option if there are people with CD

Conversation on

Having a space to share with others their concern

Share experiences and what the coeliac disease is

Talks about relationships and food

Sharing experience helps in empathise with other people

Self love first

Enhancing self-love

The insecurity is in the eye of who fears it

It might be true that first a person have to accept the coeliac disease and being

A theme

"No gluten" theme party

Having events might help to raise awareness in the population but they might be not affective

Label to identify food during social event

Labelling food with tags

Always have gluten free options

Gluten detector

Explicitly mention that the food is coeliac friendly.

Labelling food at social events can be an option, however it does not guarantee that there is no gluten cross-contamination

Coeliac you, other stuff me

Comparing this condition to others that have similar impact on social events.

Maybe this can help in sharing experience and understanding other health conditions

Not Hidden

The fact that coeliac person knows that everybody is aware of the condition

This can happen when there is trust in the other people around the coeliac.

Integrated with other food

Supermakets do not have gluten free zone

It might help in raise knowledge regarding the coeliac disease

Gluten in the air

Informing through invitation that there is a coeliac person

Knowing that there is a coeliac person in the room

Coeliac people have to always state their condition but sometime is difficult and other people might not understand completely the situation

Utopia

Make gluten food illegal

It might help in raise knowledge regarding the coeliac disease

Theme

Ideas

Reflection

Figure 10 - Themes found during the creative sessions

Gluten-free environment (Safe for a coeliac)

Create standard, rules for social events

Where the final design should be

Different presentation for GF food

Special labels to GF products during social events

Scan for GF food visible also for other guests during social events

Govern Campaign

Bracelets for social events

Dress code for dietary choicess

Label/game card for coeliac people

School book "The food bible"

Dating App for GF Food

Generation of Knowledge

Generation of Empathy

Create confetti with the symbol of GF food

Signal on social media

App that teaches about food

Cards of vulnerability (Card Game)

Game for flavours

Constellations for diets

Expressing yourself with music

Gluten-contained environment (Threat for a coealic)

phase.

Reflections:

In overall the creative session went well and all the corona measures were respected. To reach the design goal of the project, the participants raised questions about how to increase empathy with a product and how to evaluate. Participants concluded that empathizing with someone requires knowledge and experience of problems that a coeliac person might face. Therefore, the final solution has to raise awareness of the disease by involving people around the coeliac person at the social events. The main goal of the project should be to create a safe environment that allows

coeliacs to express their feelings regarding the event. For example, a coeliac person should be comfortable to say what they can eat or not and what measures have to be taken in order to create a gluten-free space without bothering others. The final design should establish a relation between coeliacs and people at the social event creating a bond.

Another topic that emerged in the creative session is the need of acquiring knowledge about other food allergies and food choices. Nowadays, during social events we need to take into account that there are several people who follow different diets, such as vegetarian and vegan, and have different allergies such as peanuts and lactose. They might face the same challenges that people affected by the coeliac disease face during social events. Therefore, the final solution might involve people who have other health conditions related to their diets.

Limitations:

Since the participants are not coeliac people, the ideas generated during the session might be not completely satisfying for a coeliac person. Most of the concepts were about labels that allow to identify gluten-free food or a coeliac person without having a clear understanding of the disease and the challenges of the gluten-free diet. This potentially can lead to an increase of unwanted attention towards a person with coeliac disease. The ideas might be raising awareness but not empathy.

5.3 Speed Dating meetings

5 concepts were generated to explore the different possibilities for the final design and evaluated using the method of the "Speed Dating" described by Zimmerman and Forlizzi (2017). In this way, concepts were developed at a faster pace and iterated based on real users' opinions. This led to a better understanding about how coeliac people envisioned the purpose and the values of each concept. Moreover, the sessions were helpful in understanding how to structure the future user-tests with the new corona measures.

Participants:

Five participants took part in this evaluation test. People affected by the coeliac disease from more than 2 years were recruited in order to cover different age groups.
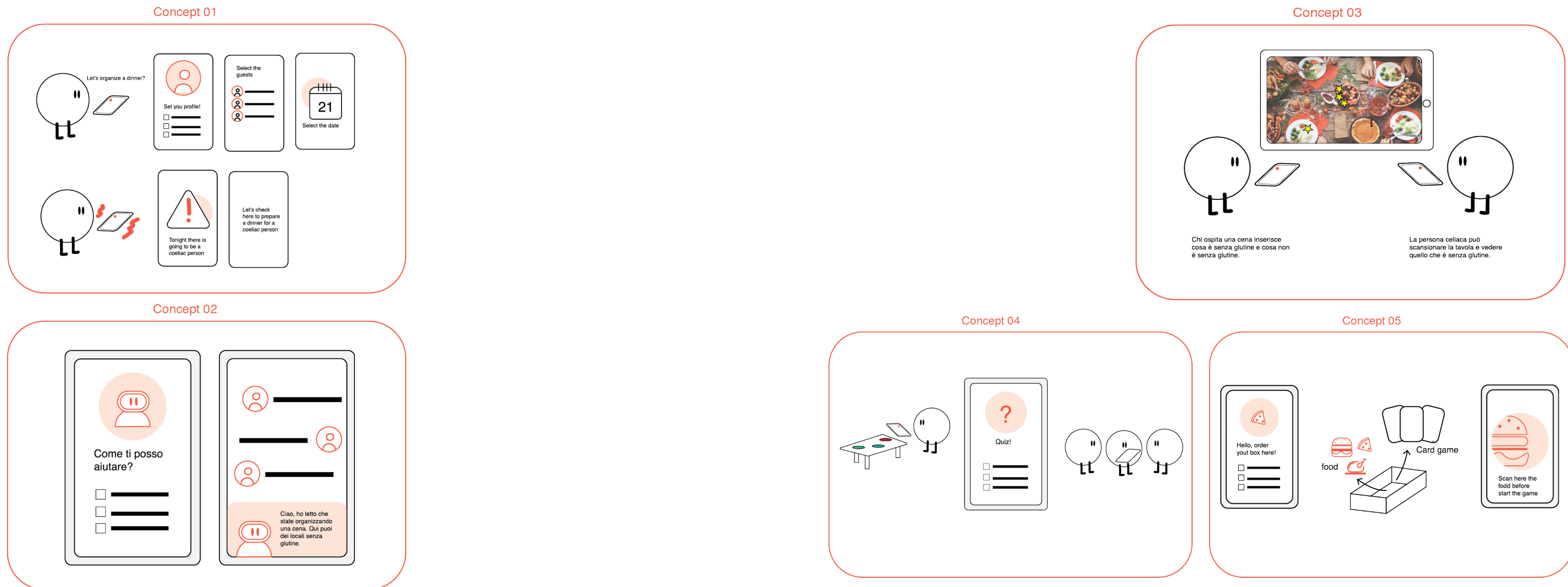
Concept 01

Concept 02

Concept 03

Chi ospita una cena inserisce cosa è senza glutine e cosa non è senza glutine.

La persona celiaca può scansionare la tavola e vedere quello che è senza glutine.

Concept 04

Quiz!

Concept 05

Hello, order yout box here!

food

Card game

Scan here the fodd before start the game

Ciao, ho letto che state organizzando una cena. Qui puoi dei locali senza glutine.

Come ti posso aiutare?

Set you profile!

Select the guests

Select the date

Let's organize a dinner?

Tonight there is going to be a coeliac person

Let's check here to prepare a dinner for a coeliac person

Figure 12 - Concepts presented during the Speed Dating Meetings

Concepts:

The following 5 concepts were presented (Figure12):

Concept 01: An App that allows to send information about how to create a safe environment for a coeliac person. The user can set up his/her profile regarding dietary preferences and invite friends for a social event (i.e. lunch or dinner). Then, the user will select the date and the host of the social event. Before the social event, the host will receive a notification that someone is coeliac. The app will provide information on preparing a safe environment for a coeliac.

Concept 02: This concept consists of a chat bot integrated with messaging service. It detects conversations about social events and will suggest restaurants and places with gluten free options.

Concept 03: This concept consists of an app that allows the host of the social event

which involves a buffet to specify food that contains gluten. Once arrived at the event, the coeliac person can scan the food with the camera of his/her phone. Food with gluten and gluten-free food will be identified by AR items that will pop-up on the screen. Tapping on the items will show information and fun facts about the coeliac disease.

Concept 04: The concept is similar to concept 03. The meals of the social event will be served on plates with different colors. The coeliac person with his/her friends can scan the plate through the camera of their phone and a quiz to solve in group will pop-up.

Concept 05: The concept is a service that provides a personalized food box. In the box, users will find food from local places and a card game. In order to eat the food, users will have to play a game about diets and coeliac disease. This concept wants to involve small realities that produce gluten-free food. From the user research,

participants cannot find products for breakfast or lunch.

Method:

The five concepts were explained and discussed throughout showing the image of the concepts and a description. At the end of each explanation, participants were asked to evaluate the utility, usability and the clearness of the concept using a Likert Scale.

Results:

The analysis of these five concepts led to some consideration about the possible interactions that coeliac people want during a social event with other people.

The Concept 01 was perceived as the most useful according to the participants. A participant explained: *"Sending people a little summary with the things to, I think you centered the problem of dining out "* . This means that this design might help to create a safe place for a coeliac person. On the other hand, a participant wondered if other people would download this app due to their lack of motivation. Therefore, she stated that *"since this is a different app and also other people have to download, I would not use it. "*

Instead, Concept 02 raised concerns regarding the notifications and the privacy. Participants would like to have a tool that can suggest places where they can eat without doing "timeless research on the internet". However, having a virtual assistant that reminds users to be coeliac would make them feel embarrassed. Additionally, participants would not appreciate that a chatbot might be able to read their conversations.They would like that conversations in a chat would remain private. They were, also, worried to annoy the other people present in the chat. Among participants emerged the idea of having direct chat with the virtual assistant. They could ask directly to the chatbot what they need for the social event, such as looking for a place that can offer gluten-free options, without involving other people.

Concept 03 was appreciated among the participants. They expressed the desire to scan food to find what they could eat or not. However, they doubted the success of this service due to the lack of knowledge about the coeliac disease from other people. For example, people who are not affected by the coeliac disease might not know which kind of flour can be considered safe. *"How can they [the people who scan the products] be sure 100% that it is gluten-free? Rather, I do not eat."*

Since the service was not perceived as a tool that might not guarantee a safe gluten-free meal, participants expressed their concern about the possibility not to find gluten-free food. Therefore this would generate additional worries and stress. Moreover, among participants there was a feeling of frustration regarding the lack of gluten-free options in bars or restaurants.

The Concept 04 and Concept 05 were the most criticized concepts among the five concepts. Both concepts are based on a gamification aspect during the social event and participants wondered how they can involve the other people. Playing games related to the coeliac disease made participants feel uncomfortable because they would receive unwanted attention from people present to the event. A participant explained *"When I am around a table with food, I only think to eat and have good company. I do not think to play games."* Other participants would prefer to have suggestions for recipes, instead to play a quiz or card game. Nonetheless, participants appreciated the Concept 05 because it would give the possibility to explore local realities through food. Moreover, during the pandemic time, several restaurants turned to take-aways without a safe gluten-free option for coeliac people.

Conclusions:

The results led to make the following considerations for the final design direction:

- Coeliac people would feel free to explain their need to have a space with no gluten around without having the feeling to annoy someone.

- The final design direction should guarantee that the food at the social event is completely gluten-free.

- During social events, coeliac people want to think about enjoying the moment of conviviality without thinking about their condition. Having during social events activities such as games about the coeliac disease might lead to generating unwanted attention on coeliacs.

5.4 A further analysis on the concepts:

The results from the evaluation of the concepts through the Speed Dating method helped to define the qualities of the final design. However, to understand which direction should be taken for the final design, as complementary activity, the researcher evaluated the concepts according to the vision of the design goal.

Method:

The Harris profile selection method was applied. Based on the design requirements and the desired interactions, a series of criteria were established. These were used to evaluate the concepts through a graphic representation of the strengths and weaknesses.

Results and Reflections:

Among the concepts, Concept 01 resulted the best in this evaluation (Appendix III). By using this concept, users would experience the preparation of gluten-free food and a suitable environment for coeliac people. This would lead, eventually, in the generation of empathy. The Concept 02 was evaluated as the second best concept. It gives suggestions about coeliac friendly places where the social event can take place. But this might not be enough to create sort of relation/interaction between coeliacs and people involved in the social event. On the other hand, concept 03, 04 and 05 might create a relationship between coeliac people and the other guests at the social event raising awareness about the coeliac disease. However, these concepts might not make guests experience and understand the challenges of following a gluten-free diet. Therefore, they might not generate empathy in people with no food restrictions. Additionally the concepts do not provide information about the creation of a safe environment for coeliacs

Concept 01

	--	-	+	++
Interaction				X
Security			X	X
Simple			X	
Empathy			X	
Feasible			X	

Concept 02

	--	-	+	++
Interaction		X	X	
Security			X	
Simple			X	
Empathy		X		
Feasible		X	X	

Concept 03

	--	-	+	++
Interaction		X		
Security	X			
Simple			X	
Empathy	X			
Feasible			X	

Concept 04

	--	-	+	++
Interaction		X	X	
Security	X			
Simple			X	
Empathy	X			
Feasible			X	

Concept 05

	--	-	+	++
Interaction		X		
Security	X			
Simple			X	
Empathy	X			
Feasible			X	

Figure 13 - Rappresentation of Harris Profile for Concept 01

5.5. Final direction

The data collected and the results from Ideation activities (Creative Session, Speed Dating meetings, and the Harris profile selection) helped to define the final design idea to further test and evaluate. The qualities that emerged in the ideation process are summarized in:

Inclusivity: People who follow a specific diet might face the same challenges that coeliac people face daily.

Empathy: Enhancing empathy is a process that requires gaining information regarding the coeliac disease and the gluten-free diet, understanding them and in the end experiencing challenges that people affected by coeliac disease face everyday.

Safe place: The final design direction should guarantee that the food at the social event is completely gluten-free.

Worries-free: Going to a gathering has to be a relaxing journey for the coeliac person and for the host of the social event. Coeliac people would feel free to explain their needs without feeling to annoy someone. The host should not be concerned when they prepare the gathering and when they receive information about how to prepare a safe place for their guests.

CREATIVE SESSION		SPEED DATING MEETINGS	
🏳️‍🌈	🧡	🌾	⚡
Inclusivity	**Empathy**	**Safe place**	**Worries-free**
People who follow a specific diet might face the same challenges that coeliac people face daily.	A process that involves: - gaining information - experience the challenges of people with CD.	The final design direction should guarantee that the food at the social event is completely gluten-free.	Coeliac people would feel free to explain their needs to have a space with no gluten around without having the feeling to annoy someone.

Due to the new measures regarding the coronavirus, gatherings are not allowed. Therefore, the final design would be focused more on small meetings, such as dinners or lunches.

5.5.1 First Iteration:

The concept developed is an app that allows users to plan and organize social events. Before the event, the host will receive a notification with information regarding how to create a safe environment for people that have dietary restrictions. This information is in the form of a to-do-list. Inside the app, users would find dedicated sections where they can find insights on the coeliac disease and other diets. Moreover, the users have the possibility to scan the barcodes of the products in order to identify gluten-free products .Figure 14 shows the wireframes.

