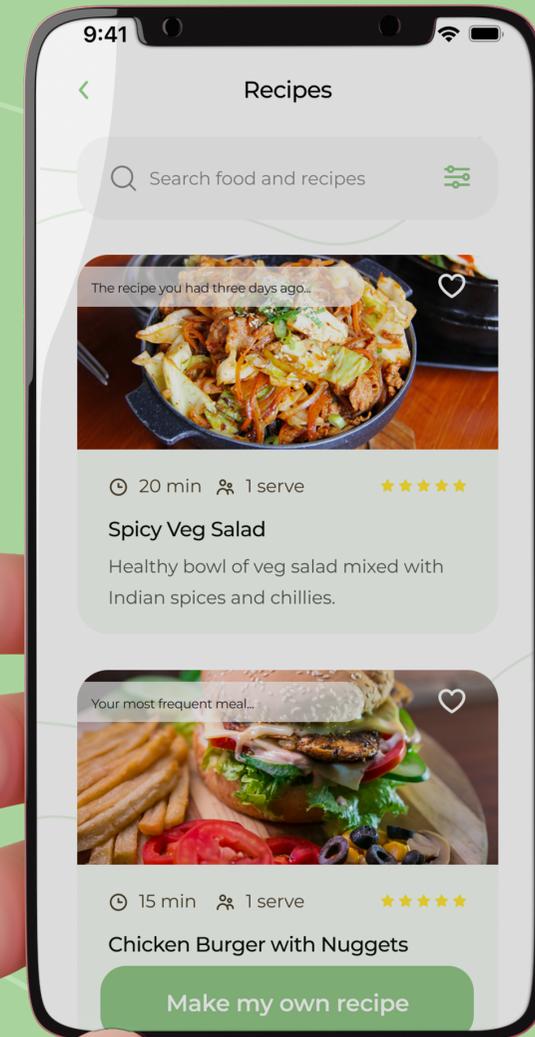


Positive Eating:

Fostering **Wellbeing** in
Healthy **Eating** Experiences
Supported by **AI-Driven**
Systems

Master Graduation Thesis
Yi Liu



**Positive Eating:
Fostering Wellbeing in Healthy Eating
Experiences Supported by AI-Driven Systems**

Master Thesis | 21 August 2023

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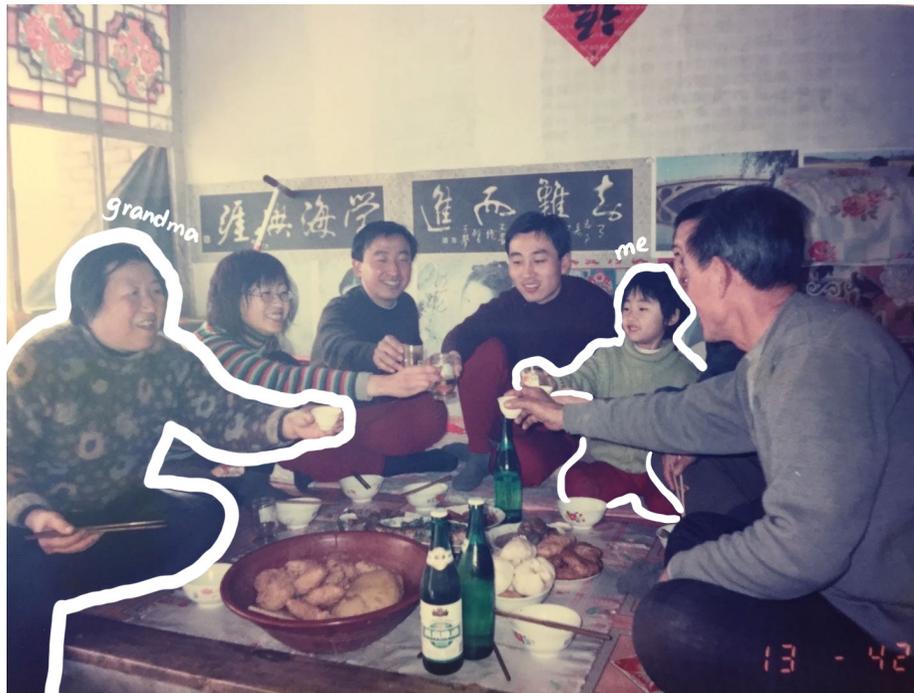


PREFACE

My grandma was a woman from a small village. She never went to any big cities except for Beijing, let alone overseas countries such as the Netherlands. She never went to school so she had little knowledge of physics or mathematics, but she did know how to cook; she was a great chef. I was raised by her. I can still remember the times when I awoke to the smell of the breakfast that she cooked when I was little - just a few slices of ham, a fried egg, a few slices of cucumber, two slices of toast - together an easy snack, but my favourite “grandma-brand” sandwich. It is weird that no one can make that easy sandwich the same as hers; I haven’t ever tasted even one the same since then. Maybe she cooked the egg differently, maybe she added some secret sauce to the sandwich - I never knew. Maybe it’s just because it’s made by her. All of her cooking had some kind of special smell, it’s hard to describe but I would know that it was her cooking just from the smell out of the kitchen. I would always think of her when I tasted her food. I loved the times when my relatives gathered around to have a big meal cooked by grandma. She passed away last year and I couldn’t see her for the last time because I was in the Netherlands. Her special recipes died along with her and her special sandwich will never again exist in this world, just as her. I wish I could have tasted her cooking more carefully before I left China, as I would have if I knew it was the last time.

She’s one of the biggest reasons I chose eating as the context of this project. I’d like to devote this little thesis to my beloved grandma. She’s the one who taught me about cooking; she’s the one who made me realise that food is so deeply related to memories. In this fast world, having a slow and decent meal seems to be rare in most people’s lives, including for myself. We often just fill ourselves quickly so we can get to the next task, without even realising what the food tastes like. My initial idea is to let people sit down and have a nice and memorable meal with their loved ones. If you start to think about your food and the people who you eat with more after reading this, then my goal is achieved.

I hope you enjoy reading this research, and appreciate your every meal from now on!



Dedicated to my grandma

EXECUTIVE SUMMARY

Background

What is healthy eating? Is it simply the intake of correct quantities of certain nutrients, regardless of how and where? The general issue which this project addresses is that of improving wellbeing within the broad context of eating.

Many eating-related guidance products have a hyper-focus on nutrition and/or weight loss, to the detriment of a wider definition of “health”. Wellbeing is not just about physical health metrics, but has a deeper psychological foundation based on various factors such as relationships with others, mindfulness, feeling purpose, and autonomy. Eating experiences should focus on these in order to achieve a truly healthy relationship with food, and an improved level of wellbeing in overall life.

With AI becoming ever-powerful, adaptable, and intelligent, it is perhaps surprising that it has not made as much impact on answering these questions as on others. Positive AI builds on the framework of positive design in order to do this, and this project aims to produce a tangible example of how this can be done.

Research and Design Procedure

This project focuses on tackling the issue within the specific context of eating at home. That is, planning, preparing meals either with friends/family or alone, and eating them. This simplified context retains a lot of nuance, but simplifies the focus regarding building relationships and autonomy, for example, since there are less restrictions and unknown factors here. By gaining an understanding of this and how design and AI can be applied in determined

ways, actual results can be obtained. The problem is therefore to promote mindful home-dining experiences by providing a service in which users can feel both in control of what they eat and closer to their loved ones.

Final Design Outcome and the Future

The problem is addressed by designing an app-based intervention system which harnesses the power of AI to create a highly-personalised recipe and experience (company or activity) recommendation system. It facilitates these with the goal of improving wellbeing based on a psychological wellbeing model tailored to the specific context, and learns based on user trends and past experiences. The wellbeing model, based on design analyses of various apps in the broader eating context in combination with wellbeing theories, gives initial direction. User testing and iterations lead to FoodVibe, the app intervention. This is then thoroughly scrutinised in an evaluation section, leading to future recommendations becoming clear.

In the future, I foresee that AI aspects - machine learning especially - will become more integrated into various aspects of wellbeing-related design. The outcome of this project will provide an example of the direction in which this could happen. Future iterations may expand the context, so that wellbeing can be emphasised in numerous other eating contexts. As wellbeing theories themselves become better understood, the foundations on which the app is built can be made more pointed and efficient. More user testing on a longer scale can also help to identify which features are most crucial and lead to an ever-streamlined design; on of the primary design goals.

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INTRODUCTION

D1

This chapter introduces the background of this project and discusses the problems that need to be tackled. Afterwards, the chapter details the project assignments and goals. Finally, the chapter presents an overview of the approach, describing the main activities that have been done to develop the project.

1.1 PROJECT INTRODUCTION

Food is the most fundamental conscious consumption in a person's daily life. After a hectic day, a great meal can provide ultimate satisfaction and comfort to most people. In recent years, there has been an increasing focus on healthy eating and holistic food experiences, which has led to a shift in the way people perceive their relationship with food (Mahr et al., 2013). However, current solutions mostly focus on helping people build a healthy and balanced diet in terms of the nutrition composition of daily meals by using smart technologies. For example: the DayTwo app, which assesses various food items based on their potential impact on users' blood sugar levels and aids users in selecting healthier food options (Ravindran, 2022). One of the limitations is that current designs may not always consider individual preferences and the nature of eating experiences; in other words, not paying enough attention to subjective wellbeing (Ryan, 2022). They track food consumption and nutrition intake, but neglect to consider user experiences and wellbeing consequences in any detail. Users may not have the long-term motivation to stick to healthy eating behaviours without customised and sustainable interventions.

There has been increasing attention towards designing for wellbeing, known as positive design. By positive design, it is meant that explicit attention is paid - during design research and in the design intention - to the effects on the subjective wellbeing of individuals or communities (Desmet & Pohlmeier, 2013). As artificial intelligence (AI) systems become more advanced, their use in aiding positive design is becoming a possibility. These systems can accurately analyse vast amounts of data quickly, make intricate decisions, and tailor their functions to various scenarios. Therefore, it may be possible that they can help entire communities looking to better their mental health levels and wellbeing, if implemented in a correct way (D'Alfonso, 2020). In this project, I will focus on enhancing wellbeing via healthy eating experiences, by creating human-centred interventions supported by AI. The project is an example of how design with AI can be used to optimise wellbeing in complex contexts, which was not widely researched in the past.

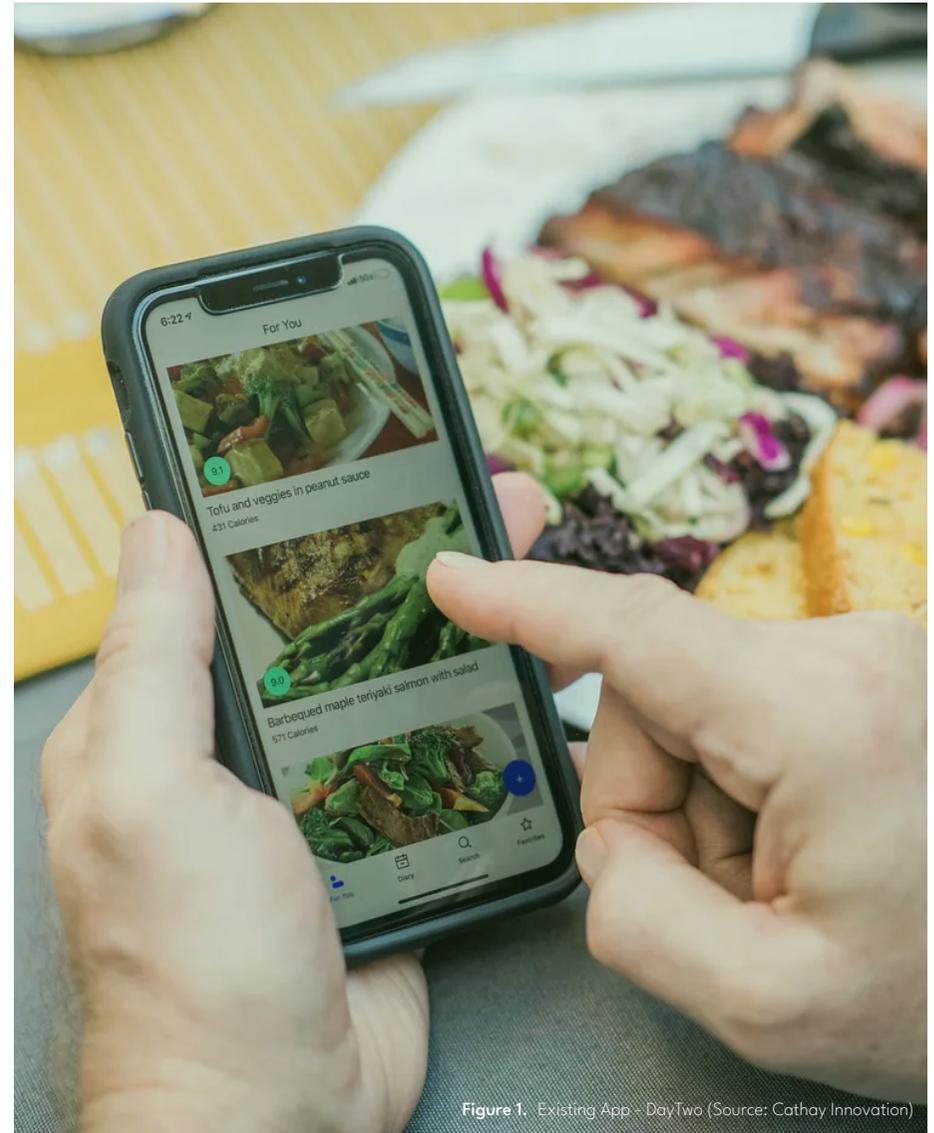


Figure 1. Existing App - DayTwo (Source: Cathay Innovation)

1.2 PROBLEM DEFINITION

1.2.1 THE PROBLEM

Limited perception of healthy eating experiences

Poor eating behaviours can have a significant impact on the overall wellbeing of individuals, in terms of both physical and mental health. However, healthy food consumption has been simply conceptualised as a matter of nutrition intake, rather than a holistic and emotional experience in most contexts of healthy eating (Gottlieb et al., 2022). This lack of knowledge regarding the true nature of healthy eating and the relationships between people and food also has unfavourable repercussions including disordered eating habits, lack of variety and delight in food, and a failure to pay attention to hunger and satiety cues.