Concept validation:

The main goal of the user testing was to answer the following research questions: Would users learn how to set a safe environment? Would the app create empathy? For this first user test, the visual design was kept at the first stage in order to focus all the insights in defining and improving the concept functionalities, leaving for the last step the visual design.

Method:

The mid-fidelity prototype was realized by using Adobe XD that allows to test the usability of the concept remotely. The participants were asked to perform three tasks (create an event, receive a notification, scan products). After the test, participants were invited to fill an online survey. The questions asked were different according to the dietary preferences/restrictions of the participants.

Participants:

A total of 10 users were recruited for this concept validation. From this group, 5 of them were not having any diet restrictions, 2 of them were affected by the coeliac disease and 3 of them were affected by the Non-Coeliac-gluten-sensitivity(NCGS). The age group of the participants was 20-30 years old.

Results:

General results:

Overall the app was appreciated by the participants. They described it as clear and easy to use. However, during the usability test, participants had difficulties in finding
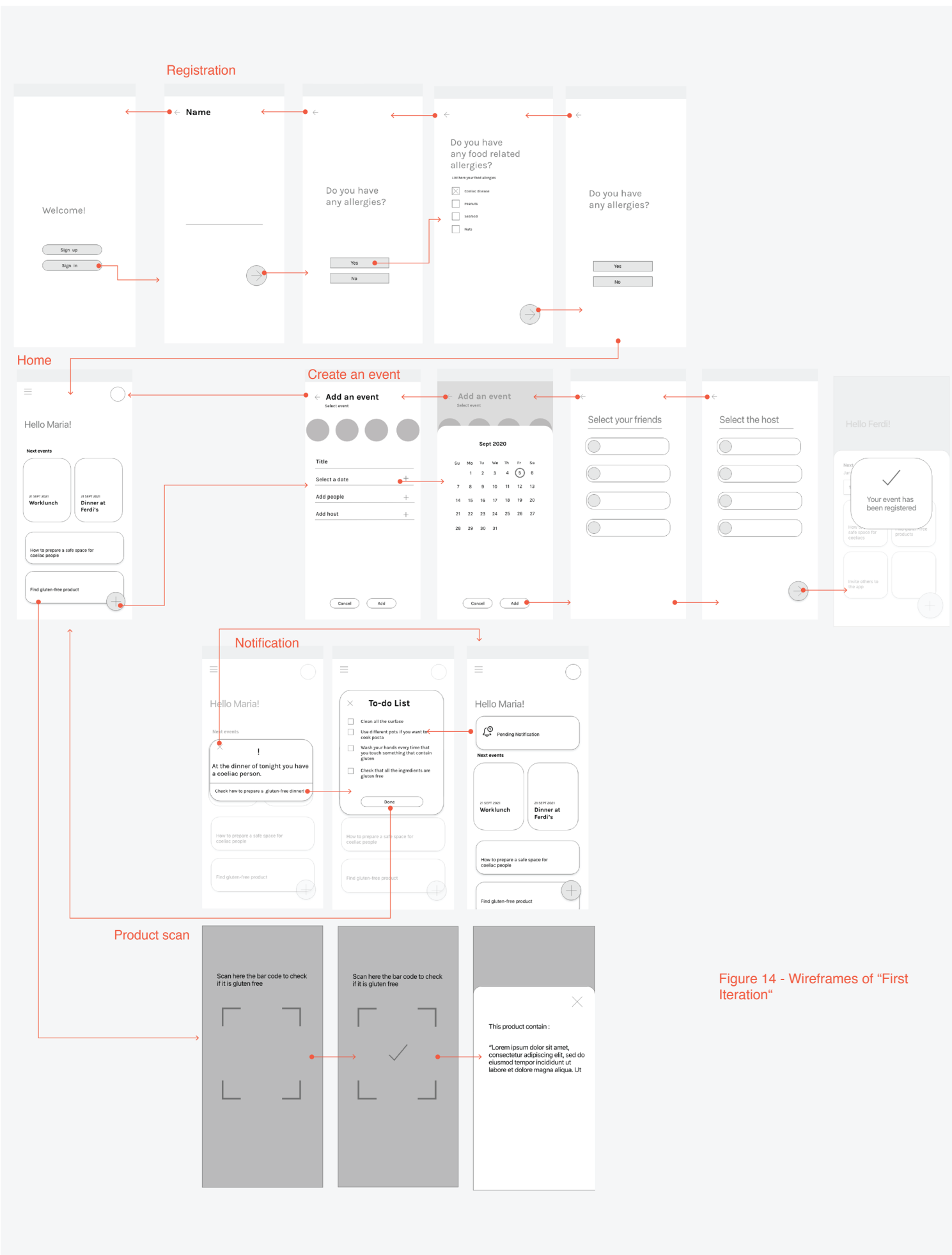
Figure 14 - Wireframes of "First Iteration"

the "add event" button due to the structure of the homepage. They perceived the Home page confusing and chaotic.

Participants appreciated the To-Do-List as a tool to receive information about creating a safe environment. A participant explained: *"The to-do list is a great way to organize the event safely, plus the key points are very easy to remember"* The Scan for products was considered by both user groups to be useful. Participants with food restrictions felt "safer" if people would use it. Instead, participants without food restrictions appreciated the possibility to use a scan. Most of them did not know where to find gluten contained and how to recognize gluten-free products.

Results from participants with food restrictions:

Participants with CD and NCGS explained that they would use the concept to have better communication with other people about their food restrictions. A participant explained:

"Because it is an opportunity to take part in a social context without my food intolerance being ignored as it often happens today. It therefore makes me sure that not only everyone (or anyone who cooks) is aware of this, but that they take care of it."

Moreover, participants explained that the app would help in managing the gluten-free diet during social events. A participant stated: *"I no longer have to worry about not eating anything at dinners / events or having to explain to people what I can eat." However, they specified that the concept might not be helpful during big social events such as weddings or going to restaurants.*

Results from participants without food restrictions:

During the test, participants recognised that they might not use the app often, unless they would have a large number of friends affected by the coeliac disease. Even though they would not use the app with regularity, they found it useful to have information and tips to prepare a safe place for a coeliac person. Moreover, they would like to have insights on the coeliac disease, the products that naturally do not contain gluten and recipes.

Four out of 5 participants would empathize with a coeliac by using that app because they would understand needs and challenges of people affected by the disease. A
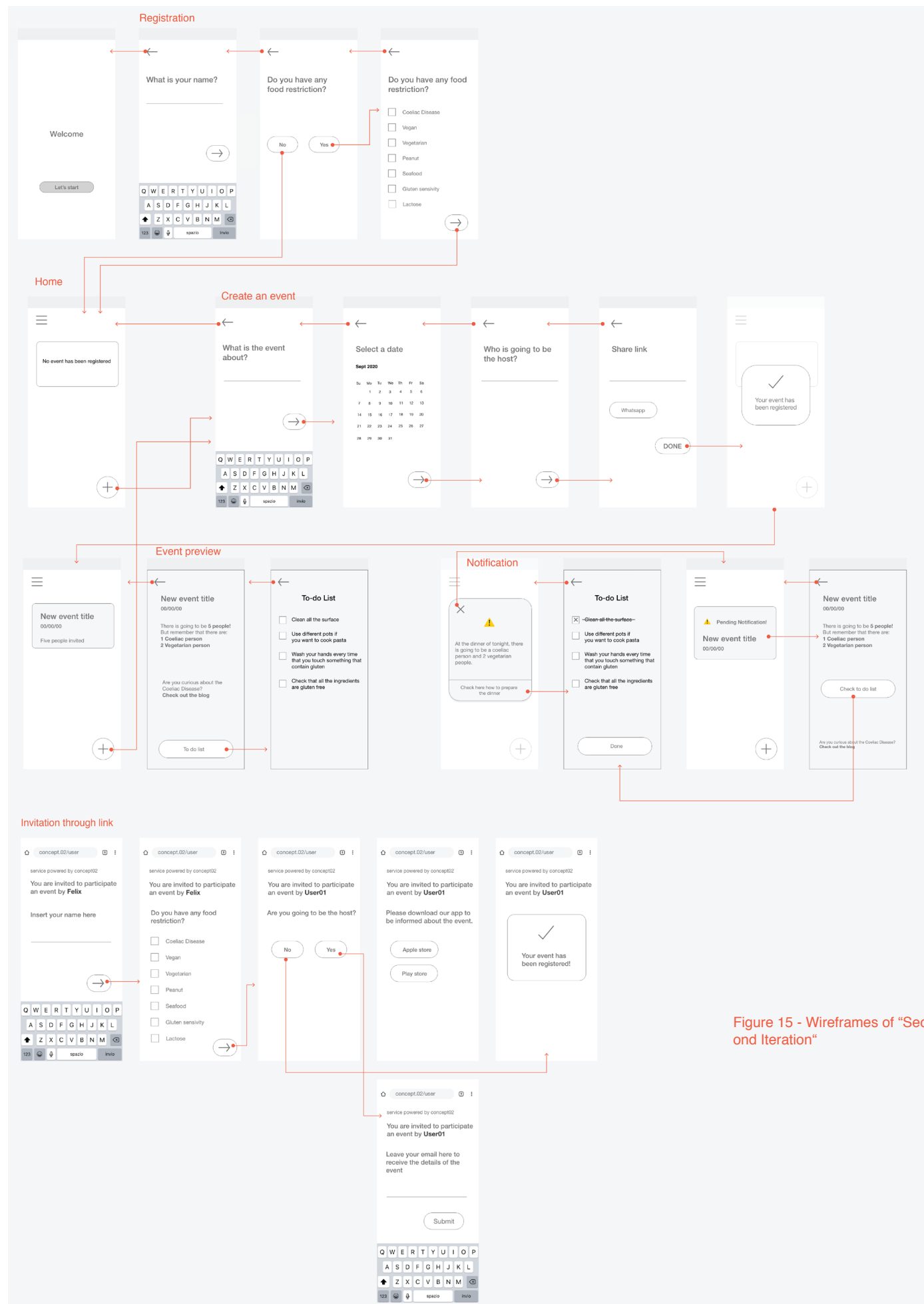
Figure 15 - Wireframes of "Second Iteration"

participant explained: *"Because it is possible to interface with the problems and needs that an intolerant person has to face every single day"*

Conclusion:

The insights discussed in the results lead to the following redesign guidelines for the second iteration:

A minimalistic graphic should be taken in consideration,

Show more information regarding the different diets and intolerance,

Add the possibility to register to the event without download the app,

5.5.2. Second Iteration:

Based on the feedback gained from the previous concept validation, a second iteration was made. The whole experience of the app was made minimal and clearer especially for the home page. The possibility to share the event through a link was added. This feature allowed people who do not want to download the app to use the service. Additionally, the insights about the coeliac disease and other diets would move to a blog. (Figure 15)

Concept validation:

The aim of this test was to understand if a minimal interface would help to have a better interaction with the concept, how people react in the use of the service and if users would prefer to have information in a form of blog or inside the app.

Method: A mid-fidelity prototype was realized by using Adobe XD that allows users to do a usability test remotely. This user test was divided into three different parts. In Appendix IV is possible to see the test plan.

Participants: For this test, 14 participants were recruited. 9 of them were affected by coeliac disease, one was vegetarian and 5 participants did not have any food restriction.

Results:

Participants found the whole experience of the concept clear, easy to use and intuitive. The homepage interface with only the essentials functions helped to create an easy and quick experience of the all service. However, the role of the guest and

the host was found confusing when users received the link of the invitation to the "event". It was not clear for the participants that they could select one or more hosts. For participants without any food restrictions, having information regarding the food intolerance would be essential to have a better understanding in preparing the environment. Information about products that contain gluten and recipes were found useful by participants.

The option to register to the event by using the link was appreciated by all the participants. Additionally, It was found that receiving the To-Do-List information by emails would be appreciated.

However, only 2 out of 14 participants stated that they would not use the app, because they would prefer to use common communication tools such as Whatsapp or normal texting to organize a social event.

Conclusion:

The insights discussed in the results lead to the following redesign guidelines for the second iteration:

Add an element of rewards after complete all the task from the To-Do-List,

Include clear indication to add more "hosts" options,

Add short information about the food restrictions or diets .

5.4.3 Main Findings:

The evaluation activities (First and Second Interaction) highlighted the positive and the negative aspects of the final design direction. Coeliac participants described the final direction as useful and helpful to manage the gluten-free diet outside their home. Using the final design direction would reduce their worries when they have to go to social events. They would not result in annoying for other people because they do not have to repeat the instructions to create a safe environment. On the other hand, participants with no-food restrictions might not use the final design direction unless they have a bigger group of friends affected by coeliac disease. However, by using the final design direction they can empathize with their guests because they can understand the needs of coeliac people.

Final Concept and Evaluation

This chapter describes the final concept, a combination of the previous ideas and interactions. Here, it is also included the final evaluation of the concept.