Negative effects induced by current services

Due to the growing availability of food consumption tracking and suggestion applications (apps) in app stores, more people are now using smartphones to keep track of their food intake or determine the nutritional values of foods (Samad et al., 2022). However, most of these apps exclusively focus on weight loss, or calorie restriction, as the sole indicators of healthy eating, overlooking other essential aspects such as psychological wellbeing and contextual factors. This narrow focus may lead to an unsustainable approach. Even more severely, it may contribute to unhealthy relationships with food; fostering anxiety, guilt, and an increased risk of developing disordered eating patterns.

What's more, while these apps can provide general guidance, they often lack personalised advice tailored to individual needs, preferences, and health conditions. This uniform approach may not account for unique dietary requirements or factors that influence personal eating experiences.

Complexity in designing with AI for wellbeing

Enhancing wellbeing in eating experiences is a challenging and complex issue to address, given that the contextual factors that impact wellbeing are intangible and vary between individuals. Designing AI systems which can account for these contextual factors and offer appropriate recommendations requires sophisticated algorithms and extensive data analysis. Moreover, eating behaviours are influenced not only by nutritional needs but also by emotional and psychological factors such as stress, mood, and social dynamics. Designing AI systems that can effectively address these factors, provide support, and promote mindful eating practices requires a nuanced understanding of human psychology and behaviour. Currently, the application of AI technology to positively enhance wellbeing in healthy eating experiences has yet to be widely investigated.

In conclusion, research and design that can promote wellbeing in the context of eating are still underexplored. Therefore, the main challenges remain in this project: what are the factors that impact wellbeing and how can design intervene to optimise wellbeing in healthy eating experiences?

1.2.2 THE ASSIGNMENT

The initial project assignment was delineated in the article "A Human-Centered Design Method for Positive AI" (van der Maden, 2023). This study pointed out that there is a lack of examples and established methods for incorporating wellbeing into the core of AI design. Therefore, a Positive AI Design Method was introduced to help designers be considerate of and address the challenges presented in the paper.

This project focuses in particular on designing the interventions of AI systems for wellbeing in the context of healthy eating. In order to fulfil this goal, the preliminary

method of van der Maden et al. is assessed and developed further throughout this project, intending to tackle specific challenges pointed out in the article. More specifically, wellbeing aspects relevant to users' healthy-eating-service experiences are identified by establishing connections between wellbeing theories and existing services. After analysing the relevant factors, wellbeing metrics are identified and applied to design outcomes for measuring wellbeing contextually. The design is evaluated and updated through user tests. Finally, a tangible design is delivered in the form of a service system that can positively affect wellbeing in people's daily eating experiences.

1.3 PROJECT GOAL AND SCOPE

1.3.1 PROJECT GOAL

This project's overarching objective is to foster wellbeing in healthy eating experiences supported by AI-driven systems. The desired outcome is a sustainably-effective intervention that can facilitate users in having mindful healthy eating experiences, while feeling in control of what they eat every day.

1.3.2 PROJECT SCOPE

Despite the complexity and variety in the context of eating, it has been decided that this project will focus on home-dining experiences with family and friends, due to time and workload limitations. Subjects such as food delivery services or healthy diets for illness will not be covered in this project.

Target Group

The target users are **dietary app users** who want to have better home dining experiences; eat healthily but not be restricted by calorie intake amount; and be more aware of their relationship with food by reflecting on what they eat every day. However, due to the special needs of children and the elderly, they will not be included in the target group for this project.

People being influenced in the context are eating partners who want to have better dining-together experiences and strengthen bonding with each other by creating unforgettable memories.

Stakeholders

The stakeholder mapping is illustrated in Figure 2. Within the scope of this project, I will focus on the interactions between users, social connections and AI-driven platforms (green highlighted region).

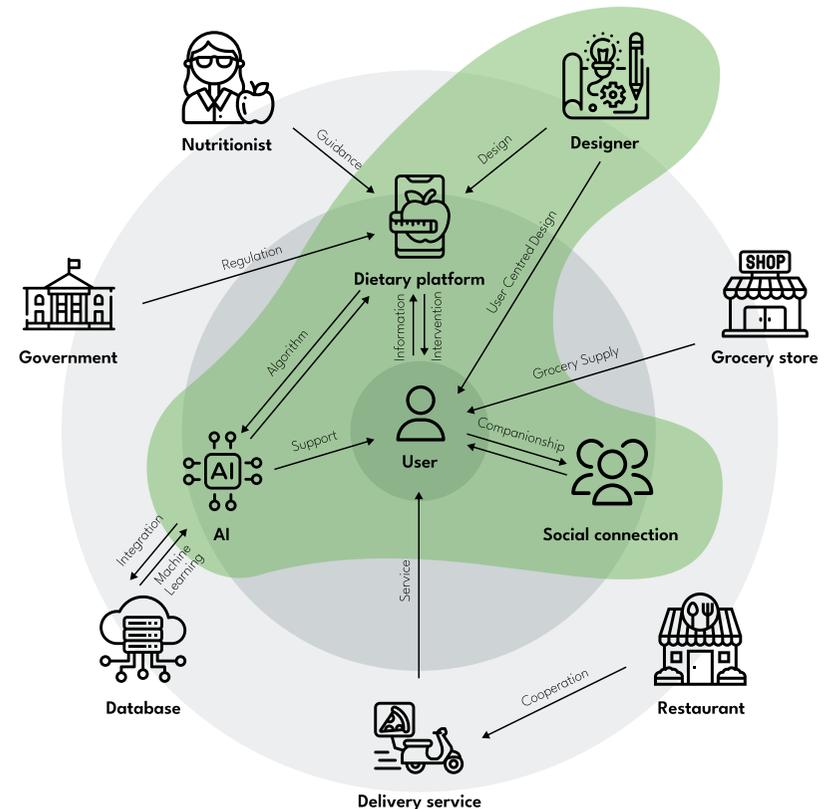


Figure 2. Contextual Stakeholder Mapping

1.4 DESIGN APPROACH

The project was divided into four major phases, which together tackle the project assignment, see Figure 3.

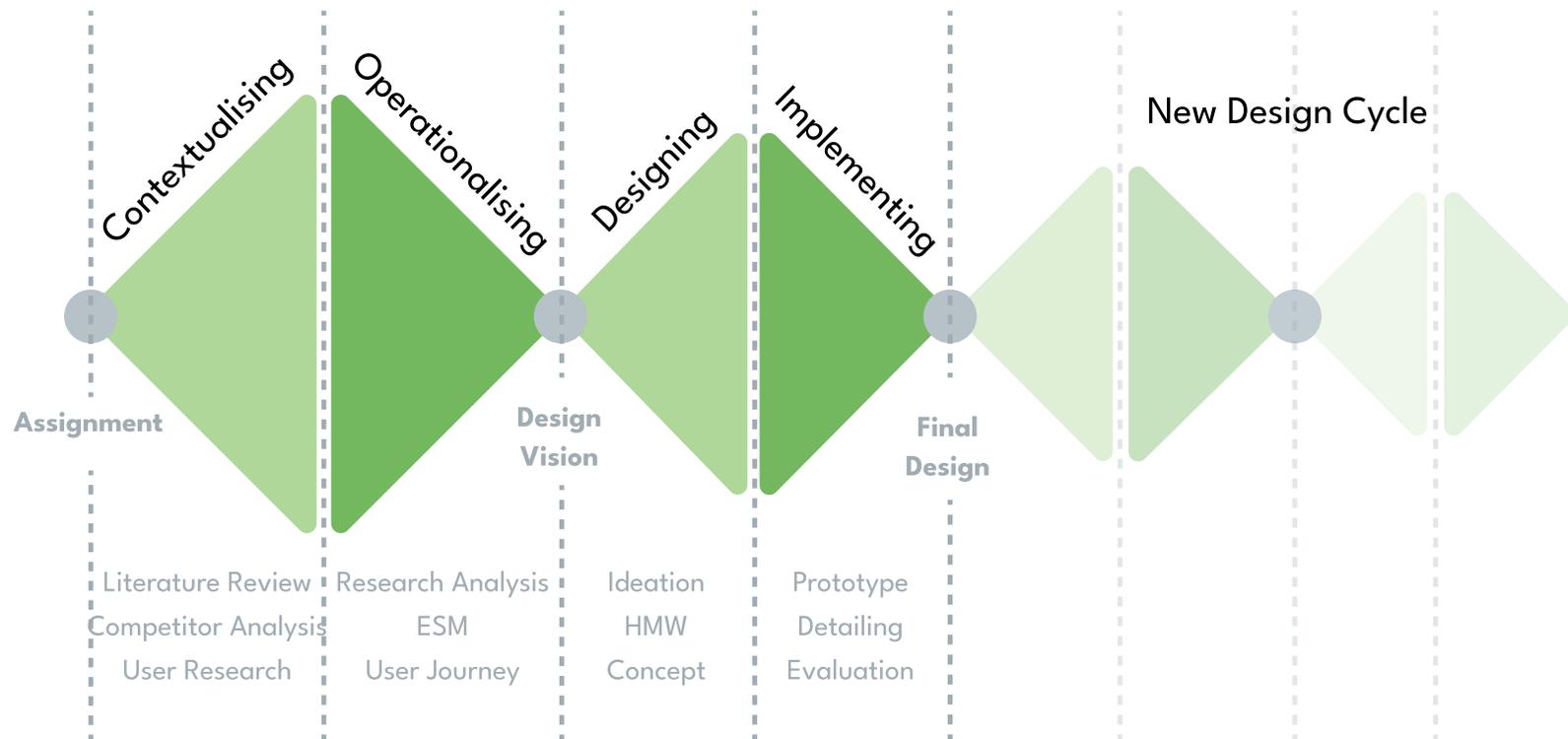


Figure 3. The Design Approach

Contextualising

Wellbeing theories need to be applied and understood within a specific context in order to be made practicable, and manifest an intervention.

The initial phase contextualised wellbeing - identifying possible connections between contextual factors and wellbeing facets. A literature review was carried out to gain a deeper understanding of wellbeing theories. However, due to the broadness of overall wellbeing theories, it is challenging to become sufficiently familiar with all the relevant literature. To reduce this complexity, desk research was conducted, and competitor analysis was performed in order to help identify relationships between wellbeing and features within current app systems, so as to establish an initial wellbeing model. To confirm this theoretical model, user research was developed. An Experience Sampling method (Sather, 2014) was adopted in this section, which helped in gaining more tangible knowledge of the effects brought on by current services on user experiences.

Operationalising

A concrete model must be established for more practical use later on, during the design process.

Drawing from the qualitative analysis of user research, a few relevant wellbeing aspects emerged in user experiences. To identify more accurate wellbeing impacts and gain deeper insights, the user journey was mapped out. All gathered insights from research served as the basis of initial design directions. Moreover, to ensure that the AI system can actively enhance these wellbeing aspects in the context, metrics for measurements within the system itself needed to be defined. From this point, the design phase started.

Designing

Many solutions to the problem can be considered, but it is important to consider which are the most appropriate to take forward and develop.

In this phase, an AI Ideation Session (Piet, 2019) was carried out to ideate possible interventions. In the first part of the session, a How Might We (HMW) statement session was used to frame the design challenges. Secondly, AI ideation cards were used to

brainstorm and generate ideas. Next, the C-Box method (impact matrix) (Byttebier & Vullings, 2009) was adopted to select ideas which had high impact on desired values. By synthesising the selected ideas, an initial design concept was developed. Wireframes and an initial prototype were developed in order to test the concept. Finally, a high-fidelity prototype was created for further user tests and evaluation. These are necessary to justify the final design.

Implementing

Future developments and design improvements must always be considered - this phase proposes future uses and recommendations for ways this can be done.

After testing the high-fidelity prototype with users, insights from this evaluation - including values and product accessibility - were integrated into a final design proposal. The final design was detailed by a thesis and a workable prototype. Due to the speciality of designing AI systems for wellbeing, implementations' impacts on wellbeing were monitored to make sure that the service system functioned continuously.