6.1 Introduction to the final concept

The final product is a simple event planner that allows users to receive different information regarding food restrictions. The final concept aims to create a safe environment for people affected by the coeliac disease, giving guidelines to who is hosting an event through a To-do-List. This allows the host of the event to know and understand what the challenges of following a gluten-free diet are. At the end of the process, the final concept enhances empathy towards coeliac people. Additionally, the final concept applies this process also to other food restrictions and diets.
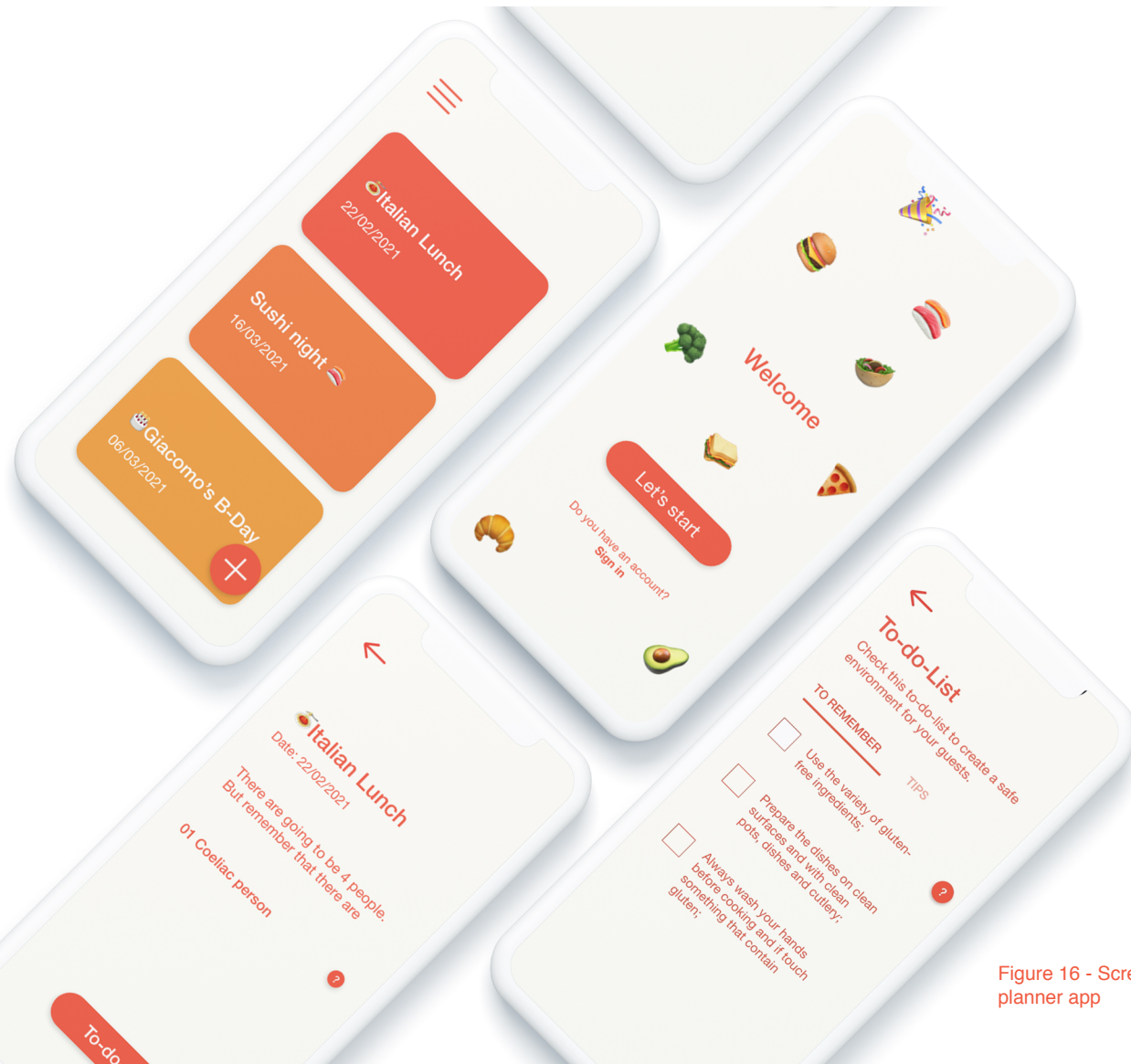
POSSIBLE USERS	HOST (main user)	GUEST (possible host)	GUEST
DESCRIPTION	The host is identified as the principal user who is available to organize the event. They are responsible for creating a safe environment for coeliac people	The guest as possible host is someone that was invited at the event and they are available to help the host with the tasks of the To-Do-List	The guest is the one who is only coming to the event without organizing or preparing the food.

Figure 17 - Description of the kind of users

Three different kinds of users were identified (Figure 17). The host or "the guest as possible host" creates an event and they will share an invitation through a link. The guests will register to the event indicating their food restrictions. This will allow the generation of a To-do-list based on the food needs of the guests to create a safe environment.
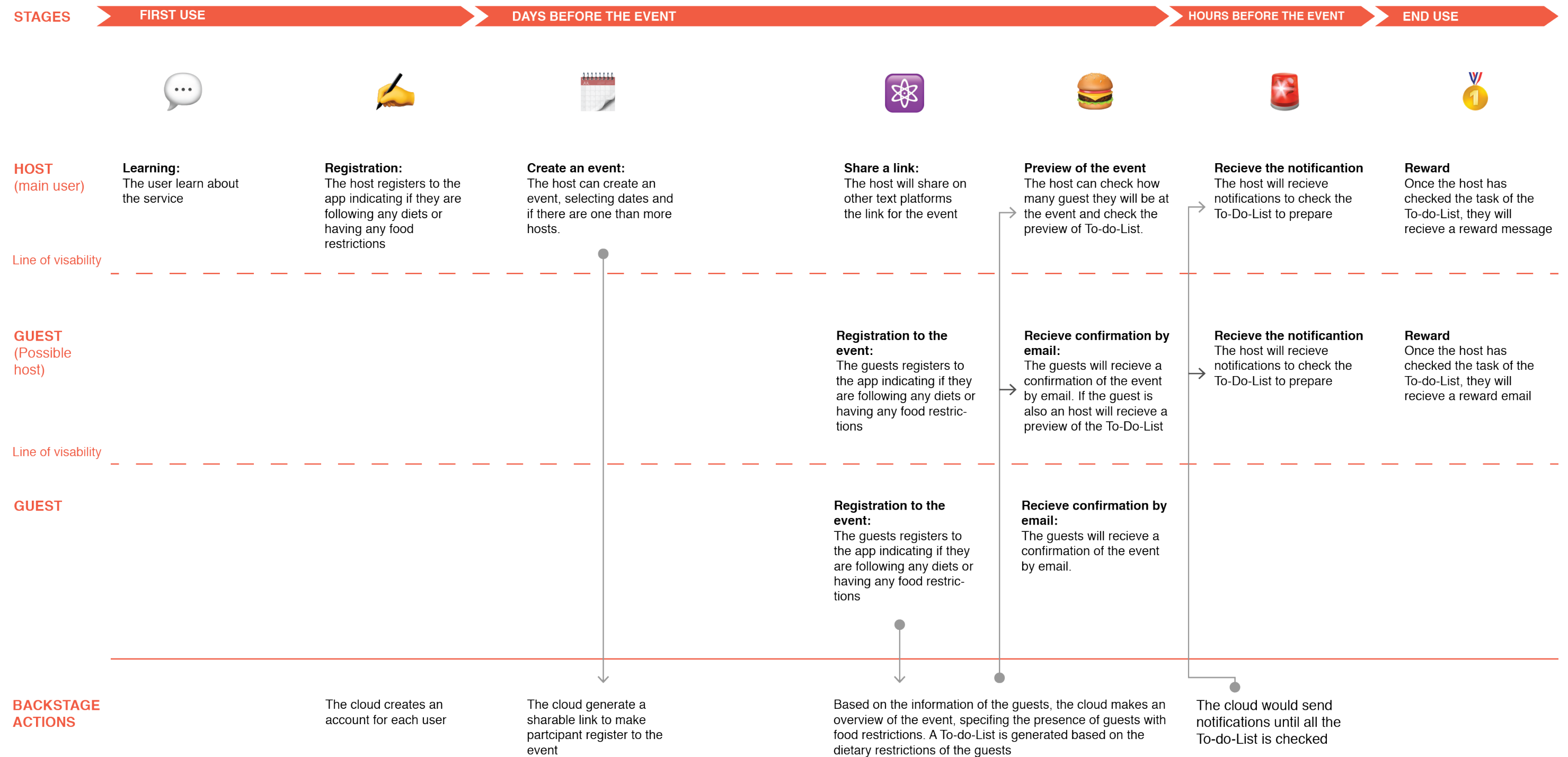
In order to help users to recognise products that are specific to a diet, it was envisioned as a scanner function for this event planner app. Users can scan the barcode of products and the app will show which food allergens are contained.

6.2 Service Journey

Figure 18 below shows the envisioned journey of preparing an event with the app, based on the one created from research. This shows the early stage activities of before making the dinner untill the dinner itself. Ideally, at the end of the process, the main user (the host) would undestand the challenges that coeliac people have to face before enjoy a social function.

STAGES	FIRST USE		DAYS BEFORE THE EVENT			HOURS BEFORE THE EVENT	END USE
HOST (main user)	**Learning:** The user learn about the service	**Registration:** The host registers to the app indicating if they are following any diets or having any food restrictions	**Create an event:** The host can create an event, selecting dates and if there are one than more hosts.	**Share a link:** The host will share on other text platforms the link for the event	**Preview of the event** The host can check how many guest they will be at the event and check the preview of To-do-List.	**Recieve the notificantion** The host will recieve notifications to check the To-do-List to prepare	**Reward** Once the host has checked the task of the To-do-List, they will recieve a reward message
Line of visability							
GUEST (Possible host)				**Registration to the event:** The guests registers to the app indicating if they are following any diets or having any food restrictions	**Recieve confirmation by email:** The guests will recieve a confirmation of the event by email. If the guest is also an host will recieve a preview of the To-Do-List	**Recieve the notificantion** The host will recieve notifications to check the To-do-List to prepare	**Reward** Once the host has checked the task of the To-do-List, they will recieve a reward email
Line of visability							
GUEST				**Registration to the event:** The guests registers to the app indicating if they are following any diets or having any food restrictions	**Recieve confirmation by email:** The guests will recieve a confirmation of the event by email.		
BACKSTAGE ACTIONS		The cloud creates an account for each user	The cloud generate a sharable link to make partcipant register to the event	Based on the information of the guests, the cloud makes an overview of the event, specifing the presence of guests with food restrictions. A To-do-List is generated based on the dietary restrictions of the guests		The cloud would send notifications until all the To-do-List is checked	

6.3 Core Experiences

The design of the user experience includes the first use, days before the event, hours before the event and the end of use. Each of these moments are defined by specific elements and functions of the app.

Registration:

During the first use of the app, users will create an account registering themselves by using their email and password. In addition they will indicate if they have any food restrictions or follow a specific diet. This would allow the cloud to create a database about the user.

Create an event:

The users can create a new event through putting a name of the event, date and they can select who is going to be the host. Once the registration of the event is done, it will be possible to invite the guest through a shareable link on other messaging platforms.

Figure 19 - Wireframes and user flow of registraction to the app
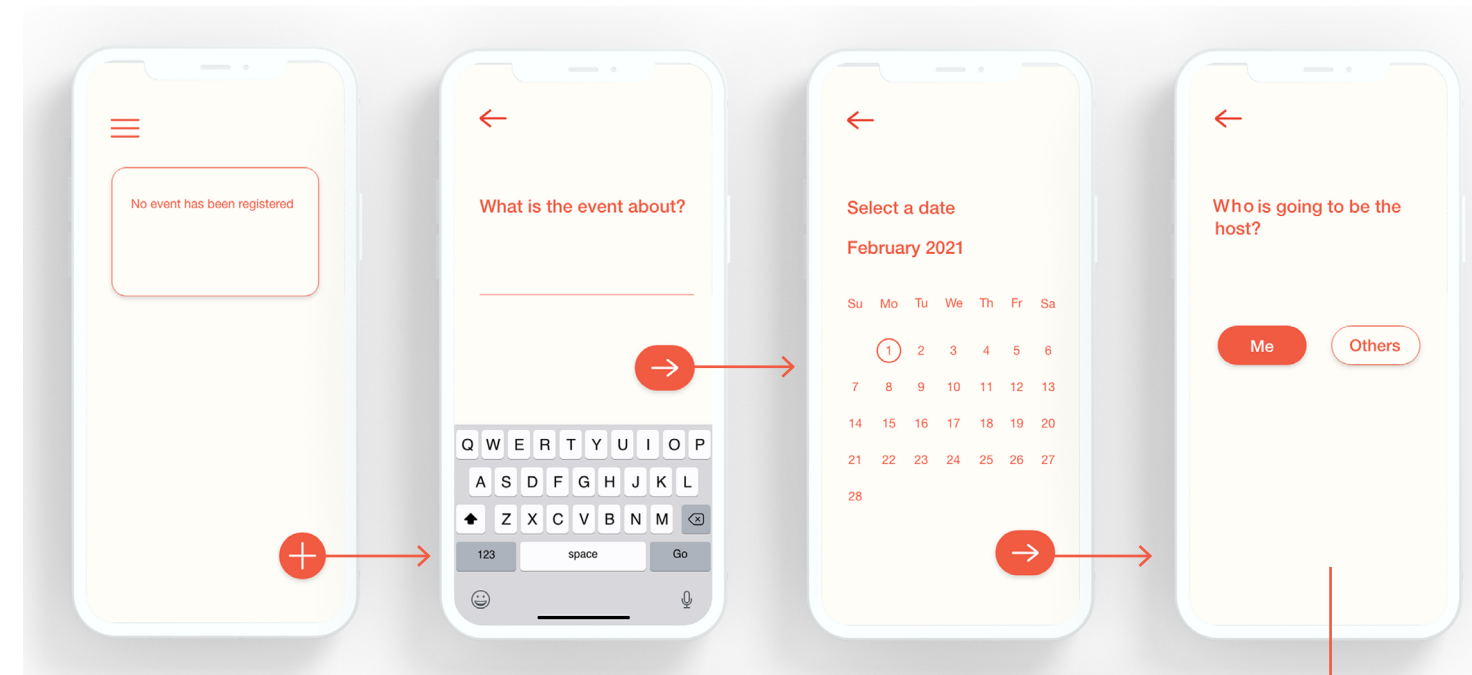
Figure 20 - Wireframes and user flow of the creation of an event
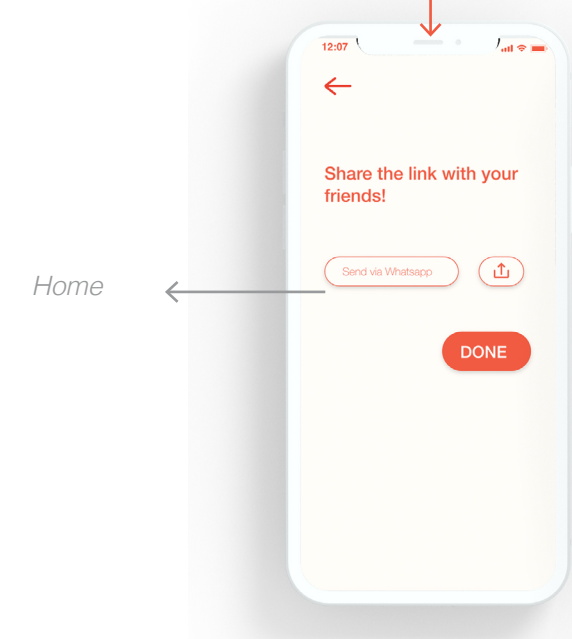
Event overview:

Once the event has been created, the user would receive the overview of the event and the To-do-List. The task of the To-Do-List is generated based on the dietary preference of the guests. The tasks are divided into "To Remember" and "Tips". The tasks in the "To Remember" list are the tasks that are essential to create a safe environment, while those in the "Tips" list are tasks that depending on the preparation of the meal, the host have to take in account. Moreover, clicking on the question mark, the user will receive additional information about the tasks or the food restrictions of the guests.

Notification:

Before the event will take place, the cloud would start sending notification to the host of the event regarding the dietary information of the guests. The notifications have the function of reminding the host to accomplish the tasks. At this moment, the To-do-List is clickable and the host can check the task. Once all the tasks are done, the host will receive a message of reward.

Figure 21 - Wireframes and user flow of the event overview

Additional information
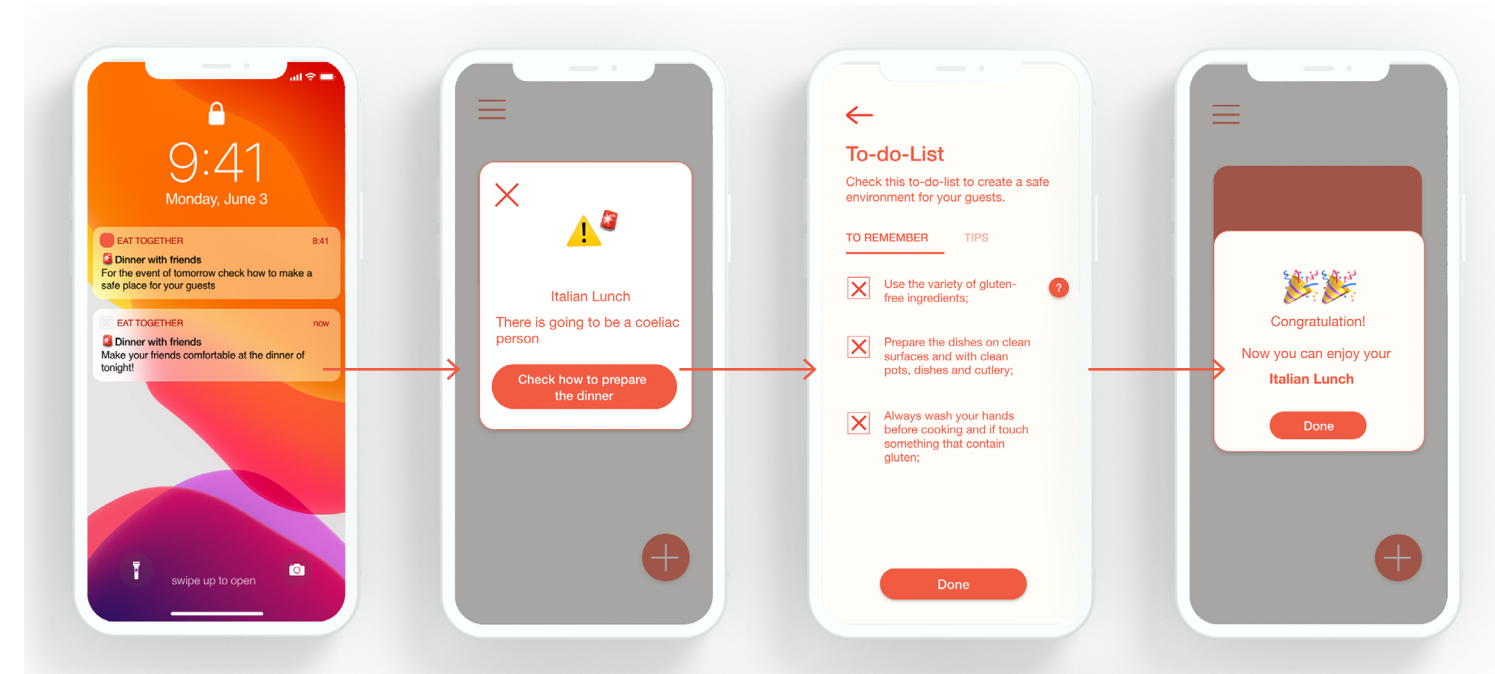
Figure 22 - Wireframes and user flow of the notification

Invitation by link:

The guests recieve an invitation through an external link. Those who have already the app, they will redirected to the app itself. While, users that do not have installed the app would register on a browser page. If the guest is also one of the hosts, they will recieve an email with the information of the event.
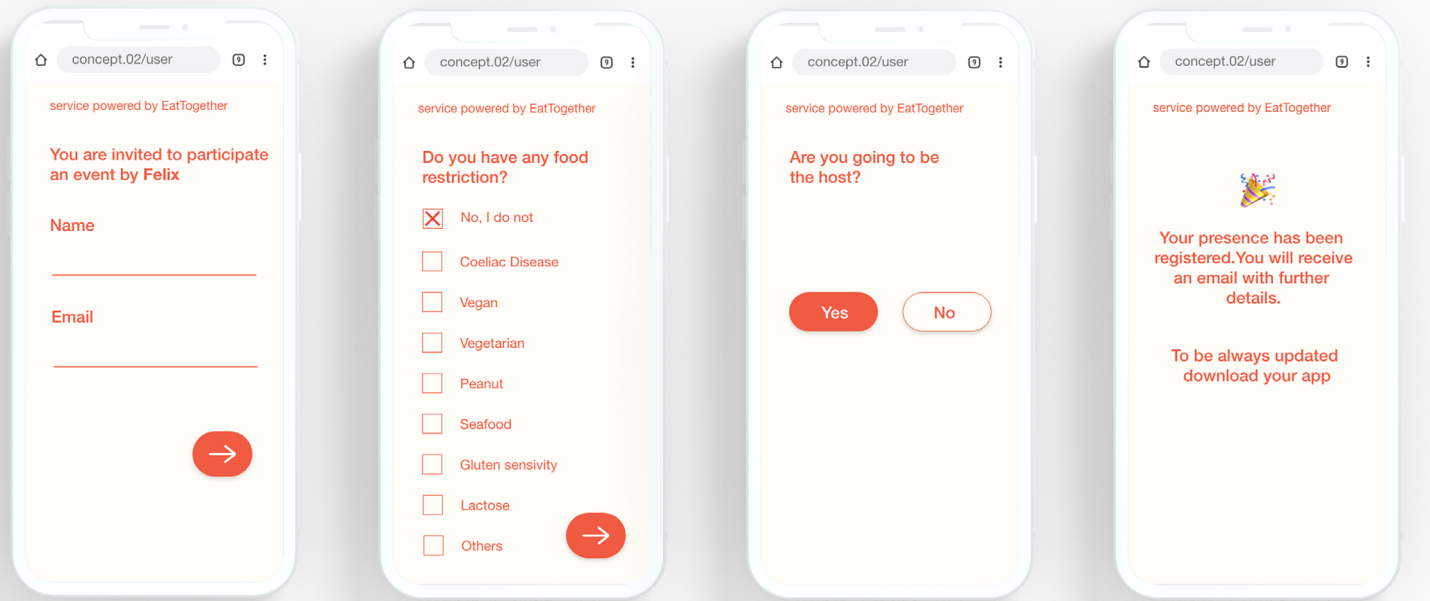
6.4 Final Evaluation

The aim of the final user test is to evaluate the quality of the interactions between the users and the concept identifying weakness and the fulfillment of the design goal and requirements. The final test was framed to evaluate the core experiences of hosting an event or receive an invitation. The research goals are summarized in:

- Understand the global comprehension of the concept,

- Understand the perception and needs related to preparing a social event for a host or a guest affected by coeliac disease.

- Understand if the concept might generate empathy between hosts and guests.

Participants:

For this test, a total of 8 participants were recruited. In the recruitment process, participants were asked if they follow any specific diets or if they have any food restrictions. However, due to the convenience sampling, participants might be not representative for the whole population.

Method:

Hosts user tests:

The evaluation test was divided in two different phases. The first phase consisted of one-on-one interviews with a usability test of the core experiences. This was conducted in-person with four participants without any food restrictions, using an interactive prototype made on ProtoPie (Appendix IV). The prototyping tool allowed us to recreate the main UI interaction of creating an event and have an overview of the "To-Do-List". After this interview,participants were asked to fill a survey. The questionnaire was made to understand the need and the experience. For the second phase of the test, participants were asked to prepare a meal completely gluten-free following the To-Do-list. At the meal, the researcher would come to the participant house, role-playing the coeliac guest. At the end of the meeting, all the experience of having a coeliac guest would be observed and discussed by the researcher. In order to simulate the notification about the event, notifications about the event were sent by the researcher through using Whatsapp, with the "To-Do-List".
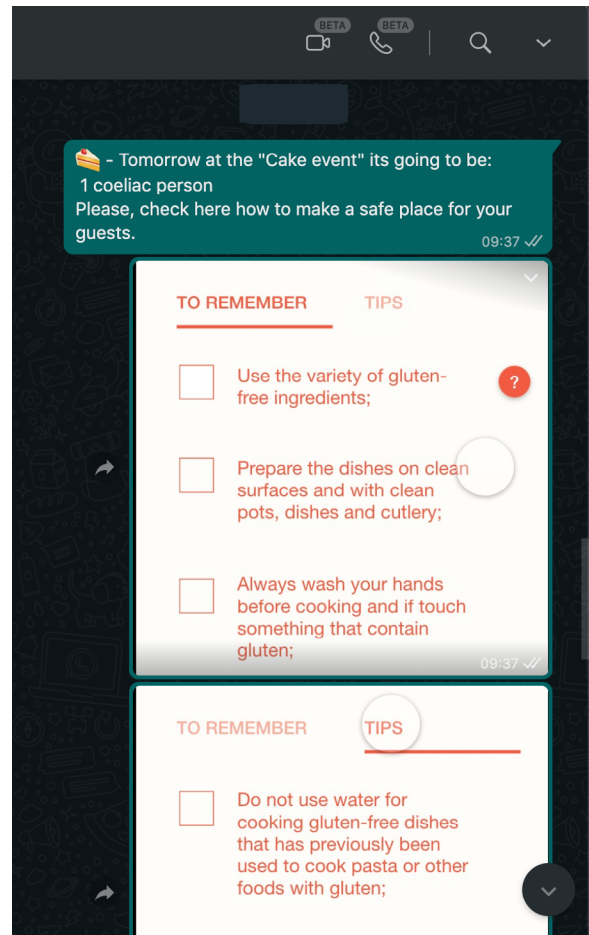
Guest user tests:

Participants affected by coeliac disease were asked to participate as guests. The test consisted in a one-on-one remote interview with a usability test of the core experiences. These tests were divided into two parts. The first part was an exploratory part: participants were asked to interact with the prototype made on ProtoPie (Appendix IV). The second part consisted in simulateting to be invited by someone using the app. At the end of the test, participants were asked to fill a survey.

Results:

Generally, the tests showed positive results in favor of the final design concept. From an usability point of view, participants completed all the tasks without any explanation. The final concept resulted in clear, friendly and easy to use. However, only one participant expressed the need to have more triggers or calls to actions.

Results from the Host User Test:

The experience of making a dinner was evaluated positive by the participants. At the end of the test participant described the experience as enriching, entrainement and constructive. The differences between the first and the second phase of the tests result visible from the Likert Scales (Figure 25). Participants recognise that through the final concept they can gain knowledge about the celiac disease and succeed in creating a safe environment through the To-Do-List. Moreover, participants could empathize with coeliac people. A participant explained : *"I had to "go through the trouble" of checking every single ingredient plus be careful not to contaminate any food"*. However, the To-Do-List resulted in an element that can influence the perception of the interaction with the event app and the preparation of the social
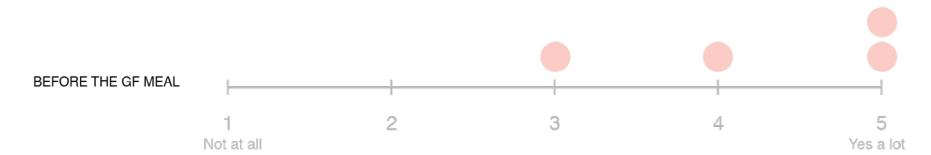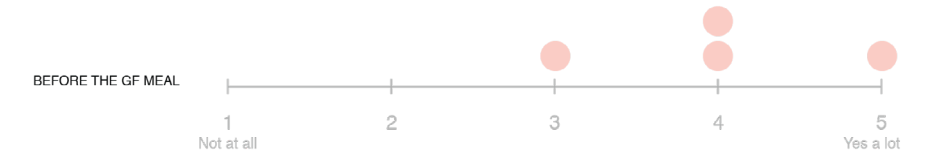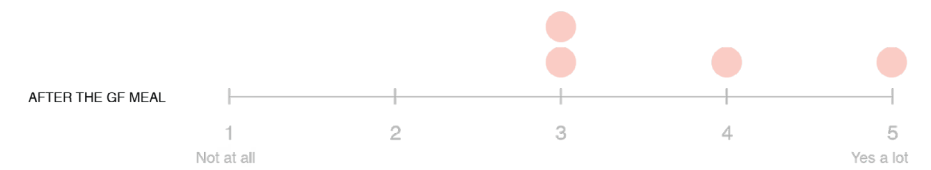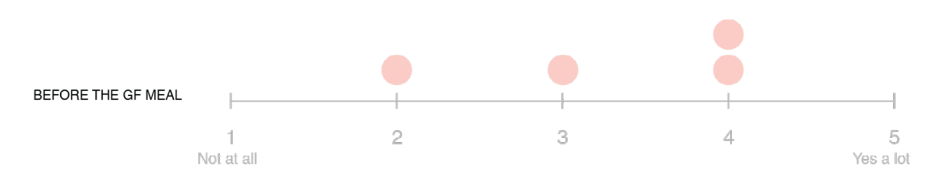
event. During the test two participants were asking about drinks and species that might contain gluten because on their labels often there is no indication of the gluten presence. Additionally, the majority of participants (3 out of 4) explained that they could not understand the differences between the "To Remember" and "Tips" tasks in the To-Do-List. They would prefer to have more information about consequences if they are not following the guidelines. Two participants also proposed to have icons or a visual roadmap to improve the readability of the To-Do-List.

Although the whole experience of using the planner app was ranked positive, three participants explained that they might prefer to be integrated with Google Drive Modules or existing calendar app.

Results from Guest User Test:

The experience with the event planner was described with essential, useful and concise. Participants stated that they would feel secure if the final design concept would be used. A participant said *"Thanks to the information in the app, it would be difficult to make mistakes."* Another participant explained: *"Many friends-acquaintances, thanks to the tips included in the app, can easily create dishes without contamination and are gluten-free. There are very clear and concise indications on how to cook gluten-free foods in total safety."* Receiving by email the information about the event seems not to be a problem. Another participant explained: "*We always receive emails and we are always connected with the phone".* During the test coeliac participants were enthusiastic about the idea, asking if the planning event app will be implemented.

6.5 Discussion and Limitation

The final user testing aimed to evaluate the final design concept generated from previous design research and iterative conceptualization phases. The goal of the test was to validate the final concept values from the point of view of users, investigating if the final concept can generate empathy and create a safe environment for people affected by coeliac disease during social events.The results demonstrated that it is possible to create a safe place for a coeliac person by using the final design concept. People without any food restriction could immerse themselves in the challenges and the difficulties that a coeliac person might face during the social events. At the end of the process, they explain that they can empathize with someone affected by coeliac disease. However, following the To-Do-List might not be enough to fully create a safe environment for coeliacs. Participants expressed in the survey by using the final concept they can gain knowledge regarding the coeliac disease and succeeding in preparing a gluten-free environment. Nevertheless, participants who organized a meal for a coeliac person started to be curious regarding gluten-free products that they could use and the consequences if they were not following the guidelines. Two participants explained that they felt insecure and stressed to choose the right ingredients for the meal. This demonstrates that the scan function envisioned for the final concept might result in an essential tool to make at ease the host of the event. Moreover, the final solution should not create stress or negative feelings in users that are hosting or organizing a social event.