Last, but not least, the Positive AI process must continually restart and evolve if it is to guarantee that AI systems maintain adequate alignment with wellbeing throughout time (van der Maden, 2023). Within the scope of this project, a proposal for a new design cycle was developed in the implementation part as a guideline for future work.

BACKGROUND

02

This chapter details important background research which is relevant to the project. Healthy eating and wellbeing are discussed as broad concepts, after which specific wellbeing models are introduced. Two different established approaches to combining wellbeing and eating are then considered. This is used to inform a basic Wellbeing Theoretical Model. The relevance of design to wellbeing - Positive Design - is then discussed, as well as how AI can be involved and implemented successfully. Finally, research on platforms that today encourage healthy eating are investigated briefly to provide further insight.

2.1 HISTORY OF HEALTHY EATING

Food is one of the basic necessities for human beings. Eating is not just a means of survival; it plays a vital role in maintaining human health and overall wellbeing. The concept of healthy eating has evolved significantly throughout history, reflecting cultural, scientific, and societal changes (Mai & Hoffmann, 2017). The desire for good health and wellbeing has driven the exploration of dietary practices and their impacts on human health.



Figure 4. Ancient Diets (Source: Wikimedia)

Ancient and traditional diets

The earliest civilizations, such as those in Ancient Egypt, Greece, and China, recognised the significance of food for sustenance and wellbeing. Their diets relied heavily on locally available whole foods, including grains, legumes, fruits, vegetables, and lean proteins (Scanlin, 2016). Traditional diets of indigenous cultures, such as the Mediterranean, Inuit, and Asian diets, reflect sustainable and nutritionally balanced approaches to eating (Singh et al., 2022).

Nutritional discoveries and scientific advancements

The discoveries of essential nutrients, such as vitamins and minerals, and advancements in nutritional science during the 19th and 20th centuries revolutionised people’s understanding of healthy eating (Semba, 2012). This period witnessed the identification of nutrient deficiencies, the development of dietary guidelines, and the recognition of the impact of diet on chronic diseases (Mozaffarian et al., 2018). In the late 1800s, Willam Banting managed to lose 50 pounds in a year. Later, he published Letter on Corpulence, Addressed to the Public (1863), which is considered to be the first instance of dieting. In 1918, Lulu



Figure 5. Willam Banting

Hunt Peters revolutionised dieting for the next century by proposing that calorie counting was a useful tool for achieving healthy weight loss for the first time. This trend that began in the 1910s has continued to today (Heffernan, 2021).

The rise of processed foods and industrialisation

The 20th century brought significant changes to food production, leading to the widespread availability of processed and convenience foods (Huebbe & Rimbach, 2020). While these innovations offered convenience and extended shelf life, they also introduced higher levels of added sugars, unhealthy fats, and artificial additives, contributing to a rise in diet-related health problems (OECD, 2021).

Paradigm shifts towards whole foods and plant-based diets

In recent decades, there has been renewed interest in whole foods and plant-based diets. Scientific research on health benefits of consuming more fruit, vegetables, whole grains, and plant proteins has drawn a lot of attention (Bouchard et al., 2022). Therefore, various dieting methods have been introduced to the public, such as the Cabbage Soup diet, the Grapefruit diet, and the Master Cleanse Diet (embodyhealthlondon, 2022). The focus has also increasingly shifted towards sustainable and environmentally friendly food choices, as well as the integration of cultural and ethical considerations into dietary decisions.



Figure 6. Various Brands of Instant Noodles (Source: TY Lim)



Figure 7. Whole Foods and Plant-Based Diets



Figure 8. Calorie Tracking Technology on Smartphones

Personalised approaches and technological advances

With advancements in technology and nutritional research, personalised approaches have emerged (Livingstone et al., 2022). Personalised nutrition can take the form of a service or a product that allows people to choose better foods based on their preferences, lifestyles, and individual health statuses (Ordovas et al., 2018). Rather than getting your nutrition advice in an old-fashioned way - letting a nutritionist evaluate your body - these new services can be supported by technologies, such as Artificial Intelligence (AI), through an app on your smartphone. Nowadays, increasingly more people choose to use healthy-eating services on their phones, such as calorie tracking and meal planning, to help them achieve health goals. However, although many have a good understanding of healthy living, they often still neglect to consider the importance of wellbeing in their lifestyles - perhaps due to lack of tools.

2.2 ABOUT WELLBEING

In the Oxford English Dictionary (1989), wellbeing is defined as “the state of being comfortable, healthy, or happy”. The World Health Organization (1946) also describes wellbeing as “a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity”. In other words, wellbeing is more than just being physically healthy; it is a multidimensional concept that indicates both subjective experiences and living conditions. Therefore, it is important to extensively review wellbeing theories and their relevance to the context of eating.

In order to adapt to the context, it is also necessary to integrate different wellbeing theories and establish a new wellbeing model applicable to this project. The relation between the theoretical model, wellbeing theories, and healthy eating methods is depicted through a Venn diagram in Figure 9.

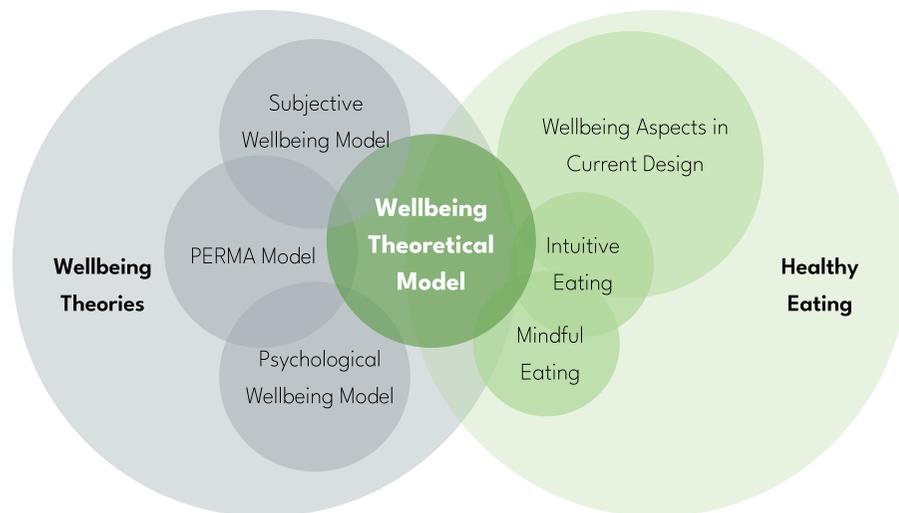


Figure 9. Construct for Establishing Theoretical Model

2.2.1 DETERMINANTS OF HAPPINESS

Since the dawn of humanity, people have been striving for happiness, but it remains challenging to define “happiness” accurately. According to Lyubomirsky (2007), the three fundamental determinants of happiness are the genetic set point, life circumstances, and intentional activity. Each of these elements account for inter-individual differences in wellbeing, which is shown in the pie chart in Figure 10 (overleaf).

The **genetic set point** accounts for roughly 50% of the variance. This implies that some people have a natural inclination to be happier than others, and they’re more likely to maintain this disposition throughout their lives. Our intrinsic level of happiness - which is (so far) unable to be affected by external factors - plays a significant role in determining our overall level of happiness.

Life circumstance factors, such as age, gender, marital status, income, and location, account for only 10% of the variance. While these factors do have an impact on our happiness, we often adjust to these changes over time through hedonic adaptation (Diener et al., 2006), meaning the change in happiness is temporary. However, despite this, current designs intended to increase happiness mostly focus on improving people’s life circumstances (DloPDesign, 2012).

Intentional activities account for the remaining 40%. These activities are deliberate and purposeful, even if they eventually become habitual. This crucial determinant holds the most potential for elevating people’s happiness since research has proven that by intentionally engaging in activities or thoughts, individuals can genuinely achieve sustained happiness (Lyubomirsky, 2007).

The elaboration and clarification of the happiness formula provides a crucial framework for comprehending factors that determine our overall wellbeing levels. Moreover, it

promotes optimism by demonstrating that despite the negative impact of hedonic adaptation, it is possible to achieve sustainable increases in happiness over time.

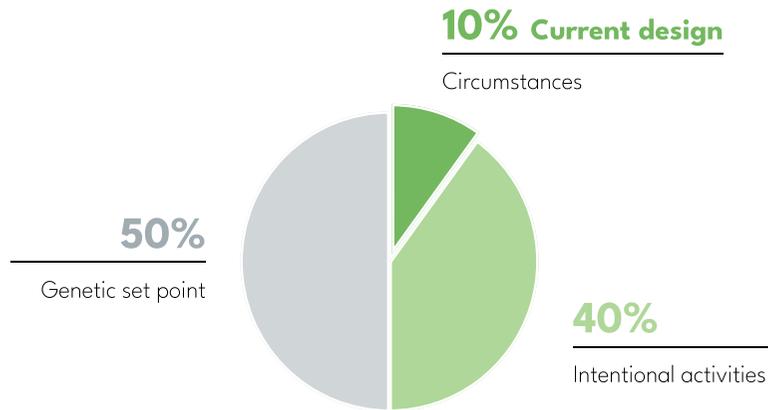


Figure 10. Determinants of Happiness

2.2.2 WELLBEING MODELS

To obtain a better understanding of which intentional activities can improve wellbeing, researchers have developed various models. Literature research is conducted in this section, and three different wellbeing models are summarised.

Subjective Wellbeing Model

In positive psychology, the long-term success, wellbeing, and flourishing of individuals is considered, and one approach to comprehend what this means to various people is through the concept of subjective wellbeing (SWB). In 1984, Ed Diener developed a three-part model of subjective wellbeing, involving both emotional responses and cognitive evaluations, to explain how people evaluate the quality of their lives (Diener, 1984). According to this theory, wellbeing consists of "three distinct but often related components": frequent positive affect, infrequent negative affect, and cognitive

evaluations of life satisfaction (Tov & Diener, 2013). SWB therefore encompasses mood and emotion, as well as evaluation of one's satisfaction with both general and specific areas of one's life (Diener et al., 1999).

Diener (1994) argued that despite their close relationships, the different SWB components reflect discrete constructions that must be understood separately. As a result, usually the two "affect" components are evaluated separately from the life satisfaction component using various scales. For instance, the self-report questionnaire - Positive and Negative Affect Scale (PANAS) - is used for assessing affective wellbeing (Watson et al., 1988); Satisfaction With Life Scale (SWLS) is a compact questionnaire for measuring global life satisfaction (Diener et al., 1985).

Understanding people's individual differences in the SWB context is of key interest in positive psychology, notably the question of why some people are happier than others. Some maintain high levels of happiness through adversity, whereas others may be considered unhappy even on their best days (Bos et al., 2016).

Psychological Wellbeing Model

In 1989, Carol Ryff introduced a psychological wellbeing model (PWB) that encompasses six dimensions of positive psychological function: self-acceptance, positive relations, autonomy, environmental mastery, purpose in life, and personal growth. Ryff's theory places emphasis on objective ideal human functioning and self-realisation, rather than solely on temporary pleasure and fleeting happiness.

Self-acceptance involves positively evaluating oneself, including accepting both good and bad qualities.

Positive relations with others are related to the amount and quality of relationships one has with others, as well as the degree of empathy and concern for their welfare.

Autonomy refers to the sense of being self-determinant, independent and having regulation of one's behaviour according to personal standards.

Environmental mastery encompasses the ability to manage one's life effectively, make

use of external opportunities, and enter into contexts that align with personal values and needs.

Purpose in life involves having a sense of direction, meaning, and personally worthwhile goals.

Personal growth refers to the realisation of one's potential and pursuit of ongoing development.

PERMA Model

In 2011, Martin Seligman introduced the PERMA model to conceptualise the main factors contributing to wellbeing in general. Five key elements are included: Positive Emotion (P), Engagement (E), Positive Relationships (R), Meaning (M), and Accomplishment (A). These elements are pursued for their own sake and are defined and measured independently from each other, with one exception (Seligman, 2011). The overall combination of these elements forms a strong foundation that enables individuals to flourish (Jimenez et al., 2015).

Positive Emotions are experienced alongside the other components of the framework - and in relation to the past, present, or future - but can also be considered separately. Happiness is viewed to be one aspect of positive emotions.

Engagement, also known as “the state of flow” (Csikszentmihalyi, 1990), is when one's strengths and qualities in various areas of life are optimally challenged. It refers to the idea of being immersed in the present moment.

Positive Relationships: People most commonly report moments of happiness when they are with others, so positive relationships - with friends, colleagues, family, or partners - are considered crucial to wellbeing.

Meaning can be found through the pursuit of worthwhile achievements by serving and belonging to something larger than the self. These include friendships, ethical behaviours, or philanthropic actions, for example.

Achievement refers to the act of accomplishing a desired goal through prolonged and focused effort; from wealth goals to personal growth or academic success.