The To-Do-List is the core function of the final concept and it should give guidelines and information about how to make a safe environment in a quick, easy and simple way. However,three participants out of four did not understand the distinctions between the tasks "To Remember" and "Tips". The all six tasks were perceived by the participants essential to complete and important to know. Additionally, participants wanted to know if they missed to complete one of the tasks what the consequences would have been. Therefore, these participants suggested having a roadmap with the tasks to do and create a color code to understand which tasks are the most important ones to do. This indicated that To-do-List should show what information are essentials in order to make a gluten-free environment. Using visuals might be useful because the host might remember several tasks.

Overall, the final concept was ranked in a positive way by participants without food restrictions. However, they perceived the app "too much". They would prefer that the final concept would have been implemented with already used apps such as Google Drive or calendars such as iCloud or Google Calendar. Therefore, it would be interesting to investigate other forms of the final concept and if it is possible to implement the To-Do-List with other platforms.

On the other hand, coeliac participants coeliac participants seemed enthusiastic about the implementation of the final concept. A participant asked *"When is it possible to download the app? "*. Overall coeliac people found the final concept useful for different reasons. First of all they felt secure going to a social event. Participants explained that they are used to check ahead if they can find gluten-free options, the host knows what the coeliac disease is or if they have to bring food. This leads them to have concerns or increase their level of vigilance during a social event. Whereas, using the final concept, they can avoid worrying if the host contaminated the food or not. A participant said *"In this way, I can be sure that others contaminate my food".* Second, they realized that they do not have to do anything before participating in a social event. They do not have to prepare food in advance, plan ahead or bring their own food. A participant explained *"I can act as a normal guest. "* Third, they thought that they would not annoy people with the explanation of the coeliac disease. Therefore, the final concept can decrease the negative emotions that coeliac people might face during social events.

Limitations:

It is important to mention the limitation of this testing session. First, the notifications and the To-Do-List were sent by Whatsapp and this could influence the experience of the final concept. The experience of completing the tasks might be different. Additionally participants could not have the overview of the event.

Secondly, due to the measure for the Covid-19, it was not possible to test the final concept with people with several food restrictions. The experience of the final concept might be different since the host should have put an higher effort to prepare the meal. Lastly, coeliac participants could not test in a real situation the final concept due to Covid-19 and they could only give feedback.

6.6 Conclusion and Raccomandation:

This project explored coping strategies used by coeliac people during social events. It mainly focused on two areas: the perception of the gluten-free diet and the coping strategies or problem-solving skills used during social situations. The research shows that people affected by the coeliac disease perceive the gluten-free diet as both the cure for their condition as well as a socially limiting lifestyle that sometimes causes negative emotions and stress.

Due to its restrictive nature, the diet is perceived as a sacrifice or a barrier, especially during social interactions. The safest place by the participants of this study is when they are at home because they can control cross-contamination and be sure that all the food is gluten-free. By contrast, social events might cause stress due to the possibility of not controlling cross-contamination or not finding gluten-free options.

The behaviour of the patients towards the gluten-free diet depends on their experience with the diagnostic process and their symptoms, which vary from person to person. Coeliac people who have a severe immune reaction are inclined to be more anxious with food and social situations that might harm or threat their health.

Therefore, different coping strategies are developed during social events to overcome negative feelings or uncomfortable situations such as not finding gluten-free food. The present study found that coeliac people plan ahead, organize their day based on the social event, research where they can find gluten-free food, and advocate activities to cope with the gluten-free diet. Moreover, there are different factors that can act as facilitators or barriers such as the support of family and friends or the palatability of gluten-free products.

Although coeliac people use different coping mechanisms to overcome uncomfortable situations, this project revealed that the feeling to be unsafe during social events remains. Participants would decide to avoid certain social events or eat before/after social events if they felt to be threatened by gluten contamination. Feeling frustration, anger, neglect and stress might be developed during social events.

In a bid to address these issues, a solution was designed: the final concept is a simple event planner app that enables hosts of social events receiving information about how to create a safe environment for coeliac people and more. The final concept enhances the feeling of security for coeliac people creating empathy and decreasing the negative emotions during social events.

Recommendation:

The final concept detailed in this chapter builds upon several cycles of research, testing and designing, resulting in a solution that effectively creates a safe environment for coeliac people generating empathy during social events. Although the final design addresses the design goal, there are naturally some topics or elements that during the research or design phase were not studied in-depth or tested. One such topic is dining out at public spaces, for example, restaurants or bars. Since the beginning of the research, coping strategies used by coeliac people were investigated in different contexts such as work lunches, family events and at bars. However, due to the Covid-19 measure it was not possible to research and test in this context.

The final design aims to be inclusive for all the other food restrictions such as vegetarian, vegan and lactose. I believe that people with other allergies or food restrictions might encounter the same challenges of celiac people. However, the study was focused only on the coeliac disease and the guidelines that should be respected during the preparation of gluten-free food. Therefore, it should be researched more on the guidelines and the coping strategies for other allergies.

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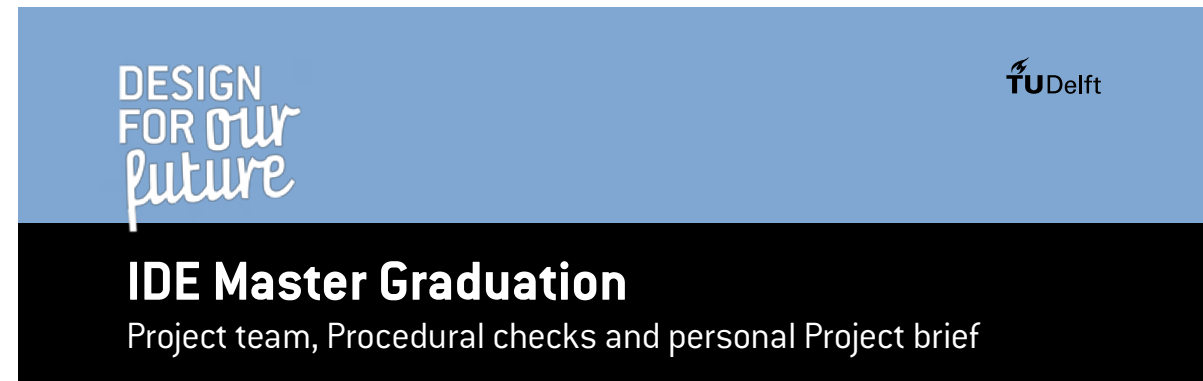
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Zysk, W., Glabska, D., Guzek, D., (2018) Social and emotional fears and worries influencing the quality of life of female celiac disease patients following a gluten-free diet. Nutrients, 10, 1414

Appendix

DESIGN FOR our future

TUDelft

IDE Master Graduation

Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student's IDE Master Graduation Project. This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.

ⓘ **USE ADOBE ACROBAT READER TO OPEN, EDIT AND SAVE THIS DOCUMENT**
Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser.

STUDENT DATA & MASTER PROGRAMME
Save this form according the format "IDE Master Graduation Project Brief_familyname_firstname_studentnumber_dd-mm-yyyy".
Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1 ! ⓘ

family name	Frediani Maria	Your master programme (only select the options that apply to you):	
initials	MF given name Maria	IDE master(s): ( ) IPD [ ] DfI ( ) SPD	
student number	4989252	2nd non-IDE master:	_____ - _____
street & no.		individual programme:	_____ - _____ (give date of approval)
zipcode & city		honours programme:	(Honours Programme Master)
country		specialisation / annotation:	(Medisign)
phone			(Tech. in Sustainable Design)
email			(Entrepeneurship)

SUPERVISORY TEAM **
Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair	dr. J.J. Kraal	dept. / section:	HCD/AED	Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..
** mentor	ir. I. A. Ruiter	dept. / section:	HCD/AED	
2nd mentor				ⓘ Second mentor only applies in case the assignment is hosted by an external organisation.
	organisation:			
	city:	country:		

comments (optional) Professsor Kraal will help me to acquire and apply the knowledge about behaviour change in the project. Due to her experience in the medical field, Professor Ruiter will help me to develop of the end product.

ⓘ Ensure a heterogeneous team. In case you wish to include two team members from the same section, please explain why.

Procedural Checks - IDE Master Graduation

TUDelft

APPROVAL PROJECT BRIEF
To be filled in by the chair of the supervisory team.

chair dr. J.J. Kraal _____   date 02 - 10 - 2020   signature _____

CHECK STUDY PROGRESS
To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair.
The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total: _____ EC   (YES) all 1st year master courses passed

Of which, taking the conditional requirements into account, can be part of the exam programme _____ EC   (NO) missing 1st year master courses are:

List of electives obtained before the third semester without approval of the BoE

name _____   date - -   signature _____

FORMAL APPROVAL GRADUATION PROJECT
To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief marked **.
Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

- Does the project fit within the (MSc)-programme of the student (taking into account, if described, the activities done next to the obligatory MSc specific courses)?
- Is the level of the project challenging enough for a MSc IDE graduating student?
- Is the project expected to be doable within 100 working days/20 weeks ?
- Does the composition of the supervisory team comply with the regulations and fit the assignment ?

Content: (APPROVED) (NOT APPROVED)

Procedure: (APPROVED) (NOT APPROVED)

comments

name _____   date - -   signature _____

Initials & Name MF   Frediani Maria _____   Student number 4989252 _____

Title of Project Coeliac disease as social disease: safety during social events _____

Coeliac disease as social disease: safety during social events

project title

Please state the title of your graduation project (above) and the start date and end date (below). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

start date   02 - 10 - 2020   04 - 03 - 2021   end date

INTRODUCTION *
Please describe, the context of your project, and address the main stakeholders (interests) within this context in a concise yet complete manner. Who are involved, what do they value and how do they currently operate within the given context? What are the main opportunities and limitations you are currently aware of (cultural- and social norms, resources (time, money,...), technology, ...).

The coeliac disease is an autoimmune disease that affects genetically predisposed people when ingesting gluten activating an inflammatory process in the small intestine. The gluten is a protein contained in different cereals including wheat, rye, barley spelt and Kamut. The exposition of this protein causes an immune reaction. The surface that absorbs all the nutrients (villi) becomes flattened and inflamed causing malabsorption. The coeliac disease can develop in any ages, even though the symptoms can develop during early childhood, the diagnosis process could take several years. (www.nhs.uk). A cause of late diagnosis is due to the symptoms that can differ from patient to patient.

According to Calo et al. (2019), this disease affects 1 out of 100 people on the world-wide population. Moreover, it is diagnosed more frequently in women with a female-to-male ration from 2:1 to 3:1. Left untreated and undiagnosed the coeliac disease can cause the development of other several health conditions such as coronary artery disease, small bowel cancers and type 1 diabetes.

The only treatment is a life long gluten-free diet that consists of the total elimination of the gluten from all the food and medication. The diet leads to a regrowth of the intestinal villi and a resolution of the symptoms. Usually, it takes from 6 months up to 5 years for the intestine heals from the gut damage caused by eating gluten. To follow a rigorous diet, experts recommend having separate kitchen tools to prepare gluten-free meals avoiding gluten cross-contamination. This phenomenon of cross-contamination consists of the exposure of gluten-free food or product to food or ingredients that contain gluten during the processing, cooking and serving.

Conducting a strict gluten-free diet results challenging and requires efforts and motivation (Leinonen, H. et al. 2019, Wolf, R.L. et al. 2018). Patients need to be educated to a new diet. They need to reorganise their days and their social life, understand what food they can eat and how to avoid cross-contamination. The creation of new routines, such as looking at labels of food, can affect the patient's adherence towards the diet causing stress and backlashes. (Leinonen, H. et al. 2019)

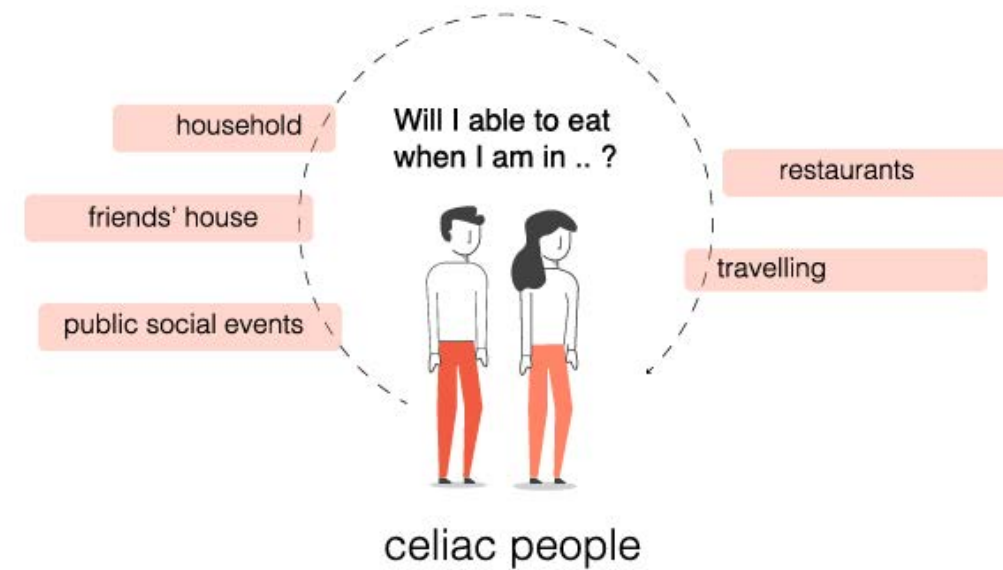space available for images / figures on next page

IDE TU Delft - E&SA Department /// Graduation project brief & study overview /// 2018-01 v30   Page 3 of 7
Initials & Name   MF   Frediani Maria   Student number 4989252
Title of Project   Coeliac disease as social disease: safety during social events

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introduction (continued): space for images

image / figure 1:   Context
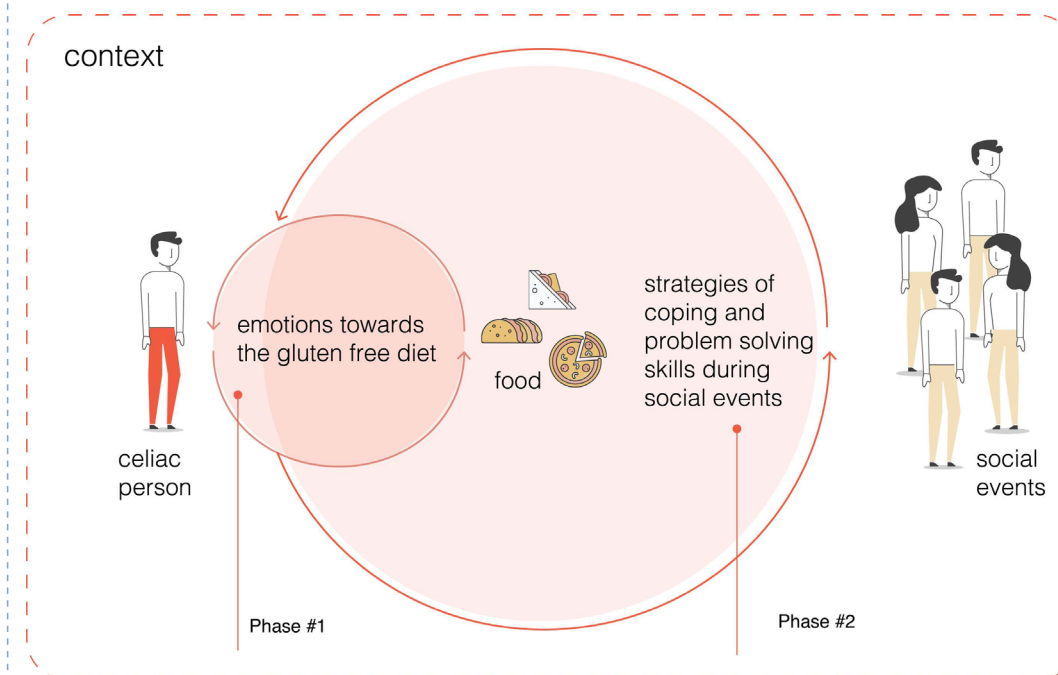
image / figure 2:   Design space of the project

IDE TU Delft - E&SA Department /// Graduation project brief & study overview /// 2018-01 v30   Page 4 of 7
Initials & Name   MF   Frediani Maria   Student number 4989252
Title of Project   Coeliac disease as social disease: safety during social events

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PROBLEM DEFINITION **
Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30 EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

Coeliac disease can be dealt with by following a diet that contains absolutely no gluten. The availability and price of certified gluten-free foods are problems to be considered (Leinonen, 2019). Approximately one out of four patients deal with either dietary compliance or social problems when they have to participate in social events or while travelling (Lee & Newman, 2003).

Avoiding foods with gluten becomes a cause of stress and/or anxiety (Wolf, 2018) when, for example, a patient decides to dine out but it is not possible to find proper gluten-free options. Furthermore, dining with other people might involve the risk of gluten cross-contamination which potentially further complicates social interactions and can interfere with the dining habits of others.

Therefore, how can coeliac people feel safe during social events? How are they coping? How can emotions towards the diet impact their social life? Coeliac disease potentially makes them either avoid social events or opt for foods that can compromise their diets.

ASSIGNMENT **
State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, ... In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

By conducting qualitative research, this project will investigate how coeliac people can feel safe during social events. Understanding which social coping strategies and problem-solving skills that are used by the target group will allow me to explore the design space around the social restrictions of the gluten-free diet. The final deliverable is a product or service that will supports celiac in feeling safe during social events.
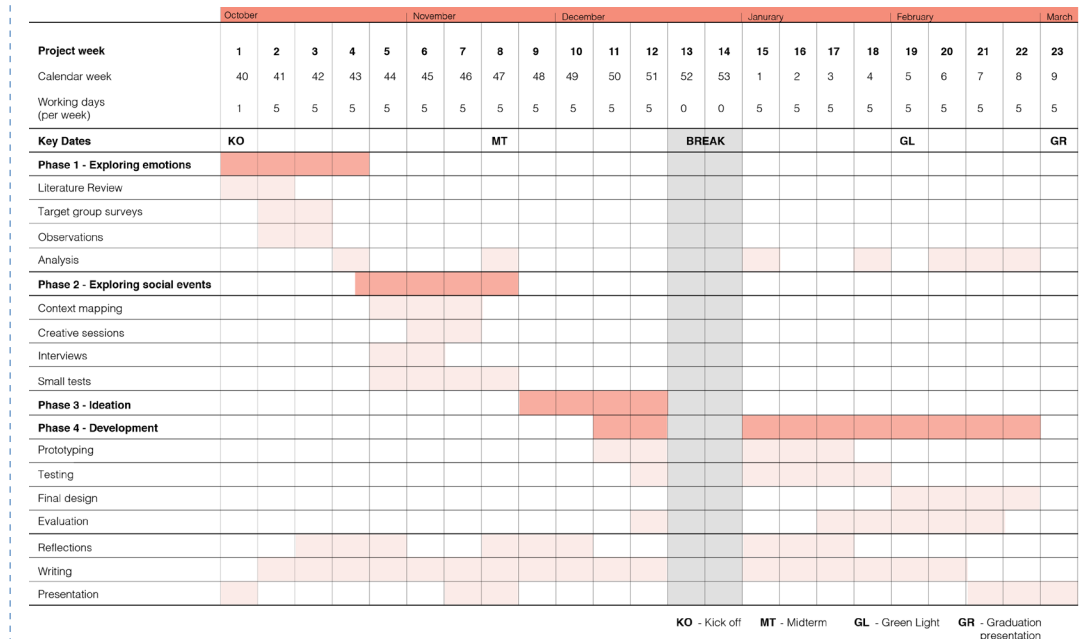
The final deliverable is a product or service that will supports coeliac in feeling safe during social events. The main focus of this project is to develop a product or system that can provide support to coeliac people during social events involving eating out. The final product should be a tool (service or product) that can help coeliac people to feel safe in a place that is not their home. The end product form will be decided based on the research and field research. However, as first ideas, the final derivable might be an easy-to-carry toolkit with all the necessary to cook such as a pan, pot, clattery and cutting-mat to dine out or a service that can trace the amount of gluten in the food.

During the project, I will deliver three different reports for each phase of the project:
- The first report that includes the results of the first and second phase of the report;
- The second report includes the results and insights of the ideation and development phase;
- The final report.

PLANNING AND APPROACH **
Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any, for instance because of holidays or parallel activities.

start date   2 - 10 - 2020   4 - 3 - 2021   end date

	October				November				December				January				February				March
Project week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Calendar week	40	41	42	43	44	45	46	47	48	49	50	51	52	53	1	2	3	4	5	6	7	8	9
Working days (per week)	1	5	5	5	5	5	5	5	5	5	5	5	0	0	5	5	5	5	5	5	5	5	5
Key Dates	KO						MT						BREAK				GL						GR
Phase 1 - Exploring emotions																							
Literature Review																							
Target group surveys																							
Observations																							
Analysis																							
Phase 2 - Exploring social events																							
Context mapping																							
Creative sessions																							
Interviews																							
Small tests																							
Phase 3 - Ideation																							
Phase 4 - Development																							
Prototyping																							
Testing																							
Final design																							
Evaluation																							
Reflections																							
Writing																							
Presentation																							

KO - Kick off   **MT** - Midterm   **GL** - Green Light   **GR** - Graduation presentation

The project will be divided into four different phases and in each of them diverging and converging approach.

The first one is the "Exploring emotions" that involves a literature review, identifying the existing problem and existing solutions, target group survey and observations where key insights where collected. The main focus of this phase is to investigate what the emotions and the feeling of the target group towards the gluten-free diet. This phase aims to be a quantitative research that will create the basis for the next phases.

The second phase is the "Exploring social events" that involves context mapping through creative sessions and interviews to understand needs, values, expectations and behavior. The aim of this phase is to examine what coping strategies or the problem-solving skills are involved during social events. To have a complete view of the context and how to reach the goal of this project, small activities will be conducted such. From this phase on, a qualitative research will start.

In the third phase is the ideation where the initial solutions will generate throughout brainstorming and storyboards.

The last phase is the development that involves prototyping phase and testing solutions generated during the ideation phase. Once analyzed and evaluated the results form the testing, the development of the final design will start. Moreover, the evaluation of the final design is planned.

MOTIVATION AND PERSONAL AMBITIONS
Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities (etc.) and point out the competences you have yet developed. Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge a on specific subject, broadening your competences or experimenting with a specific tool and/or methodology, ... Stick to no more than five ambitions.

As an interaction designer, I have always been interested in people, especially in people's mind and their behaviour. During the last two years as DFI student, I had the opportunity to reflect on the role of design in improving people's well being. I think that through using participatory and human-centred approaches is possible to help people internalise certain concepts and trigger their thoughts, improving their well being and surroundings. Therefore, my aim for this project is to explore the theories on changing behaviours and apply them to develop a product that can have a positive impact on people lifestyle. During the project, I am interested in applying different frameworks such as the product experience in human-product interaction (Desmet & Hekkert, 2007) and the Appraisal Theory (Lazarus, 1991) . Specifically, the two frameworks, mentioned above, might help me during the ideation phase of the project and evaluate the final design.

Due to my personal experience in this topic as a coeliac person, I will understand the complexity of managing a gluten free diet engaging with the coeliac community and emphasizing with them on a deeper level. It will allow me to improve my skills in communication with the stakeholders and to explore coping strategies and methodologies leading me to have a broader understanding of the topic.

Another of my learning goals is regarding project management and approach. My goal is to stay pro-active during the ideation and testing phase pushing my boundaries in the generation of ideas and prototyping them. Additionally, I would like to improve my time-management of the project respecting deadlines and trying to have my graduation presentation three days before the 100 working days.

During the project, I will try to get in touch with the Italian Coeliac Association. They could be a valuable resource for the project sharing their experiences and strategies. Moreover, they could help me in reaching a vast number of participants for this project.

Due to the Covid outbreaks in the Netherlands, it is possible that I will be not able to observe the target group during big social events, such as conferences, lunch meetings or simply in a restaurant. Additionally, the majority of the meetings will be online and this might affects the final results of the project, specifically, the target group might be not able to interact directly with the end design.

FINAL COMMENTS
In case your project brief needs final comments, please add any information you think is relevant.

Appendix II:

User Research

1. Questions of the Survey (Italian)

La dieta senza glutine

CONSENSO

Caro partecipante,

Mi chiamo Maria Frediani e sono uno studente magistrale in Design presso il Politecnico di Delft (Delft University of Technology) in Olanda. Sei invitato a partecipare a questo questionario chiamato "La dieta senza glutine" che fa parte del mio progetto di Laurea "Coeliac Disease: safety during social events". Lo scopo di questo questionario è quello di capire quale sia l'impatto della dieta senza glutine nella vita di tutti i giorni e quali sono le strategie per poter gestire una vita senza glutine.

Una volta riassunti i dati di questo questionario, utilizzerò i risultati per progettare un nuovo prodotto che possa far sentire le persone celiache sicure durante eventi sociali.

Le informazioni raccolte saranno anonime ed utilizzate esclusivamente del contesto del progetto. I risultati saranno condivisi con i professori di questo progetto. I dati potranno essere utilizzati per pubblicazioni scientifiche. Nel caso che venga fatta una pubblicazione scientifica, i dati saranno mostrati solo a livello di gruppo. I risultati saranno presentati in maniera tale che i partecipanti non siano rintracciabili.

La partecipazione in questa ricerca è volontaria. Puoi fermarti ad ogni momento e sei libero di non rispodere ad alcune domande.

Premendo il testo "AVANTI", dai il tuo consenso al trattamento dei tuoi dati.

Se hai qualsiasi domanda riguardante la ricerca, contattami tramite email:

Maria Frediani
m.frediani@student.tudelft.nl

Next

La dieta senza glutine

Quanti anni hai?

- ○ 10-15
- ○ 16-21
- ○ 22-30
- ○ 31-40
- ○ 41-50
- ○ 51-60
- ○ 60+

Da dove vieni?

Choose ▾

Da quanto tempo sai di essere celiaco?

- ○ 1 anno
- ○ 2 anni
- ○ 3 anni
- ○ 4-10 anni
- ○ 10+ anni

Come è cambiata la tua vita dopo la diagnosi?

Your answer

Che cosa significa per te la dieta senza glutine?

Your answer

Quale è il momento peggiore della giornata con la dieta senza glutine?

- ○ colazione
- ○ pranzo
- ○ cena
- ○ merenda

Perchè?

Your answer

Senti che la tua libertà si sia ristretta con la dieta senza glutine?

- ○ si
- ○ No

Segui una dieta senza glutine ferrea? (Non hai mai sgarrato?)

Your answer

Hai mai mangiato cibo non certificato senza glutine? Quando?

Your answer

Partecipi ad alcuni incontri per seguire il tuo stato di salute con il tuo medico curante? Perchè?

Your answer

Questi incontri ti aiutano con la gestione della dieta senza glutine? Perchè?

Your answer

Quando scegli di comprare un prodotto, cosa fai per vedere che è senza glutine?

- ☐ leggi le etichette
- ☐ chiedi informazioni ai commessi
- ☐ controlli su applicazioni

Se utilizzi specifici strumenti, indicane qui:

Your answer

Dove ti senti più sicuro a mangiare senza glutine? perchè?

Your answer

Back   Next

Saresti disponibile per una intervista online ? Lascia qui la tua email, ti scriverò al più presto. Grazie

Your answer

Back   Submit

91

2. Statement Cards from the Survey

A RESTRICTED SOCIAL LIFE

NO EXPLORING DIFFERENT CUISINES	LIMITED SOCIAL EXPERIENCES	SOCIALISING OR WORK LUNCHES ARE DIFFICULT

MISSING SOCIAL EVENTS	DINING OUT IS NOT A GREAT EXPERIENCE	SOCIAL LIFE IS PENALISED

LIMITED DURING LUNCH OR DINNER

LACK OF AVAILABILITY OF GF PRODUCTS

LIMITED GF PRODUCTS	LIMITED FOOD CHOICES	NO GF PRODUCT AVAILABLE	LIMITED OPTIONS

LIMITED PLACE'S CHOICES	REDUCED FOOD CHOICE AT RESTURANTS	NO ALTERNATIVES	

UNPALATABLE GF PRODUCT

ALWAYS THE SAME	IT'S NOT THE SAME THING

QUALITY MATTERS

NO FREEDOM OF DINING OUT

NO THINKING ABOUT GOING OUT	IT IS IMPOSSIBLE TO EAT EVERYWHERE	NOT ANYMORE "I SEE IT AND TAKE IT"

NO THINKING WHAT/WHERE TO EAT	DIFFERENT APPROACH TO EAT OUT	RESTRICTIONS

PLANNING AHEAD

ALWAYS ORGANIZED	BEING ORGANISED	HAVING SOMETHING TO EAT ALWAYS WITH ME

ALWAYS ORGANISED	PLANNING AND ORGANISING	HARD TO ORGANISED TO GO OUT

ORGANIZING	PLANNING AND ORGANISING	

UNTRUSTWORTHY PEOPLE WITHOUT CD

LACK OF PEOPLE'S AWARENESS	PEOPLE DO NOT KNOW ABOUT GLUTEN	PEOPLE'S AWARENESS

NOT EVERYBODY UNDERSTANDS

WORRIES AND STRESS

VERIFY THAT EVERYTHING IS GF	LESS CHOICES AND MORE STRESS	NOT BEING RELAXED WHILE TRAVELLING

WORRIES ON WHERE AND WHEN YOU CAN EAT	FEELING DISCOMFORT	

RESEARCHING

RESEARCH OF THE PLACE TO EAT	RESEARCH AND RESEARCH

RISK OF CROSS-CONTAMINATION

CROSS-CONTAMINATION	PAYING ATTENTION ON WHAT TO EAT

SKIP A MEAL

This statement card didn't fit in the clusters, however it is important to take in account that people might prefer to skip meals in order to adapt themselves to the situation.

---

3. Miro sheet used as stimuli for the Generative Session

01

INTRODUZIONE

Caro partecipante,

Ti ringrazio per aver rinnovato la tua disponibilità per questa intervista online che fa parte del mio progetto di Laurea "Coeliac Disease: safety during social events". Lo scopo di questa intervista è quello di capire quali sono le strategie da voi adottate per poter gestire una vita senza glutine e se il percorso diagnostico, che avete effettuato, può aver influenzato queste strategie.