Conclusion

Positive psychology has two general and accepted notions of wellbeing: hedonistic and eudaimonic (Ryan & Deci, 2001). The PWB model represents the eudaimonic viewpoint, whereas the SWB model represents hedonic, and the PERMA model has overlap with both (Phaekwamdee et al., 2022). While the PERMA model emphasises positive emotions, engagement, and accomplishment as essential components of wellbeing, PWB places greater emphasis on self-acceptance, autonomy, and personal growth, and SWB emphasises life satisfaction and an absence of negative emotion. Positive relationships and meaning are shared aspects between PWB and PERMA, whereas the overlap between SWB and PERMA lies in positive emotion emphasis (Tulip et al., 2020). A visual depicting the relationship between the models can be seen in Figure 11.

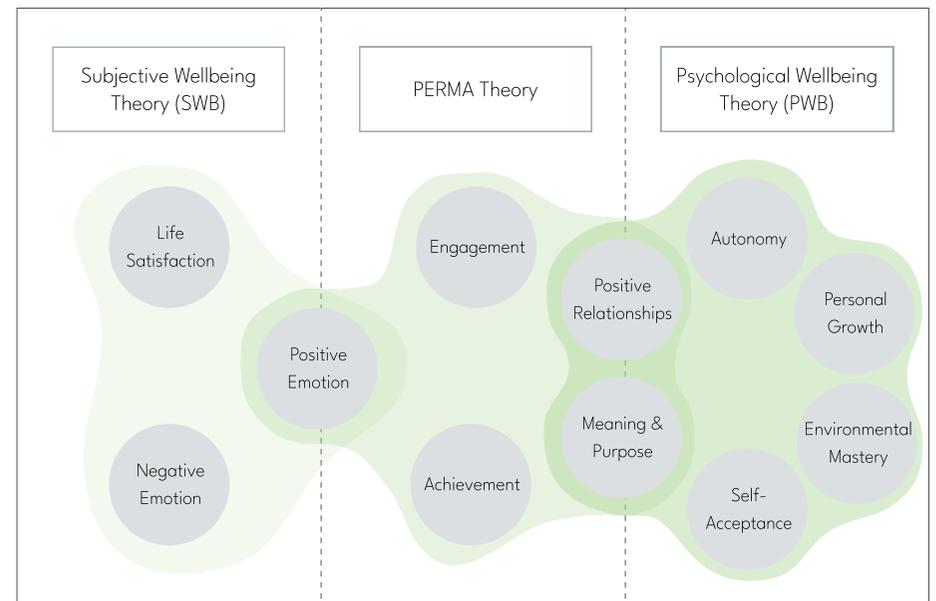


Figure 11. Factors of Wellbeing

All three models offer valuable insights into wellbeing. Although there exist differences in the specific components, each recognises the multidimensional nature of wellbeing and emphasises the importance of various diverse aspects of human experiences in promoting flourishing and optimal functioning (Tulip et al., 2020).

When designing for wellbeing, designers should draw from multiple theories to develop a more comprehensive understanding of human flourishing and to create interventions that promote wellbeing, since one is not widely regarded as more valid than the others. In fact, all are generally accepted and have been verified (Phaekwamdee et al., 2022). They may simply provide different avenues on which a design problem can be approached.

2.2.3 WELLBEING AND EATING

With people increasingly paying more attention to their overall wellbeing, there has been a growing interest in the relationship between eating and wellbeing. Studies have shown that there is a link between what we eat and individuals' wellbeing (e.g. Ares et al., 2014; Grunert et al., 2007; Schnettler et al., 2015). Scientists and nutritionists alike have developed new eating approaches to promote wellbeing, such as intuitive eating and mindful eating. Unlike traditional dieting, these eating approaches focus more on cultivating a positive and compassionate mindset towards food, body, and eating.

Intuitive Eating

The term “intuitive eating” was first used by Evelyn Tribole and Elyse Resch (1995). Unlike other dieting methods, intuitive eating is based on the belief that there is no such thing as objectively “good” or “bad” food. Instead, it encourages practitioners to eat whatever feels good to them (Sreenivas, 2023). Intuitive eating focuses on building a healthy and trusting relationship with one's body and internal cues for hunger, fullness, and satisfaction.

It follows ten guidelines (Tribole & Resch, 2012):



1. Reject the diet mentality



2. Recognise your hunger



3. Make peace with food



4. Challenge the 'food police'



5. Feel your fullness



6. Discover the satisfaction factor



7. Cope with your feelings



8. Respect your body



9. Exercise and feel the difference



10. Honour your health

It has been confirmed by Linardon et al. (2021) that intuitive eating is a process that correlates well with self-reflection, self-compassion, and patience. It aims to help individuals reconnect with their body's evolutionary wisdom and develop a healthy, balanced, and sustainable approach to eating that supports overall wellbeing. It's important to note that intuitive eating is not a weight-loss program but rather a way to cultivate a healthy relationship with food and body.

Mindful Eating

Compared with intuitive eating, mindful eating is a broader concept. The term “mindfulness” was defined as

“paying attention in a particular way, on purpose, in the present moment, and nonjudgmentally”

(Kabat-Zinn, 1990)

In the late 1970s, Kabat-Zinn founded the Mindfulness-Based Stress Reduction Center at the University of Massachusetts Medical School. Within this center, he introduced mindfulness exercises for food that have since become well-known as mindful eating (Nelson, 2017).

In recent years, with an increasing number of practitioners adopting mindful eating, its fundamental principles have gained broader recognition. However, it's important to note that mindful eating is not a trademarked diet program, and there is no universally agreed-upon set of activities or principles that define it (Garone, 2022). The approach to mindful eating may vary among individuals and experts, allowing for flexibility and personalisation in its practice.

In essence, though, mindful eating focuses on cultivating heightened awareness and non-judgmental attention to various aspects of eating. It centers around the experiences of eating, body-related sensations, and thoughts and emotions related to food. During mindful eating, individuals consciously focus on the foods they choose, internal and external physical cues, and their subjective responses to those cues. The aim is to develop a greater understanding of one's relationship with food and to make choices that align with physical and emotional wellbeing (Fung et al., 2016).

Incorporating Both Methods

Intuitive eating and mindful eating are not in any way contradictory. Both methods recognise the influence of the human mental state on food choices and encourage actions such as tuning into feelings of fullness and finding pleasure in eating. Moreover, both approaches can help alleviate food-related stress, albeit in different ways. Mindful eating achieves this by promoting focused attention to meals, while intuitive eating

combines mindfulness with other tools to reconnect with the body, address deep-rooted negative beliefs about food and the body, and promote overall wellbeing.

2.3 POSITIVE DESIGN

In recent years, the incorporation of wellbeing into design has become more widespread. Society is becoming more aware of how psychology can be applied to have more desirable outcomes in fields from business to home life, and so designers increasingly have to consider this. For example, whereas in the past health was considered entirely physical, now studies confirm the intimate tie between the body and mind - psychology can be incorporated even in this domain (Di Gesto, Cristian & Cheli, 2021).

Positive psychology is a deeply-studied field which focuses on strengths or virtues which enable individuals and communities to thrive and feel fulfilled. Positive Design draws upon the wisdom of positive psychology to develop and enhance products and/or services that foster human well-being and flourishing (Pohlmeyer, 2013). It does this often, for example, by focusing on designing with the elements of the PERMA model in mind. Therefore, positive design goes beyond considerations of function or aesthetics and prioritises the users' emotions through a user-centric approach.

A Positive Design Framework has been established (Desmet & Pohlmeier, 2013) which delineates three major aspects contributing to positive design. These are Design for Virtue - the appeal to morals; Design for Personal Significance - aiding in the pursuit of personally significant goals; and Design for Pleasure - feeling positive effects in numerous possible forms. This is visualised in Figure 12.

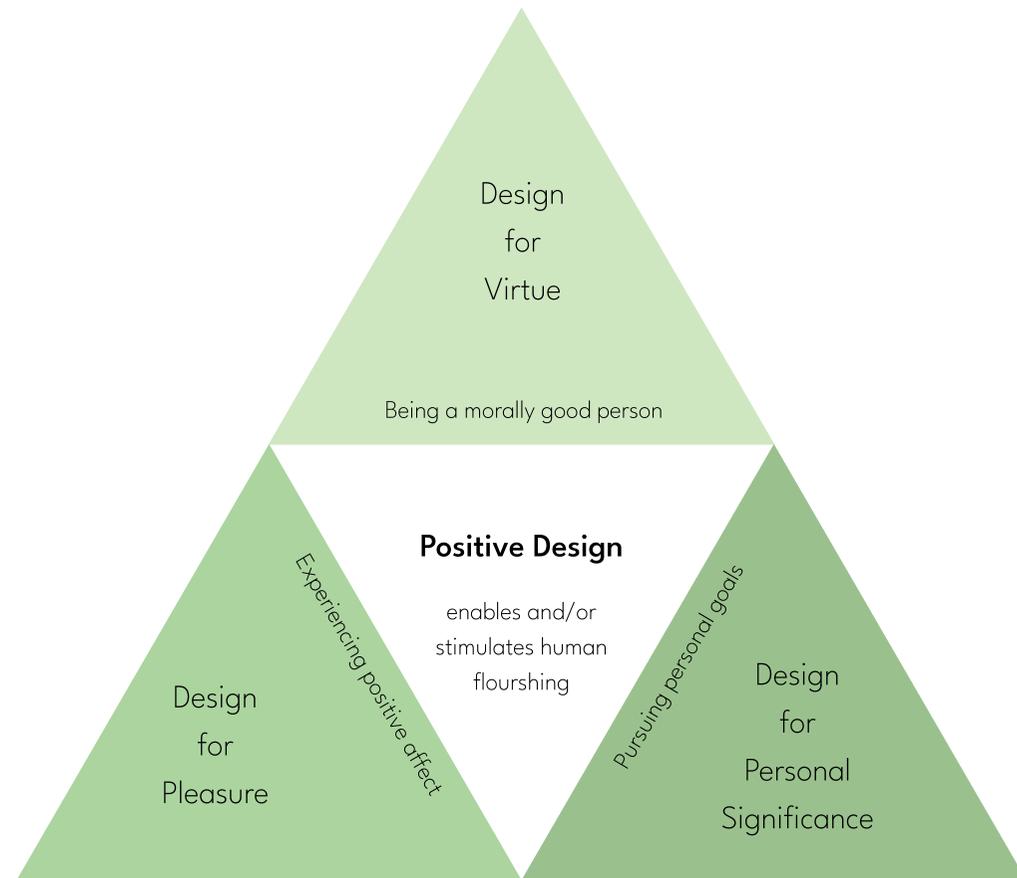


Figure 12. Positive Design Framework (adapted from Desmet & Pohlmeier, 2013)

2.4 AI FOR WELLBEING

The term Artificial Intelligence (AI) encompasses a wide range of techniques and approaches which develop computational systems to mimic cognitive processes in humans. These include learning, reasoning, solving problems, recognising patterns, and predicting, among others (D'Alfonso, 2020). Recent advancements, such as those in large language models (LLMs) and Generative AI, and Machine Learning (ML), signal that AI will continue to become ever-present and permeate across almost every field (van der Maden, 2023).

Already, AI is finding powerful applications in mental health. For example, natural language processors (NLPs) and audio analysis tools are being used to draw connections between language used and psychological states. Traditionally, a psychiatrist may use transcriptions of sessions with a patient in mental health language analysis, but now AI can draw on language used in vastly more non-clinical contexts for the same purpose. Chatbots and other virtual communication tools also harness NLPs to perform clinical mental health tasks; the first chatbot developed in 1966 was programmed to mimic a client-centred therapist (D'Alfonso, 2020). AI may also be most useful within the mental health context in providing the ability to self-track and generally analyse data in various ways (Graham et al., 2019).

There is an increasingly growing - yet still small - body of research on how AI can and should be applied to improving wellbeing, in addition to mental health (van der Maden, 2023). Furthermore, the powerful nature of AI necessitates the consideration of wellbeing in the design process of systems. It was proposed in van der Maden et al. (2023) that “all ethical AI systems should have the implicit objective of enhancing human wellbeing”.

In order to understand AI design for wellbeing, it helps to realise AI as a subset of the field of cybernetics. Cybernetics was first described as “the interdisciplinary study of complex systems' structure, behavior, and control, particularly involving communication, feedback, and control processes” (Wiener, 1961). These can include biological,

technical, cognitive, or social systems, for example. A cybernetic system has 5 essential components: a sensor, a controller, an actuator, a goal state, and an environment. The sensor retrieves information from the environment, the controller determines how to move towards the goal state, and the actuator carries out the actions determined by the controller. Within this context, the relation between design and AI crystallises into designing sensors and actuators within the system of operation (van der Maden, 2023).

AI alignment has become a crucial consideration in the development of AI systems which must be both harmless and beneficial. It is the concept that AI systems should consider and respect human values - which may include wellbeing. Wellbeing as a Positive Psychology object was studied in Section 2.2, and so the challenge is to align this within the development of AI. There exist methods already of aligning AI exist, such as Constitutional AI (Bai et al., 2022), but since these focus mostly on changing internal processes within controllers, they are not strictly design methods and are unlikely to affect wellbeing significantly (van der Maden, 2023).

A Positive AI Design Method was proposed (van der Maden, 2023) which builds on insights from Positive Design in order to design wellbeing-aligned AI systems. See Section 1.4 for this approach, which is selected in the current project.

2.5 HEALTHY EATING PLATFORMS TODAY

In this section, relevant research areas on current eating-related apps is briefly reviewed. This is necessary to see where these services successful and in which ways there is room for innovation.

AI advances, alongside significant increases in the use of food consumption tracking/recommendation apps, have led to various fronts of research in this area (Samad et al., 2022). This type of research relates to optimal weight loss techniques which suit individuals and their lifestyles, for example. The U.S. accounted for the maximum share of users of diet and nutrition apps on the market, due in part to a large number of locally based, dominating app producers (DataBridge, 2021). According to a survey, 26 percent of those aged 18 to 29 years regularly use apps to track their diet and nutrition (Kunst, 2019).

Many apps available today also focus on fitness. Across major app stores, there were already 32,500 mobile health and fitness apps by 2017, with many more today (Ferrara

et al., 2019). These play an important role in simplifying tracking health-related behaviours, weight, and also make new technology or techniques widely available (Chen et al., 2015).

Food recommendation is a significant field of discussion also. Both society and individuals - on a more precise basis - require advice, which is always evolving (Min et al., 2019). The incorporation of health as a main priority in this is mostly a recent concern - in the past individuals followed more general guidelines (Nag et al., 2017). Recently, however, there are many varied diets available with different goals attached, which address different body types, deficiencies, or others.

Despite such widespread use of these nutrition and diet apps, only a limited few have undergone rigorous scrutiny to verify efficacy in enhancing health (Coughlin et al., 2015). Many are criticised for promoting “fad diets” which have little - or even detrimental - effects. There has also been criticism regarding the way these apps restrict users; a power imbalance (in knowledge) hold users back from expanding their health knowledge, which may lead to detrimental effects (Ryan, 2022). Such ease of accessibility and ability to self-monitor minute details, a growing concern regarding the harmful potential iatrogenic effects (illness arising from the act of medical observation) exists (NeumarkSztainer et al., 2006). These may include eating disorders and anxiety, for example (Berry et al., 2021).

In conclusion, there is much development which has already been achieved in some directions of eating apps. However, many areas relating to broader wellbeing are both unexplored and untested. This has the potential to reduce users’ wellbeing due to blind focus on physical health metrics. Further research must be carried out to give users more autonomy and trust in apps that they use.



2.6 CONCLUSION

In this chapter, two wellbeing theories (PERMA and PWB) were introduced. Product designers must have an understanding of these if they wish to develop products which enhance wellbeing in a deeper way than through fleeting happiness, as is the main purpose of this project. The relation between wellbeing and eating was also discussed - these two primary topics in the project have an unneglectable impact on one another. Understanding this is a key solution to enhancing wellbeing in the healthy-eating context.

Positive design was also outlined - how psychology informs how design choices can be made to enhance wellbeing. This is built upon by positive AI; the utilisation of positive design in the construction of powerful AI systems which aim to facilitate better wellbeing and mental health. With this in mind, notable or relevant aspects of existing healthy eating platforms/research were summarised via desk research, highlighting neglected areas of research and design.

From these sections, it is possible to identify links between aspects of the wellbeing theories (section 2.2.2), and common features within these apps. For example, a “goal setting” feature prominent in eating apps links to engagement as a wellbeing factor, and so it is reasonable to assume that engagement is an important aspect within a context of eating. The precise way in which the feature influences the wellbeing aspect is yet unknown and studied in the context study chapter. This linking was made for six wellbeing aspects to construct a preliminary wellbeing theoretical model. To assist this, a wellbeing mindmap connecting theories was created, see Appendix B.

Wellbeing Theoretical Model

Six wellbeing aspects, which are likely important to influence in the context of eating, are identified in this first theoretical model. The objective of this model is simply to identify which wellbeing aspects are likely to have most relevance to eating apps. It is based on the linking method between aspects in section 2.2 and features observed via 2.5, and serves as a foundation for research in the context study later which will lead to

updates and verification. This will also serve as a guide for formulating the design goals later on.

Positive Relationships

Having healthy, fulfilling connections with others. Characterised by trust and openness.

Engagement

The state of being immersed in a moment, also called the state of flow. When one's strengths and qualities are optimally challenged, in work, study, relationships, or other areas.

Mindfulness

Being aware of one's surroundings and accepting one's thoughts, without judgement.

Autonomy

The ability to feel in control, have choices, and have mental freedom. The ability to act in a way authentic to one's values and beliefs.

Meaning

The feeling that one's life is worthwhile. Having goals, structure, and direction, and feeling that one can achieve or maintain these.

Positive Emotion

Experiencing moments which bring feelings of joy, interest, love, satisfaction, physical wellbeing, and similar. These moments are not corrupted by negative feelings.

CONTEXT STUDY

03

This chapter focuses on the context study, including investigating current solutions and users' experiences within them. For this, competitor analysis and user research phases are conducted. These aid in identifying and confirming related wellbeing aspects, from which design goals are generated.

3.1 COMPETITOR ANALYSIS

Analysis of existing services is crucial in understanding industry design standards and accepted methods, for example of enacting behaviour change. Existing platforms are the results of numerous iterations by designers aiming to solve related problems. By studying these carefully, it becomes clear which areas have sufficient solutions and where design opportunities for improvements or innovation exist.

In the following, five apps that emphasise different aspects of eating will be introduced, including PlateJoy, a personalised meal planning service; Ate Food Journal, a food journal and habit tracking service; Lifesum, a calorie and macro-tracking service that helps users achieve health goals; Noom, a psychology-based app that helps make healthy food choices; and Munch, a decision-making app created for group dining experiences.

These cases were selected because they address the same general theme of eating as the product service system that will be implemented in this project. Additionally, in order to fully experience these services, getting to know both positive and negative influences, all the apps listed above were downloaded and used for over a week. More detailed feature analysis can be found in Appendix C.

3.1.1 MEAL PLANNING - PLATEJOY

PlateJoy is a meal planning service with a strong focus on nutrition. It offers personalised weekly menus tailored to individual preferences and dietary needs. Additionally, it streamlines users' weekly shopping trips by creating an organised grocery list based on what they currently own and what they still need to buy (Healthline, 2021).

How does it work?

Here are four major steps in the app functionality (see Figure 13). After signing up,

the first step is for the user to set parameters of their weekly meal plan. This involves choosing the desired meals for which they want recipes, deciding on the number of recipes to prepare (or whether they are fine with leftovers), and determining the amount of time they wish to allocate for each meal. After customising their preferences, the user will have the option to add specific recipes to their weekly menu. The next step is to review the customised plan. From this window, the user can view their weekly menu and make any desired recipe swaps. Once the user is satisfied with their menu, they will select 'confirm' and be directed to a page where they can check off any ingredients they already have in their fridge or pantry. Upon finalising the meal plan, the user will receive a shopping list that is organised by area of the grocery store. The list will also include notes on the required quantities of each ingredient to purchase, with future meals taken into consideration.

Pros

Personalised meal plans: PlateJoy creates customised meal plans based on individual preferences, dietary restrictions, and health goals. This personalisation ensures that

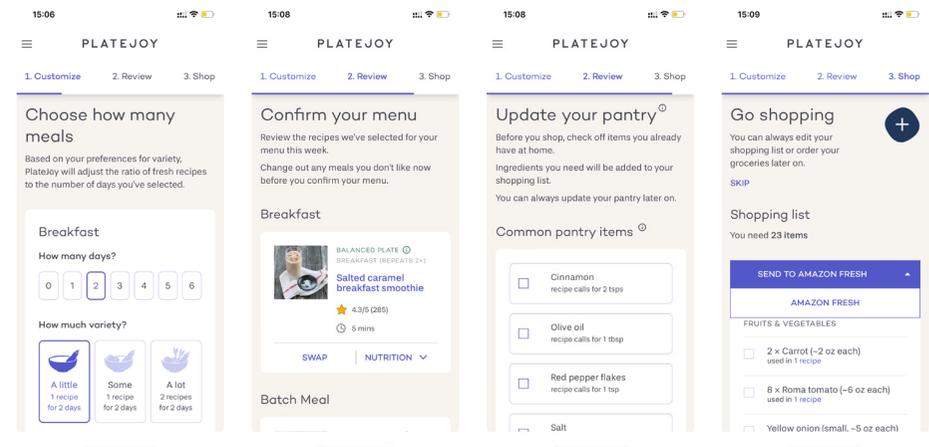


Figure 13. The Four Major Steps of PlateJoy

users receive meal recommendations that suit their specific needs and tastes.

Nutrition-focused: PlateJoy emphasises nutrition in its meal planning, helping users make healthier choices and meet specific dietary requirements. The app provides a wide range of well-balanced recipes that consider modern nutritional guidelines.

Reduces food waste: By providing a shopping list based on planned meals, PlateJoy helps users purchase only necessary ingredients, reducing food waste. This feature also promotes cost-effectiveness by minimising unnecessary purchases.

Cons

Lack of flexibility: While PlateJoy offers a rigid meal structure, it can inherently limit flexibility in food choices and spontaneous eating. This can make it challenging to adapt to changing schedules, social events, or individual preferences, potentially leading to feelings of deprivation or frustration.

Increased stress and pressure: These meal planning apps - including PlateJoy - can create additional stress and pressure to adhere to a specific plan or meet certain goals. This pressure may contribute to feelings of failure or guilt if one deviates from the planned meals, potentially impacting wellbeing.

Unrealistic expectations and comparison: Some of the meals suggested by the system are visually appealing, which may create unrealistic expectations or foster comparison with others. This can lead to feelings of inadequacy or the belief that one must replicate these meals too closely in order to achieve a healthy lifestyle.

Takeaways

Through investigating this app, it is clear that for meal planning services, giving users sufficient flexibility and choices in their foods is essential. It is also necessary to be aware of the negative feelings possibly caused due to unrealistic meal plans in the future design; the app must be authentic and not make false promises.

3.1.2 FOOD JOURNALING SERVICE - ATE

Ate is a food journaling app that aims to assist the user in developing a sustainable and healthy lifestyle. With its user-friendly journaling system, it simplifies the process of consistent tracking, enabling the user to cultivate a greater sense of self-awareness and reflection regarding their eating habits (Kiss, 2022).

How does it work?

Ate app provides a photo-based service (see Figure 14). It asks users to capture meal moments by taking photos and storing them in a timeline, referred to as the 'path'. Alongside the visual record, users can enrich entries by including notable meal details such as dining companions, preparation information, and taste opinions.

Users are given the flexibility to classify each meal as '#onpath' or '#offpath', based on their individual judgement without a rigid right or wrong answer. For instance, someone may consider indulging in a reasonably-sized dessert while celebrating a special occasion as an '#onpath' choice. The app generates a visual timeline that serves as a guide, assisting users in staying on track and continually realigning themselves with chosen goals.

Pros

Enhanced self-awareness: Ate promotes self-awareness by encouraging users to reflect on their eating habits, emotional state, and motivations behind meal choices. This increased awareness can help users identify patterns, triggers, and methods for improvement.

Mindful eating practices: By capturing moments through photos and recording various details, Ate promotes mindful and conscientious eating. Users become more conscious of their food choices, flavours, and dining experiences, which can lead to better portion control, improved satisfaction, and a deeper connection with the act of eating.

Non-restrictive approach: Ate doesn't promote strict calorie counting or impose specific dietary restrictions. Instead, it focuses on promoting a balanced, sustainable

approach to eating, allowing users to be better informed with their choices based on preferences and individual requirements.

Cons

Information overload: Food journaling apps require consistent input of meal details, which can become overwhelming for many users. The process of capturing photos, adding notes, and recording emotional states may feel time-consuming and burdensome, potentially leading to frustration or discouragement.

Potential for inaccuracies: Food journaling apps rely on users accurately capturing and inputting meal information. However, it's possible to unintentionally misrepresent portion sizes, forget certain ingredients, or overlook details, which may affect the accuracy of nutritional or behavioural insights gained from the app and therefore of advice as well.

Takeaways

User input effort should be kept to a minimum when using the app; too much time spent on this detracts from the experiences eating and can cause frustration or inaccurate data. Taking photos of experiences is a way to encourage self-reflection whilst not wasting time. The app should also be able to gently guide users, rather than entirely upend their enjoyable eating lifestyles.