Vi prego di considerare questa piattaforma come un piccolo opuscolo con tre principali attività.

Una volta riassunti i dati di questa intervista, utilizzerò i risultati per progettare un nuovo prodotto che possa far sentire le persone celiache sicure durante eventi sociali.

Le informazioni raccolte saranno anonime ed utilizzate esclusivamente nel contesto del progetto. I risultati saranno condivisi con i professori che seguono questo progetto. I dati potranno essere utilizzati per eventuali pubblicazioni scientifiche. Nel caso che venga fatta una pubblicazione scientifica, i risultati saranno mostrati solo a livello di gruppo e presentati in maniera che i partecipanti non siano rintracciabili.

La partecipazione in questa ricerca è volontaria. Puoi fermarti ad ogni momento o sei libero di non rispondere ad alcune domande.

Per qualsiasi informazione o problema con la piattaforma contatti:

Maria Frediani
m.frediani@student.tudelft.nl
+39 347 8432879

INSTRUZIONI PER L'USO

Potete trovare gli strumenti di scrittura a sinistra del vostro schermo. Nella immagine qui sotto andiamo a vederli nel dettaglio

Testo: attraverso questo comando potrete creare caselle di testo e post-it di diverse dimensioni

Forme: con questa funzione potrete scegliere di creare delle diverse forme come quadrati, rettangoli oppure frecce

Icone: potrete cercare diverse icone e caricarle su questa piattaforma

Immagini: potrete fare una ricerca per immagini e caricarle su questa piattaforma

Ciao clicca qui e scrivi il tuo nome o un nome di fantasia

02

DALLA DIAGNOSI AD OGGI

Come è cambiata la tua vita dalla diagnosi ad oggi?

Descrivi come è stato il tuo percorso nello scoprire la celiachia evidenziando azioni ed eventi che hanno segnato la vita di tutti i giorni.
Rifletti su come il tuo percorso possa aver avuto un impatto sulla gestione della dieta senza glutine ad oggi.

Sulla **linea del tempo** in corrispondenza dei diversi momenti (pre-diagnosi, diagnosi e post- diagnosi) descrivi con le immagini sottostanti e con un piccolo testo il tuo stato d'animo. Poni le emozioni positive al di sopra della linea del tempo, mentre quelle negative al di sotto.

Copia ed incolla le emozioni qui sotto, puoi sceglierle più di una e scrivi con un post it la tua esperienza. Per scrivere, fai doppio click sullo schermo e posizionali lungo la linea del tempo.

GIOIA AMMIRAZIONE ORGOGLIO SPERANZA SODDISFAZIONE AFFASCINATO DESIDERIO

TRISTEZZA PAURA VERGOGNA DISPREZZO RABBIA NOIA DISGUSTO

PRE-DIAGNOSI   DIAGNOSI   POST-DIAGNOSI

emozioni positive   linea del tempo   emozioni negative

COMANDI UTILI

Creare un post it :
Doppio click sullo schermo

Copiare un elemento:
selezionare un elemento, premere contemporaneamente CTRL e C per Windows, invece per Mac COMMAND e C

Incollare un elemento:
premere contemporaneamente CTRL e V per Windows,
invece per Mac COMMAND e V

04

DIVERSE SITUAZIONI

In questo esercizio vi saranno proposte diverse situazioni e vi sarà chiesto di descrivere in breve cosa avreste fatto e cosa provereste se foste in quella situazione.

Clicca due volte su "rispondi qui..." per scrivere la vostra risposta.

L'aperitivo

Vai a fare un aperitivo con degli amici in un locale dove non sei mai stato e non è certificato da AIC.

Cosa fai ?

Rispondi qui...

Ordini comunque da bere ed insieme alla tua bibita portano patatine, noccoline ed alcuni stuzzichini.

Cosa fai ?

Rispondi qui...

Cosa provi in questa situazione?

Rispondi qui...

05

DIVERSE SITUAZIONI

Una cena da amici

I tuoi amici ti invitano a cena, ma una volta che sei arrivato/a a casa loro noti che non hanno fatto molta attenzione nella preparazione dei piatti senza glutine.

Cosa fai?

Cosa provi in questa situazione?

Cosa avresti fatto se avresti saputo di questa situazione in anticipo? Come ti saresti organizzato?

06

DIVERSE SITUAZIONI

Pranzo di lavoro

Nel caso tu non riesca a far cambiare posto al tu

Cosa fai ?

Cosa provi in questa situazione?

Cosa avresti fatto se non avessi saputo di questa Come ti saresti organizzato?

4. Participants Generative Sessions

PARTICIPANT	AGE	BEING COELIAC (years)
P1	60	1
P2	24	6
P3	55	5
P4	23	5
P5	32	30
P6	25	21
P7	26	16
P8	26	6
P9	32	14

Table 02 - Characteristics of the participants

5. Statement Cards from the Generative sessions

Coping strategies and problem solving skills

Organization

- bringing food also for the other people
- being organized
- bringing at the social event their own food
- bring medications with you
- cooking with other people

Taking initiative

- Decide where to eat for everybody
- manage the organization of the social events
- call the restaurant before and making sure that there is not contamination
- Order to a different take away
- managing the menù of the dinner

Identification

- ask for chips that are packed
- choosing options that they have less probability to contain gluten
- thing that i dont know, i dont eat

Selection

- eating at home and arrive later at the restutant
- selecting social events

Research

- researching places
- using the AIC app
- identify gluten free produtcs
- looking at the labels on the packages

Stating to be coeliac

- Saying to be coeliac
- asking for gluten free food
- remind friends to be ceoliac
- ask for a separete plate
- try to not bother explaining the coeliac disease

Factors

People around the coeliac

- the full family eats home gluten free
- family
- friends
- coeliac association

Lack of knowledge of the disease

- lack of attention from other people
- other people think that you are only researching attention
- lack of knowledge
- people that dont understand the coeliac

Limited choices

- no finding gluten free things
- going to finger food places

Food quality

- the taste of the product

Un-healty behaviour

- risking cross contamination if you are in social events
- skip a meal
- eat something with gluten
- eating sostitutional food
- avoiding uncomfortable situations

Emotions

- Frustrated
- sadness if people dont think about me
- anxiety
- shamed cause people have to thing about you

Desire

- public spaces should have gluten free product
- be able to explore
- being free to eat what i want
- no to think about anything

Appendix III:

Idealitiation and conceptualization

1. Creative session plan

Phase	Activities	Time	Aim	Done	Materials	Notes
Introduction	Welcome	5 min	Welcome participants, explaining the agenda for the evening	☑		
Introduction	Icebreaker	5 min	Put participants at ease	☑	Post-it, markers,	What are you looking for during a social event? - Draw it on a post it and put on the wall
Introduction	Project Brief	10 min	Explain the project and the design goal	☑	Print the design goal and the framework	
Problem Finding	Purge ideas - 01	10 min	Purge dominant ideas	☑	Post-it, markers, pens	In case divide the Problem as Given in: "H2 enhance feeling of security for coeliac people during a social event?" "H2 increase emphaty for a coeliac person? during social events?" "H2 reduce negative emotions for a coeliac people during social events?"
Problem Finding	Reflections and Selections	min	Reflections of the Ideas and selecting them	☑	Give dots	
Problem Finding	Generate H2s	5 min	Reformulate the problem statement	☑		
Idea Finding	Purge ideas - 02	10 min	Purge dominant ideas	☑		
Idea Finding	Absurd questioning	15 min	Going beyond the box	☑		
Idea Finding	Drawing ideas	15 min		☑	A3	
Concept Development	Presentation of ideas	10 min		☑		
Concept Development	Wrap-up	5 min	Conclusion and thank you	☑		

2. Speed Dating meetings

Probes and results

Concept 01

🇮🇹

Una applicazione che permette di creare un evento per una cena o pranzo e mandare consigli o linee guida a chi organizza l'evento sociale.

🇬🇧

An App that allows sending information about how to create a safe environment for a coeliac person. The user can set up his/her profile regarding dietary preferences and invite friends for a social event (i.e. lunch or dinner). Then, the user will select the date and the host of the social event. Before the social event, the host will receive a notification that someone is coeliac. The app will provide information on preparing a safe environment for a coeliac.

Utilizzeresti questa applicazione?
1 ○ ○ ○ ○ ○ 5

è chiara?
1 ○ ○ ○ ○ ○ 5

è utile?
1 ○ ○ ○ ○ ○ 5

Users	Usability	Clear	Utility	Notes
Noemi [OPEN]	5	5	5	It is good for coeliacs, non-coeliac and other allergies. For the participant, it would be perfect. It helps a lot to organise a dinner.
Maria Bruna	5	5	5	It would be useful.
Elisa	5	5	5	
Eva	2	4	4	I wouldn't download an other app
Massimo	5	4	5	Interesting if developed for large group of people. For example for companies.

Concept 02

🇮🇹

Un chatbot / assistente virtuale che propone locali o attività che hanno prodotti SG, "leggendo" la chat.

🇬🇧

This concept consists of a chatbot that detects conversations about social events. It will suggest restaurants and places with gluten free options.

Utilizzeresti questa applicazione?

1 ○ ○ ○ ○ ○ 5

è chiara?

1 ○ ○ ○ ○ ○ 5

è utile?

1 ○ ○ ○ ○ ○ 5

Aa Users	# Usability	# Clear	# Utility	≡ Notes	+
Noemi	5	5	5	It is good, because we need something fast and clear. Maybe something with the menù.	
Maria Bruna	4	5	5	That would be nice, but personally I am not clicking with virtual assistants or chat box. It shouldn't be intrusive. We shouldn't interact with the bot.	
Elisa	4	5	5		
Eva		4		The usability and utility depends on "reading the messages" see the miro board	
Massimo	5	4	5	The notifications shouldn't be intrusive	

Concept 03

🇮🇹

Una applicazione che permette di identificare i piatti senza glutine. Attraverso la fotocamera del telefono la persona celiaca può individuare i piatti senza glutine attraverso AR simboli. Cliccando sui simboli si potranno avere maggior informazioni

🇬🇧

This concept consists of an app that allows the host of the social event to specify food that has gluten. Once arrived at the event, the coeliac person can scan the food with the camera of his/her phone. Food with gluten and gluten-free food will be identified with AR items. Tapping on the items will be shown information and fun facts about the coeliac disease.

Utilizzeresti questa applicazione?

1 ○ ○ ○ ○ ○ 5

è chiara?

1 ○ ○ ○ ○ ○ 5

è utile?

1 ○ ○ ○ ○ ○ 5

Aa Users	# Usability	# Clear	# Utility	≡ Notes	+
Noemi	5	3	2	Complexed for other people. People do not know which GF products. It is not clear if it feasible. The participant will not trust the person who is hosting the event. High level of contamination	
Maria Bruna	5	5	5		
Elisa	5	5	5		
Eva	5	5	2	The participant wouldn't trust who is organizing the food or the event	
Massimo	2.5	2.5	2.5	The app is busy and complicated for who is organizing the event	

Concept 04

🇮🇹

I cibi vengono serviti su piatti colorati ed attraverso la fotocamera del telefono si potrà scansionare i piatti e un quiz da risolvere in gruppo apparirà.

🇬🇧

The concept is similar to concept 03. The meals of the social event will be served on plates with different colours. The coeliac person with his/her friends can scan the plate through the camera of their phone and a quiz to solve in a group will pop-up.
This concept can be used in restaurants or bars.

Utilizzeresti questa applicazione?
1 ○ ○ ○ ○ ○ 5

è chiara?
1 ○ ○ ○ ○ ○ 5

è utile?
1 ○ ○ ○ ○ ○ 5

Aa Users	# Usability	# Clear	# Utility	≡ Notes	+
Noemi	5	5	4		
Maria Bruna	4	5	4		
Elisa	3	5	3	It is difficult to involve other people in the game.	
Eva	3	4	3.4	I wouldn't like the spot light on me	
Massimo	2	5	1	I like just to eat when we are at the dinner but i would need some glass of wine in order to play	

Concept 05

🇮🇹

Un servizio che manda delle box con all'interno del cibo di aziende locali senza glutine e un gioco di carte. Per poter mangiare il cibo all'inetrno della box, i partecipanti dovranno giocare ad un gioco di carte.

🇬🇧

The concept is a service that provide a personalized box. In the box, users will find food from local places and a card game. In order to eat the food, users will have to play a game about diets and coeliac disease.
This concepts wants to involves small realities that produce gluten-free food. From the user research, participants cannot find products for breakfast or lunch.

Utilizzeresti questa applicazione?
1 ○ ○ ○ ○ ○ 5

è chiara?
1 ○ ○ ○ ○ ○ 5

è utile?
1 ○ ○ ○ ○ ○ 5

Aa Users	# Usability	# Clear	# Utility	≡ Notes	+
Noemi	4	5	3	This could be to find new places. The restaurants should do it, especially for these pandemic situation. The concept is nice, but without the card game is better.	
Maria Bruna	5	5	5	That could be nice if the game is fast. The card could be recipes and not a game.	
Elisa	5	5	5		
Eva	5	4	5	It would be nice to know new realities	
Massimo	1	5	1	I like just to eat when we are at the dinner but i would need some glass of wine in order to play	

3. Harris profile

Qualities and Results

Interaction	Does it enable collaboration between coeliacs and non-coeliac people?
Security	Does this concept create a safe environment for people affected by coeliac disease?
Simple	Is the concept easy to understand and use?
Empathy	Does it generate empathy among coeliac people and people present at the social event?
Feasible	Are there any technical considerations that may obstruct ...

Concept 01

	--	-	+	++
Interaction				■
Security			■	
Simple			■	
Empathy			■	
Feasible			■	

Concept 02

	--	-	+	++
Interaction		■	■	
Security			■	
Simple			■	
Empathy		■		
Feasible		■	■	

Concept 03

	--	-	+	++
Interaction		■		
Security	■			
Simple			■	
Empathy	■			
Feasible			■	

Concept 04

	--	-	+	++
Interaction			■	
Security	■	■		
Simple			■	
Empathy		■		
Feasible			■	

Concept 05

	--	-	+	++
Interaction		■		
Security	■			
Simple		■	■	
Empathy	■			
Feasible			■	

4. First Iteration
User Plan

User Test Plan + Add a view   🔍 Search ⤢ ⋯ **New** ⌄

Aa Activities	☑ Done	≡ Time	≡ Notes	+
Welcome and introduction	☐	10 min	Send link for prototype	
Explanation of the concept	☐	5 min		
Tasks : 1. Create an event 2. Simulation of the Notification 3. Scan the products	☐	15 min		
Feedback // Reflection	☐	10 min	Send link survey	
Wrap-up	☐	5 min		
Remind participants to do the survey	☐	—		

+ New

User Test - concept 01

CONSENSO

Caro partecipante,

Mi chiamo Maria Frediani e sono uno studente magistrale in Design presso il Politecnico di Delft (Delft University of Technology) in Olanda. Sei invitato a partecipare a User Test - concept 01 che fa parte del mio progetto di Laurea "Coeliac Disease: safety during social events". Dopo aver testato l'applicazione ti prego di effettuare il seguente questionario.