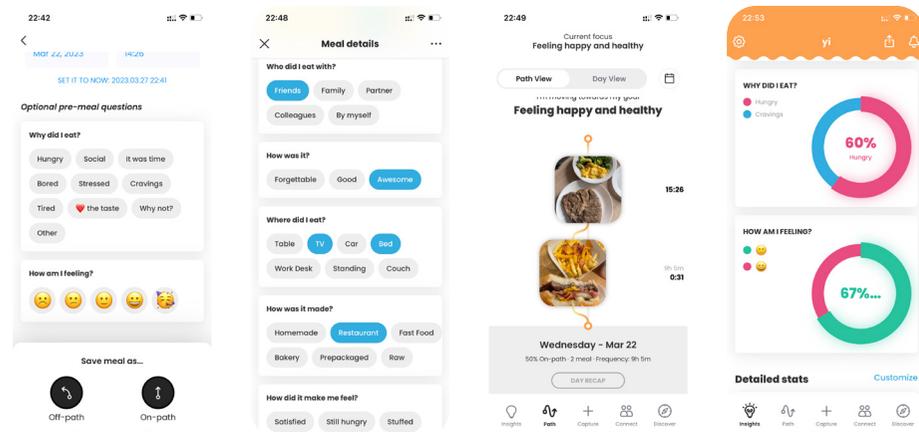


Figure 14. Functionality of the Ate App

3.1.3 CALORIE TRACKING - LIFESUM

Lifusum is a calorie and macro-tracking app for supporting individuals in reaching their health and fitness goals. It is specifically designed to aid users in achieving their desired health as well as wellness goals. The app positions itself as a valuable tool that provides dietary recommendations to foster a healthier lifestyle (Parker, 2022).

How does it work?

Lifusum works by gathering information about the user's caloric needs using initial questions (age, height, and weight; see Figure 15). The app then utilises this data to run basic calorie calculations and provide the user with general calorie and micronutrient targets based on their goals. The app does not set a specific timeline for the user to reach their goal, but it adapts the calorie and macro recommendations based on the user's preferred rate of weekly weight loss.

Pros

Personalised approach: Lifusum takes into account individual information and goals to provide personalised calorie and micronutrient targets. This customisation helps users align their dietary intake with their specific objectives.

Goal-oriented guidance: Lifusum provides general recommendations and guidance to help users work towards their health and fitness goals. It offers suggestions for portion control, meal planning, and healthier food choices, assisting users in making positive dietary changes.

Educational resources: Lifusum provides educational content and articles on nutrition, health, as well as wellness. Users can access valuable information to expand their knowledge, make informed choices, and develop a deeper understanding of their habits.

Cons

Strict focus on numbers: Lifusum's emphasis on calorie counting and macronutrient tracking may lead to an excessive focus on numbers, potentially triggering or reinforcing disordered eating behaviours in individuals who are susceptible to such conditions.

Potential for obsessive behaviour: Constantly tracking and monitoring food intake, along with striving to meet specific calorie and macro targets, can lead to obsessive tendencies and an unhealthy preoccupation with food and body image. This can clearly negatively impact wellbeing.

Limited food variety: Rigidly adhering to recommended calorie and macronutrient targets may inadvertently restrict food choices and result in a narrow range of consumed foods. This can lead to a lack of dietary diversity, potential nutrient deficiencies, and reduced enjoyment when eating.

App reliance and user burnout: Consistently using Lifesum and adhering to its tracking and recommendations can become time-consuming and burdensome for some users. The app's reliance on constant input may contribute to fatigue or burnout, especially if users find the process overwhelming or intrusive.

Lack of context and individual circumstances: Lifesum's approach may not account for individual factors such as medical conditions, allergies, cultural considerations, or specific dietary requirements. It's crucial to separately consider personal circumstances and consult with a healthcare professional for any further tailored advice.

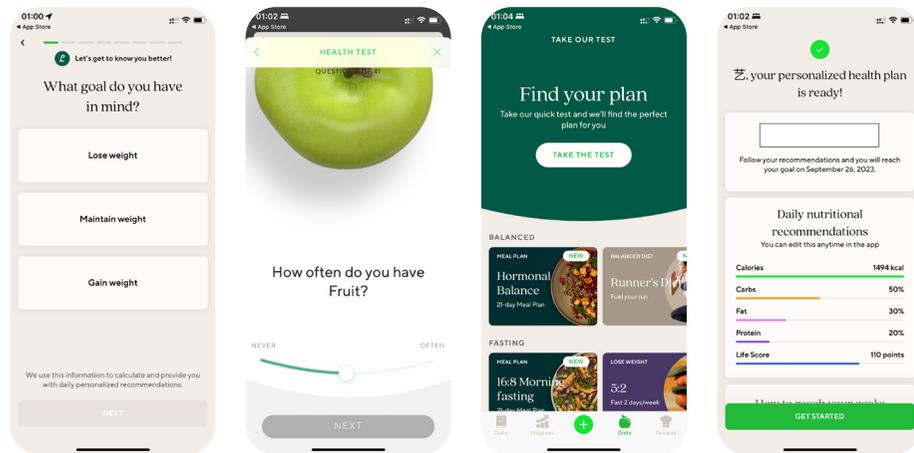


Figure 15. Lifesum Feature: Setting a Goal

Takeaways

Being able to provide goals whilst still focusing on the journey can be a valuable approach. The app should also provide ways for users to understand what they are doing more deeply, and should be as personalised as possible - generic advice can be found elsewhere. On the other hand, tying goals to explicit metrics such as weight is not necessarily congruent with a wellbeing approach. The app should also be minimal in its interactions, so that users do not feel the need to obsess or pay close attention to it when they are enjoying experiences.

3.1.4 DIETING SERVICE - NOOM

Noom utilises a psychology-based approach to support individuals in making healthy eating choices and implementing habit changes to achieve their goals, especially weight loss.

How does it work?

Noom's program starts with a 10-minute online quiz that asks about your height, weight, gender, age, and reasons for wanting to lose weight. It also considers your activity level, eating habits, and any health risks you may have. In the program, you complete 10 mini-lessons on psychology and behaviour change over 16 weeks (see Figure 16).

After approximately two days, users are connected with a goal coach who will check in with them twice a week, track progress, and provide motivational messages. Within a few more days, users are assigned a group coach and placed in a peer group. The group coach moderates the peer group chat, shares weight loss tips, and occasionally responds to individual posts.

Pros

Psychology-based approach: Noom's focus on psychology and behaviour change principles helps users understand and address underlying factors that contribute to eating habits and overall wellness. This approach can support long-term behaviour change and promote sustainable results.

Peer support and community: Being assigned to a peer group allows users to connect with others who are on a similar wellness journey. The group chat provides a supportive environment where users can share experiences, challenges, and strategies. This sense of community and peer support can foster motivation, accountability, and a feeling of belonging.

Cons

Cost: Noom is a paid program, and the subscription fees may be expensive for some users. The pricing structure and ongoing subscription model can be a barrier for individuals on a tight budget or those seeking free or more affordable alternatives.

Extensive questionnaire: The initial online quiz in Noom's program can be lengthy and involve multiple questions about various aspects of the user's health, lifestyle, and goals. Some users may find the questionnaire overwhelming, intrusive, or time-consuming to complete.

Information overload: Noom's content delivery includes 10 mini-lessons on psychology and behaviour change over 16 weeks. For some users, the volume of information and pace of the program may feel overwhelming or difficult to absorb effectively. This can hinder the ability to implement and sustain recommended changes.

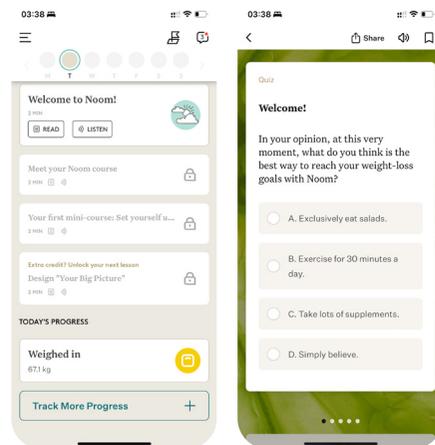


Figure 16. Noom's Lessons

Focus on weight loss: Although Noom positions itself as a program for overall wellness, the primary emphasis is often on weight loss. This may not align with everyone's goals or values, and individuals seeking a more holistic approach to health may find the weight-centric focus limiting.

Takeaways

Being connected with others can make habit changes much easier and more enjoyable - the support of family or friends should be accessible when possible. Also, it is clear that a psychology-based approach has merit and can be a powerful approach. Additionally, the app should not try to give too much information - it should be accessible if wanted, but the app should just give necessary guidance.

3.1.5 DECISION MAKING - MUNCH

Munch is a dining decision-making app designed to facilitate enjoyable group dining experiences post-pandemic. The app aims to foster group collaboration and assist users in selecting restaurants that pique their interest, ensuring a satisfying and collective dining experience (Porpora, 2021).

How does it work?

When users log in to Munch, they have the option to create a group of diners. They can then select a location for their dining options, establishing where they want to find restaurants. After setting the location, users can invite their friends to join them on the app.

Similar to popular dating apps like Tinder, Munch employs a swiping mechanism to help users make decisions (see Figure 17). However, instead of swiping on potential partners, Munch users swipe left or right on restaurants they would like to dine in. This interactive process allows the group to explore various dining options together.

Once the group reaches a consensus and selects a restaurant, users can check the

restaurant information to confirm their decision or opt for a new choice if desired. Munch keeps a record of all the dining groups and restaurants the users have decided to visit, providing a convenient way to keep track of past and future dining experiences, and make tailored recommendations.

Pros

Interactive and engaging experience: The Tinder-like swiping interface adds an element of fun and interactivity to the dining decision-making process. Users can actively participate by swiping left or right on restaurant options, making the experience engaging and enjoyable for the group.

Efficient decision-making: The swiping mechanism helps expedite the decision-making process. By swiftly reviewing and selecting restaurant options, Munch helps groups reach a consensus efficiently, saving time and minimising indecision or disagreement.

Cons

Exclusion of non-participating members: In groups where not all members have access to or use Munch, the app's decision-making process may exclude individuals.

This can limit the inclusivity of decision-making and may lead to alternative methods being necessary to involve all group members, rendering the app less useful.

Difficulty accommodating diverse preferences: In a group setting, individuals may have different dietary restrictions, allergies, or cultural preferences. Food decision-making apps might struggle to adequately consider and accommodate these diverse requirements, potentially leading to limited options or excluding certain individuals from the decision-making process.

Takeaways

Decision making efficiency is key to avoiding worry and saving time - involving others via the app and finding overlap in desires is a good way to do this. The user interface should also be enjoyable to interact with, since users will otherwise simply stop using. Also, in order to avoid excluding people, the app should give multiple options when possible, long with reasoning so that users can still make informed decisions.

3.1.6 CONCLUSION

A feature comparison is summarised in Figure 18, from which we can draw several conclusions. The most common feature shared between these apps is the ability to set specific goals. This is an important feature as it helps provide clarity, focus, and motivation for users to continue using (Ekhtiar et al., 2023). Goals help to justify other features and provide direction, motivation, clarity, and measurability to users.

Most of these diet-related apps focused greatly on nutrition and weight loss to the detriment of other areas. Wellbeing, for example, was not given as much care and is often limited to asking about enjoyment during a meal or progress towards some goal.

During the dieting app design process, it is crucial to consider possible negative effects and limitations on wellbeing of various features. The existing apps highlight some clear wellbeing aspects which are affected in this context: anxiety caused by hyper-focus on calorie tracking or weight loss progress, negative dining experiences and disorders

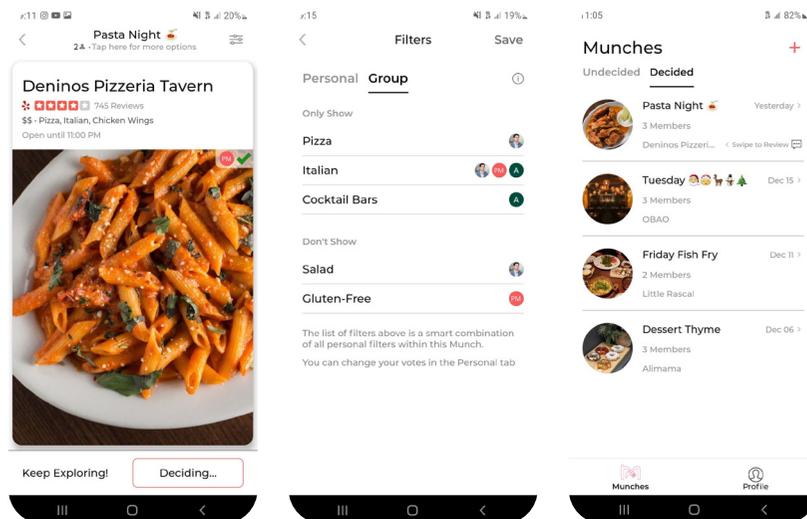


Figure 17. Tinder-Like Mechanism for Decision Making

stemming from restrictions, or loss of connection with other humans due to differences in requirements/goals, for example. Dining must be considered in the social context and, although the scope of this project only includes home dining, social factors such as varying preferences between people eating together remain vital.

Feature Name					
Customising	✓			✓	
Goal setting	✓	✓	✓	✓	
Recipe	✓		✓	✓	
Food Information	✓		✓	✓	
Diet planning	✓		✓		
Calorie tracking	✓		✓		
Weight controlling	✓		✓	✓	
Nutrition advice	✓		✓		
Online grocery shopping	✓				
Leftover handling	✓				
Meal recording		✓	✓		
Meal reminding			✓		
Socialising		✓		✓	✓
Emotion checking		✓			
Utensil documenting	✓				
Health measuring		✓			
Relevant guiding		✓		✓	

Figure 18. Feature Comparison

3.2 USER RESEARCH

In the previous chapter, a wellbeing theoretical model was defined. However, it is based on assumptions resulting from literature research. To confirm this model with actual users - gaining understanding of users' perspectives about which wellbeing aspects are influenced in the real context - user research will be conducted in this section.