Una volta riassunti i dati di questo questionario, utilizzerò i risultati per progettare un nuovo prodotto che possa far sentire le persone celiache sicure durante eventi sociali.

Le informazioni raccolte saranno anonime ed utilizzate esclusivamente del contesto del progetto. I risultati saranno condivisi con i professori di questo progetto. I dati potranno essere utilizzati per pubblicazioni scientifiche. Nel caso che venga fatta una pubblicazione scientifica, i dati saranno mostrati solo a livello di gruppo. I risultati saranno presentati in maniera tale che i partecipanti non siano rintracciabili.

La partecipazione in questa ricerca è volontaria. Puoi fermarti ad ogni momento e sei libero di non rispondere ad alcune domande.

Premendo il testo "AVANTI", dai il tuo consenso al trattamento dei tuoi dati.

Se hai qualsiasi domanda riguardante la ricerca, contattami tramite email:

Maria Frediani
m.frediani@student.tudelft.nl

Next

User Test - concept 01

*Required

General information

Quanti anni hai? *

Your answer

Hai delle allergie e/o intolleranze alimentari? O segui un regime alimentare? *

○ Si
○ No

Hai delle allergie e/o intolleranze alimentari? O segui un regime alimentare? *

○ Si
○ No

Sei ... *

○ Celiaco
○ Sensibile al glutine / Intollerante al glutine
○ Vegetariano
○ Vegano
○ Nessuno delle prime

Back   Next

For participants with no food restrictions

Utilizzeresti questa applicazione? *

	1	2	3	4	5	
No per niente	○	○	○	○	○	Si molto

Perchè? *

Your answer

Secondo te questa applicazione è chiara? *

	1	2	3	4	5	
No per niente	○	○	○	○	○	Si molto

Perchè? *

Your answer

Sai cosa è la celiachia ?

	1	2	3	4	5	
No per niente	○	○	○	○	○	Si, molto

Riusciresti ad imparare come creare un posto sicuro per una persona celiaca attraverso l'uso di questa applicazione? *

	1	2	3	4	5	
No, per niente	○	○	○	○	○	Si molto

Perchè?

Your answer

Secondo te applicazione può aiutare ad empatizzare con un celiaco? *

	1	2	3	4	5	
No per niente	○	○	○	○	○	Si molto

Perchè? *

Your answer

Che tipo di informazioni riguardanti la celiachia vorresti ricevere quando prepari un evento sociale? (Cena, pranzo, ecc.) *

Your answer

Come vorresti ricevere queste informazioni? (es. come una lista di cose da fare, approfondimenti ecc.) *

Your answer

Pensi che le notifiche riguardo l'evento siano intrusive? *

	1	2	3	4	5	
No per niente	○	○	○	○	○	Si molto

Perchè? *

Your answer

Utilizzare questa applicazione ti fa sentiere

☐ Rilassato
☐ Felice
☐ Stressato
☐ Paura
☐ Annoiato
☐ Curioso
☐ Calmo
☐ Indifferente
☐ Arrabbiato
☐ Contento

Cosa cambieresti di questa applicazione? *

Your answer

For participants with food restrictions

Utilizzeresti questa applicazione

	1	2	3	4	5	
No, per niente	○	○	○	○	○	Si, molto

Perché?

Your answer

Secondo te questa applicazione è chiara?

	1	2	3	4	5	
No per niente	○	○	○	○	○	Si molto

Perchè?

Your answer

Pensi che questa applicazione ti possa aiutare a gestire la dieta senza glutine fuori casa?

	1	2	3	4	5	
No per niente	○	○	○	○	○	Si molto

Perchè?

Your answer

Pensi che le notifiche siano intrusive?

○ Si
○ No

Perchè?

Your answer

Ti sentiresti al sicuro ad andare a mangiare a casa di qualcuno che utilizza questa applicazione?

○ Si
○ No

Perchè?

Your answer

Che tipo di informazioni riguardanti altre allergie alimentari vorresti ricevere quando prepari un evento sociale? (Cena, pranzo, ecc.)

Your answer

Nel caso venga utilizzata questa applicazione, ti sentiresti comunque in dovere di specificare che sei celiaco o che hai una intolleranza al glutine?

○ si
○ No

Perchè?

Your answer

Utilizzare questa applicazione ti fa sentiere

☐ Rilassato
☐ Felice
☐ Stressato
☐ Paura
☐ Annoiato
☐ Curioso
☐ Calmo
☐ Indifferente
☐ Arrabbiato
☐ Contento
☐ Insicuro

Cosa cambieresti di questa applicazione?

Your answer

Back   Next

5. Second Iteration

Participants

Aa Partcipants	# Age	⚙ Concept	☑ Coeliac	☑ Gluten sensivity	☑ Anything
P1	25	Concept 02	☐	☐	☑
P2	32	Concept 02	☑	☐	☐
P3	26	Concept 02	☑	☐	☐
P4	23	Concept 02	☑	☐	☐
P5	24	Concept 02	☑	☐	☐
P6	30	Concept 02	☐	☐	☑
P7	26	Concept 02	☑	☐	☐
P8	30	Concept 02	☑	☐	☐
P9	60	Concept 02	☑	☐	☐
P10	29	Concept 02	☐	☐	☐
P11	30	Concept 02	☐	☐	☑
P12	27	Concept 02	☑	☐	☑
P13	60	Concept 02	☑	☐	☐
P14	22	Concept 02	☐	☐	☑

+ New

Test Planning

Phases	Tasks	Questions	Stimuli	+
00 - Welcome	Brief Explaination		Send the link for Usability test	
01 - App Exploration	Registration to the Service			
01 - App Exploration	Exploration of the app			
01 - App Exploration	Create an event			
01 - App Exploration	Review the event	How did you experience the prototipe? What do you think about the overview of the event? Would you like have more information about the food restrictions?		
02 - PreEvent	Receive the notification	Do you think that the notifications are intrusive?	The researcher share the screen	
02 - PreEvent	Check To-do-List	What do you think about the To-do-List? Which kind of information would you like to have?		
		To no-coeliac person: would you empathise with a coeliac person?		
03 - Invitation	Receive the invitation		Send the link for usability test	
03 - Invitation	Registration to the event	Would you like to register with your email?		
03 - Invitation	Choose to be the host X2			
03 - Invitation	Download the app	Would you download the app if you where the host?		
03 - Invitation	Receive the email	Would you like to receive the notification about the event through email if you were the host? Would you read them?		
00-Wrap up	Wrap-up	How do you feel about the all experience? What do you think?		

Appendix IV:

Final Evaluation

Plans

Evaluation Plan - No food restrictions Participants

Phases	Tasks	Research Activities	Set up	Notes
01-PreDinner	Welcome		This part of the test can be done remotely or in person. It will depend on the preferences of the participant.	
01-PreDinner	Brief of the activities		The link to the prototype will be provided.	
01-PreDinner	Exploration of the concept	Qualitative research - Usability test / Observation		
01-PreDinner	Evaluation of the all experience	Quantitive research - Survey		A survey will be send to the participant
02-PreparationDinner	Dinner		The participant will be ask to prepare a dinner for a coeliac person	
02-PreparationDinner	Notification		The preparation of the dinner will be remotely. The research will send notification through whatsapp.	3xNotification will send
02-PreparationDinner	Receiving the To-Do-List		The researcher will send the To-do-List through whatsapp	
03-Dinner	Dinner evaluation	Qualitative Research- Questions/Observation	The researcher will go to have dinner to the partcipant	
03-Dinner		Quantitive research - Suvey		A survey will send to the participant

It is possible to try the stimuli used for this test at this link

https://cloud.protopie.io/p/e31174dd05/7?ui=true&mockup=true&touch-Hint=true&scaleToFit=true&cursorType=touch

Evaluation Plan - Coeliac Participant + Add a view

☰ Phases	Aa Tasks	☰ Research Activities	+
00- Welcome	Welcome and brief of the activities		
01 - Receive Invitation	Registration to the event as guest	Qualitative Research - Usability test /Observation	
02 - Evaluation	Evaluation of the experience	Quantitive Research - Survey	

It is possible to try the stimuli used for this test at this link

https://cloud.protopie.io/p/c97c9f1cd1/2?ui=true&mockup=true&touchHint=true&scaleToFit=true&cursorType=touch

Final Evaluation - User Test with host
First Part

Final Evaluation - Host part 01

INFORMED CONSENT

Dear participant,

I am Maria Frediani and I am a master student in Design Engineering at Delft University of Technology (TU Delft). You are invited to participate in this survey on "Final Evaluation - Host part 01", part of my graduation project "Coeliac Disease: safety during social events".

After summarizing the data from this survey, I will use the data to design a new product to feel coeliacs safe during social events.

The information will be anonymized, used in the context of this project, and shared with the chair and mentor of this project. The data might be used for scientific publications. In the case of scientific publications, the data will be shown on a group level only. The results will be presented in such a way that the participants cannot be traced.

Participating in this research is voluntary. You can stop at any moment and if you don't want to answer a certain question you are always free to say so.

By pressing the button"NEXT", you are acknowledged of this informed consent.

If you have questions at any time about the research, please, contact me.

Maria Frediani
m.frediani@student.tudelft.nl

Next

Final Evaluation - Host part 01

*Required

Questions

How old are you?

Your answer

Do you have any specifics food restrictions?

○ yes

○ No

○ Other: _____

Did you know before this meeting about the coeliac disease?

	1	2	3	4	5	
Not at all	○	○	○	○	○	Yes a lot

Would you use this app? *

	1	2	3	4	5	
Not at all	○	○	○	○	○	Yes a lot

Why? *

Your answer

Do you think that the app is clear ? *

	1	2	3	4	5	
No at all	○	○	○	○	○	Yes a lot

why ? *

Your answer

Do you think that by using this app you would learn how to prepare a safe place for a coeliac person? *

	1	2	3	4	5	
Not at all	○	○	○	○	○	Yes a lot

Why? *

Your answer

By using this app, do you think that you would empathise with a coeliac person? *

	1	2	3	4	5	
Not at all	○	○	○	○	○	Yes a lot

Why? *

Your answer

Final Evaluation - User Test with host
Second Part

Final Evaluation - Host part 02

INFORMED CONSENT

Dear participant,

I am Maria Frediani and I am a master student in Design Engineering at Delft University of Technology (TU Delft). You are invited to participate in this survey on "Final Evaluation - Host part 02", part of my graduation project "Coeliac Disease: safety during social events".

After summarizing the data from this survey, I will use the data to design a new product to feel coeliacs safe during social events.

The information will be anonymized, used in the context of this project, and shared with the chair and mentor of this project. The data might be used for scientific publications. In the case of scientific publications, the data will be shown on a group level only. The results will be presented in such a way that the participants cannot be traced.

Participating in this research is voluntary. You can stop at any moment and if you don't want to answer a certain question you are always free to say so.

By pressing the button"NEXT", you are acknowledged of this informed consent.

If you have questions at any time about the research, please, contact me.

Maria Frediani
m.frediani@student.tudelft.nl

Next

Final Evaluation - Host part 02

*Required

Questions

How old are you ? *

Your answer

Do you have any food restrictions? *

○ Yes
○ No
○ Other: _____

Now that you experience having a coeliac person for dinner, would you use this app? *

	1	2	3	4	5	
Not at all	○	○	○	○	○	Yes a lot

Why? *

Your answer

Do you think that the notifications are intrusive? *

	1	2	3	4	5	
Not at all	○	○	○	○	○	Yes a lot

Why ? *

Your answer

By using this app would you learn how to create a safe environment for a coeliac? *

	1	2	3	4	5	
Not at all	○	○	○	○	○	Yes a lot

Why? *

Your answer

How would you describe with one word the all experience of having a coeliac person for dinner? *

Your answer

The experience of the app made you feel..

☐ Relaxed
☐ Angry
☐ Curious
☐ Happy
☐ Bored
☐ Content
☐ Annoyed
☐ Calm

Now that you experience of preparing a dinner for a coeliac person, would you empathise with coeliac people? *

	1	2	3	4	5	
No at all	○	○	○	○	○	Yes a lot

Why? *

Your answer

What would you change of the app? *

Your answer

Any comments /suggestion?

Your answer

Back   Next

Final Evaluation - Guests

CONSENSO

Caro partecipante,

Mi chiamo Maria Frediani e sono uno studente magistrale in Design presso il Politecnico di Delft (Delft University of Technology) in Olanda. Sei invitato a partecipare a questo questionario chiamato "Final Evaluation-Guests" che fa parte del mio progetto di Laurea "Coeliac Disease: safety during social events".

Una volta riassunti i dati di questo questionario, utilizzerò i risultati per progettare un nuovo prodotto che possa far sentire le persone celiache sicure durante eventi sociali.

Le informazioni raccolte saranno anonime ed utilizzate esclusivamente del contesto del progetto. I risultati saranno condivisi con i professori di questo progetto. I dati potranno essere utilizzati per pubblicazioni scientifiche. Nel caso che venga fatta una pubblicazione scientifica, i dati saranno mostrati solo a livello di gruppo. I risultati saranno presentati in maniera tale che i partecipanti non siano rintracciabili.

La partecipazione in questa ricerca è volontaria. Puoi fermarti ad ogni momento e sei libero di non rispodere ad alcune domande.

Premendo il testo "AVANTI", dai il tuo consenso al trattamento dei tuoi dati.

Se hai qualsiasi domanda riguardante la ricerca, contattami tramite email:

Maria Frediani
m.frediani@student.tudelft.nl

Final Evaluation - Guests

*Required

Domande

Quanti anni hai?

Your answer

Pensi che utilizzeresti questa app? *

	1	2	3	4	5	
No per niente	○	○	○	○	○	Si molto

Perchè? *

Your answer

Pensi che utilizzando questa app, le altre persone possono capire cosa è la celiachia? *

	1	2	3	4	5	
No per niente	○	○	○	○	○	Si molto

Perché? *

Your answer

Pensi che questa app potrebbe aiutarti nell'essere più tranquill* riguardo la contaminazione durante eventi sociali? *

	1	2	3	4	5	
No per niente	○	○	○	○	○	Si molto

Perchè? *

Your answer

Come descriveresti con una parola l'esperienza di questa app? *

Your answer

Cosa cambieresti di questa app? *

Your answer

Ti sentiresti al sicur* ad andare a mangiare a casa di qualcuno che utilizza questa applicazione? *

	1	2	3	4	5	
No per niente	○	○	○	○	○	Si molto

Perché?

Your answer

Nel caso venisse utilizzata questa applicazione, ti sentiresti comunque in dovere di specificare che sei celiaco o che hai una intolleranza al glutine? *

○ Si

○ No

Perchè? *

Your answer

Utilizzare questa applicazione ti fa sentiere questa app?

☐ Rilassato

☐ Felice

☐ Stressato

☐ Annoiato

☐ Curioso

☐ Vergogna

☐ Sicuro

☐ Paura

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Cosa cambieresti di questa applicazione?

Your answer

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