3.2.1 RESEARCH METHOD

In order to gain reliable insights into users' experiences and needs, qualitative research using the **Experience Sampling Method (ESM)** was conducted (Sather, 2014).

The ESM is used to capture real-time, in-the-moment experiences and behaviours of individuals in their natural environments (Niall Bolger & Jean-Philippe Laurenceau, 2013). It involves collecting data through repeated and brief assessments, typically done through electronic devices or the internet (Krieken, et al., 2016). This method allows researchers to gather detailed information about individuals' thoughts, emotions, activities, and contextual factors as they occur in their daily lives (Hektner et al., 2007).

It can be difficult from an ethical and practical standpoint to conduct investigations by observing people in their home surroundings (Nicolau i Torra et al., 2022). Therefore, ESM is a highly valuable approach for this project. It offers an opportunity to gather rich, moment-specific insights into the impact of the current services on users' eating experiences, including the effectiveness of features, user satisfaction, and perceived benefits or drawbacks.

3.2.2 RESEARCH SETUP

Research Goal

The goal of this research is to encourage participants to reflect on their eating experiences whilst using one of several apps, and from this gain a deeper understanding of the impacts current dietary apps/services have on eating experiences. Results obtained from this will be used to improve the theoretical wellbeing model, including adding wellbeing aspects that are missing but which turn out to be important to users.

Pilot Test

Before conducting the actual test, two pilot tests were carried out to make sure the testing materials can achieve the desired research goal. Used materials and test results can be found in Appendix D.

It was found that professional wellbeing terms such as “autonomy” should not be presented directly to participants, instead, converting them into questions such as “Do you prefer to choose your own meals or let the app make the decision for you?” works better. Moreover, one of the main goals of this research is to get user experiences on the current apps. Therefore, how participants experience the features and interfaces should be implied in the ESM testing materials. To cope with the issues that emerged in pilot tests, a newly adapted version of testing materials was established (see Appendix D).

Participants

It started with recruiting participants from my personal network. Five participants were registered. It was required that they all used healthy-eating related apps since the goal was to gain insights into their eating experiences. They were asked to document any three meals at home within a week and write down their experiences of using the app. Participants were informed about the purpose and structure of the study and asked to sign a consent form prior to any data collection. This study was approved by the Human Research Ethics Committee of TU Delft. Figure 19 shows the participant-app pairings.



Figure 19. Participant-App Pairing

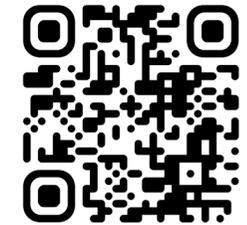
Materials and Procedure

I developed the ESM kit to be used digitally on www.miro.com. The website enables online collaboration between users in a whiteboard-like interactive environment that allows posting digital post-its, drawings, and adding pictures or web-based graphics. To prevent participants from seeing each other's contents, I created a separate kit specifically for each participant. At the beginning of the study, each participant received access to their individual Miro board. During the session and after the data-collecting process began, participants had the opportunity to email questions about the procedure and application of the software. The daily tasks were anticipated to take 15-20 minutes to accomplish.

The kit consisted of an introductory part and four main parts; see Appendix D or scan the QR code on the right.

The introductory part explained the research purpose and procedure. The first part asked about the app they were using and why they selected it. The second part

consisted of four boards: one example board and three blank boards. Each of the boards showed sections for eating setup, meal information (top) and a timeline of interactions with the app (bottom) (see Figure 20).



Scan to view the ESM kit!

Day 1

Date: _____ Which meal?: _____

Eating Setup

Did you eat alone or with company?
[Your answer...]

Where did you eat at?
[Your answer...]

What did you like or dislike about the eating environment? Why?
[Your answer...]

Your Food

What did you eat?
(Take a picture of your food)
[Your answer...]

[Camera icon]

Why did you choose this food?
[Your answer...]

Timeline

Your activity (Feel free to add pictures)
Plan a meal [Lightbulb icon] Finish [Clock icon]

What did you do with the app?
(leave screenshots here)

How did you feel?
(Put emotion stickers here)

Why did you feel this way?

Emotion Stickers

Drag the emotion stickers to the card
Don't forget to copy/paste if you need some ones!

Figure 20. One of the Blank Boards

Eating Setup:

In this section, participants were required to indicate who they ate with, where they ate/what it was like, and whether they had any negative feelings towards these. This primarily gave insight into the positive relationships aspect of the wellbeing model, but also into engagement (whether they were distracted or busy) and autonomy (perhaps they had to eat away from their usual area).

Your Food:

In this section, participants uploaded photos of their meals and were asked to describe it and the reasons for their choices. This gave insight into their levels of autonomy and mindfulness, in some cases. For example, whether they always ate this food or whether they had more specific or unusual reasons.

Timeline:

The timeline overviewed participants' entire process - from preparation to cooking and cleaning up - via photos and text. They also uploaded screenshots to demonstrate the ways in which they interacted with their app along the way. With each step, they described their feelings towards what they were doing and gave some reasons for these. This helped to gain understanding of the ways users interact with the apps, and their opinions/feelings towards specific actions.

Positive/negative emotions were clearly seen, but levels of mindfulness could also be inferred from their reflections. It was also valuable to see exactly in which ways participants interacted with their apps, and which they found worthwhile.

Emotion Stickers:

To help participants with accurately conveying emotions at each stage, the resource board contained an array of illustrations of different emotions based on the PrEmo2 measurement tool. This is used to measure emotions elicited by stimuli accurately (Laurans & Desmet, 2012).

The third part consisted of three different postcards to fill in (see Figure 21), which asked participants about their feelings, experiences and perspectives specifically relating to the factors (1) **engagement**; (2) **autonomy**; and (3) **meaning**. The topics were based on the remaining factors from the theoretical model.

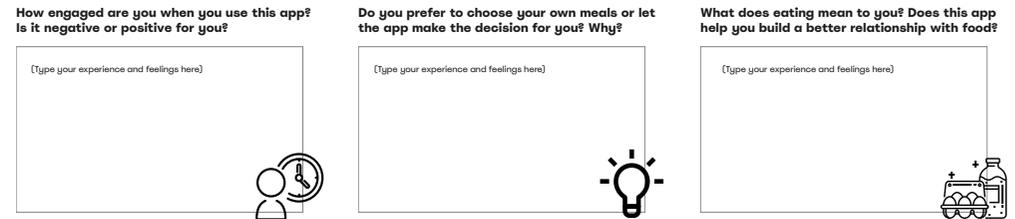


Figure 21. Three Postcards

The fourth and final part was a blank section for participants to expound upon anything which they felt they wanted to mention, which may not have been relevant to the previous parts.

Retrieved Data and Data Analysis

After collecting data from participants, a qualitative analysis was conducted (see Appendix E). From each kit the findings and insights were written down and summarised for further use. The moments when participants felt any positive or negative emotions were clustered (see Figure 22).



Figure 22. Findings and Insights

3.2.3 RESULTS

In this section, the results of the qualitative analysis from the Experience Sampling kit will be presented.

Contextual Factors

After analysing the data collected, it was defined that seven contextual factors contribute to users' eating experiences (see Figure 23).

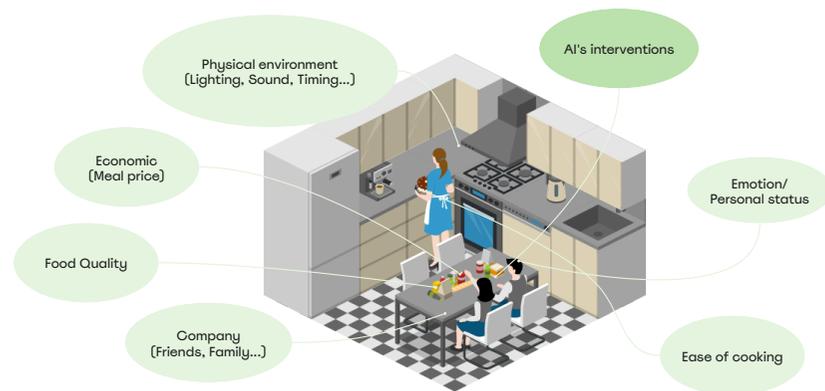


Figure 23. Contextual Factors

Physical Environment:

A majority of reported negative feelings were the result of environmental factors. For example, if the food was ready to eat but the dining area was still messy, a participant's chair was uncomfortable, or the area was loud. On the other hand, positive emotions often arose from pleasant physical environments; a participant mentioned sunlight shining through their window improved their mood, along with the music they were playing.

Economic:

Meal price played an important role in how participants felt about their meals. One described the reason for eating an unhealthy meal as the high cost for a more balanced one. The implication is that economic factors must be taken into consideration when

recommending food to users.

Food Quality:

Food quality is an obvious but important factor, referring to a wide range of qualities. A favourite meal can give a user something to look forward to and make their day satisfying. Specific meals can also remind users of positive memories, giving social value as well.

Company:

Those joining users for their meals are also crucial. Eating can be a social event during which people are forced to slow down and interact with others and create memories that they might not have time for elsewhere. In the research, one user reported feeling sad that she had to eat alone. However, company is not limited to other people, as some prefer to eat alone at times. Still many of those report playing music or watching TV whilst eating, making those aspects act as company.

App's Intervention:

The main subject of this project; how exactly an app's instructions change users' eating patterns or routines is vital to understand. Most importantly, negative aspects must be considered, such as frustration/anxiety or loss of enjoyment arising from the repetitive nature of entering information constantly, or being informed that calorie intake is too high. Conversely, too few or universal recommendations can also decrease the joy of eating. Participants also reported not wanting to continue using their apps when it did not function as expected.

Emotion:

Mood can directly impact a user's perception of a meal, just as a meal can determine one's mood. Understanding the emotions of users is therefore important.

Ease of Cooking:

If a meal is too difficult or time-consuming to prepare, it may become less enjoyable and lead to frustration and hunger. If the app is to recommend such a meal after a long day - when the user wants a relaxing and easy meal - they are not likely to be satisfied.

User Journey Map

In this section, a user journey was mapped out to narrate the experience of the user with the eating app during a meal (see Figure 24).

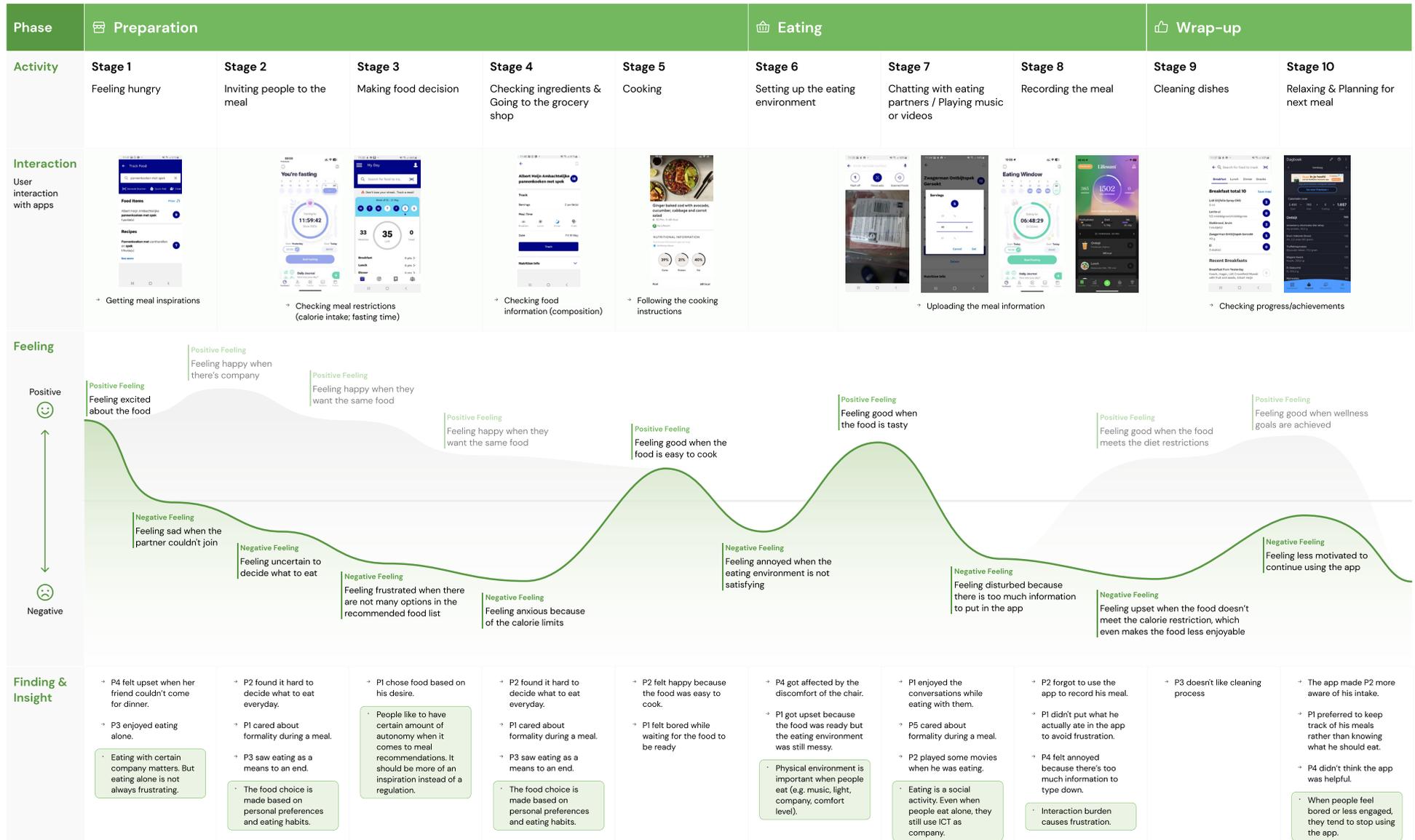


Figure 24. User Journey

3.2.4 INSIGHTS

Insights generated from the analysis were clustered into different themes in the following. Quotes from participants were added.

Breaking restrictions of "eating healthily" & making my own food decisions



“ The app didn't help me that much because I don't like salad.”

“ I felt angry when the app said that I had already had enough calories for today, which makes the food even less enjoyable.”



When it comes to healthy eating, many think first of salads or “boring” foods. Some are discouraged from changing their diets due to poor selections of foods and general intake restrictions in these apps, which lead to low levels of autonomy and negative impacts on wellbeing. In reality, healthy eating does not necessarily mean only selecting so-called “healthy foods”, and having pleasant and joyful dining experiences is often more beneficial.

Feeling engaged and motivated by knowing benefits and seeing achievements



“ There was somewhat a sense of achievement at the beginning, but I don't really know what information I can get from it, and soon it gets boring.”

“ I want to understand more of how my body is changing during fasting. But I barely see anything, and my motivation has dropped drastically over time.”



Many apps do not lead to long-term effects for most users, perhaps caused by a lack of human-centred design focus. After the novelty factor wears off, users often feel bored or unmotivated to continue using them. The service should allow in-time customisation

and be able to adapt promptly to when users' statuses or preferences change, in order to increase feelings of engagement and have their needs met. Notably, when the sense of achievement is greater, levels of engagement are as well. Therefore, informing users of even small achievements may contribute to a more sustainable, prolonged service.

The interactions with the app



“ Sometimes I am very frustrated with the app, as it can make a simple meal a lot of work. Often I enter [into the app] something that I feel is closest to what I am eating, rather than actually what I am eating, to avoid frustrating situations with the app and to save time.”

“ It was time consuming and frustrating when items were not easy to find in the app.”



Interactions play a crucial role in app design, determining the user experience. Well-designed interactions are vital to improve user engagement, satisfaction, goal achievement, and therefore the success of the service. It was observed that users are quick to be dishonest regarding the information input into the app if the process is too arduous, complicated, or tedious. They likely also engage much less, and are more likely to quit. Therefore, accessibility, usability, and simplicity stand above in importance. Additionally, interactions should be minimised as much as possible during eating, so that users can engage and focus on their meal without disturbance.

Eating as a social activity



“ It is very pleasurable to sit and have a nice conversation with my wife during my meal.”

“ I felt sad when my partner told me he couldn't come for the breakfast.”



Notably, four out of five participants mentioned that they enjoy eating with their loved ones and friends. Although the scope of the project only includes home-dining, it is still important to consider eating as a social event. When designing for healthy-eating, it must be kept in mind that eating is not just an essential physiological activity, but also a valuable social event with cultural and emotional significance. Recognising and embracing this can enhance enjoyment and benefit gained from shared meals. Whether with family, friends, or acquaintances, there is opportunity to contribute to overall wellbeing.

Building a relationship with food



“ It was nice to think about my meals more, as it made me aware of how food/eating made me feel, rather than just thinking it is fuel for my body.”

“ In the past, I had a small period that I wanted to lose weight. I don't feel like that anymore, and I prioritise eating above most things. A 'good' diet has definitely changed my relationship with food for the better.”



The subject of this project - healthy eating - should refer not only to eating healthy food, but developing a healthy relationship with food. Reflection on meals and how one feels at all times can help to become aware of more meaning relating to meals, as well as the goals one wishes to achieve. In other words, mindfulness is an important component in building a healthier relationship with eating. This can be achieved in the service design by guiding users to think about recent meals and helping to promote more mindful eating practices based on them.

3.2.5 LIMITATIONS

This user research contained some limitations to bear in mind. Only five participants took part to a reasonable extent, and some of these failed to document all three requested meals - due to the quite substantial test material workload - leading to some

limited impressions of their apps. The participant pool was also quite homogenous - mostly students - due to a limited recruitment network.

These limitations stem from a restricted recruitment time, and may mean that the results are not representative of the wider population. Nonetheless, the results were in line with wellbeing theory expectations, and are therefore considered valid.

3.2.6 CONCLUSION

This section gave important insights into which wellbeing factors were important to users in the eating app context specifically. These primarily included positive relationships, positive emotion, autonomy, mindfulness, and engagement.

An additional observation was that users care more about their feelings during a meal than the objective healthiness of it, although this can be a factor affecting the former. The healthy eating they desired was really a pleasant dining experience and a balanced and calm mindset towards eating. It became clear that a method to achieve this was not calorie-counting or simple diet restriction, which in fact had the converse effect. More broadly, the current apps simply did not effectively help the users to achieve these goals at all.

These insights were gained via the Experience Sampling Method, and it is worth mentioning that a different type of research method would likely not be as effective due to the sensitive way in which personal experiences can be influenced by a researcher. In user-centred design, the particular research method is therefore vital, and must be able to obtain accurate, insightful results which are representative of how users will behave outside the research environment.

Conclusions from the user research are used in the following chapter as the foundation for an updated wellbeing model, as well as for generating design direction.

3.3 CONCLUSION

At the beginning of this chapter, several eating-related apps were studied and their most important/unique features were crystallised. User research was then conducted in order to gain deeper understanding of connections between features and wellbeing factors, as identified in the early preliminary theoretical wellbeing model.

We can compare that initial model (Section 2.6) with conclusions drawn from the user research. Overall, the theoretical model was essentially correct. However, there also exist relations and correlations between the wellbeing factors which were not accounted for. For example; when achievements are made, engagement tends to increase; positive emotions can stem from the promotion of positive relationships; and autonomy can be better achieved when being more mindful whilst planning meals. Based on these, an updated wellbeing model is defined, see Figure 25.

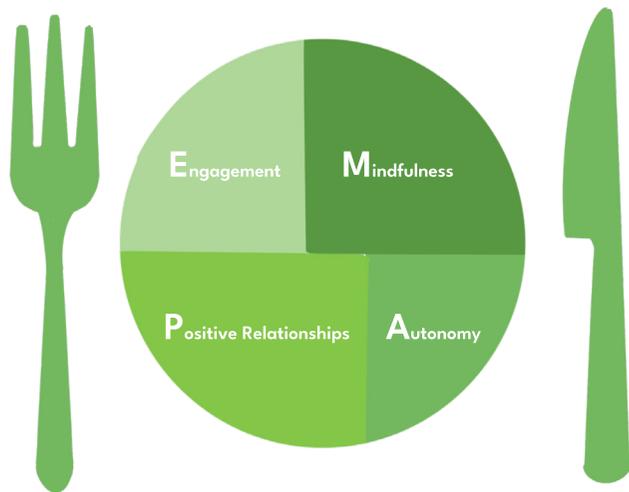


Figure 25. Updated Wellbeing Model

Design Goal

The updated wellbeing model of section 3.3 highlights the important factors contributing to wellbeing within the specific context of diet and health apps. Based on this model, design goals are established. Since autonomy and relatedness are the fundamental contributing factors to increasing motivation for engagement (Ryan & Powelson, 1991), it is not necessary to make engagement an explicit, separate goal. Therefore, design goals are formulated as:



Facilitate Positive Relationships

The service will provide space for socialisation.



Facilitate Autonomy

The overall experience will be based on users' preferences and desires.



Facilitate Mindfulness

The service will promote mindful eating experiences, helping users to be aware of the food choices they make.

DESIGN PROCESS

D4

In this chapter, a design vision is derived and presented based on the context study conclusion. Design requirements are defined according to both user needs and the design vision. A technology section describes how the product form is selected as the method of intervention (the way in which the service interacts with the user) based on a series of criteria and the QOC method. An AI Ideation session is then conducted to develop the concept further. Prior to the final design chapter, first round user tests are then conducted to iterate the concept.

4.1 DESIGN DIRECTION

Based on the insights from previous study, a design direction is further defined, with a design vision and design requirements.

4.1.1 DESIGN VISION

*“To promote **mindful** home-dining experiences by providing a service in which users can feel both in control of what they eat and closer to their loved ones.”*

Before further expounding upon the design vision, it should be mentioned that this project cannot provide one complete solution to cope with all wellbeing aspects and that choices need to be made by the designer. Based on the previous study, I believe that a healthy eating practice should be aligned with a mindful and joyful eating experience; lack of pleasure in the old-fashioned healthy eating method stands in the way of effectiveness. Therefore, I aim to design a service system that helps users have mindful eating experiences in which they are aware of and enjoy what they eat.

In this service, users' autonomy is a priority, which means the old - established - system/ app interaction methods must be thrown away. Instead of being controlled by an app, users must be able to make the decisions regarding what they eat, whilst still enriching connotations of healthy eating. To make sure this service actually functions and benefits users, users should feel engaged even after the novelty fades away. This can be achieved in two primary ways: by high ease of adaption to user needs supported by AI, and by a focus on fostering positive relationships between people. Positive relationships facilitated by the app - being in a community of joint users - ensure that users have an easier time committing in longer terms.

4.1.2 DESIGN REQUIREMENTS

The preliminary design requirements are defined based on all the previous research activities including competitor analysis, user research, the literature review and design goals. The design requirements will be used to evaluate the final design. They are preliminary here since, through cycles of design and evaluation, the requirements can be added to.



Minimised Input

The product should be capable of automatically capturing the majority of users' statuses without requiring them to manually input their information frequently.



Minimised Disturbance

The product should provide interaction in a way that is non-intrusive and simple, ensuring that users are not disturbed or distracted while they are eating.



More Fun

The product should be attractive to users by delivering joyful and entertaining experiences, enabling users to be more engaged and enthusiastic while using the service.



More Adaptability

The product system should allow for the reflection process of users by incorporating an adapting mechanism in line with the wellbeing measurement framework.

4.1.3 TECHNOLOGY

Criteria

Technology is the only suitable environment for this service, since it must be able to update instantly, be interactive, and convey a range of information in a simple way. In this section we consider possible technologies through which the service could be implemented: a smartphone/pad, a smart watch, smart glasses/headset, and a smart speaker system. Five criteria for the technology are established and given weightings of importance, from which the most suitable can be seen. It is important that a viable technology is sufficient in all criteria, since one missing would render the flow of the system too interrupted. They are as follows, along with weightings:

Reliability (8): The service relies on analysing trends based on accurate information, so reliability is vital. Furthermore, lack of trust stemming from unreliability may have negative effects on wellbeing.

Ease of Use (10): It must be intuitive to use, since it relies on users constantly interacting. If this is an arduous task then the service will not be sustainable.

Non-Intrusiveness (7): Users must not feel disturbed while they eat or otherwise go through their day, as this directly detracts from the design goals such as fostering positive relationships and mindfulness.

Acceptance (7): The chosen platform must not represent an inherent barrier which turns off potential users or makes them feel dissatisfied. A technology which many already use is therefore ideal.

Low-Cost (3): The service should preferably be accessible to many, and having others around the user also able to partake helps build community and positive relationships, increasing sustainability.

QOC Method

Specifically, the Question, Option, Criteria method was used to aid in technology selection. This consists of questions relating to important design issues, presenting possible options to meet answer these, and assessment criteria (mentioned above) to quantitatively compare options (MacLean et al., 1991). The question formulated was **“Which technology is most suitable for tracking intake and measuring wellbeing for this project?”**. See Figure 26 for a summary.

Possible Technology					
		Smartphone/Pad	Smart watch	Smart glasses/Headsets	Smart speaker
Criteria	Reliability (8)	9	7	6	6
	Ease of use (10)	8	9	7	8
	Non-intrusiveness (7)	6	7	7	8
	Acceptance (7)	10	9	6	8
	Low-cost (3)	6	7	4	10
Average score		8.06	7.97	6.31	7.71

Figure 26. Rating Technologies Based on Criteria

The result was that a smartphone/pad app is most suitable, scoring highly both in each category and overall. Therefore, this was confirmed as the chosen platform for the project.

4.2 IDEATION

After defining the design direction, it is time to come up with an innovative yet feasible solution. Design goals and requirements should be kept in mind at all times in order to ensure that each feature has a relevant purpose.

4.2.1 SETUP

An AI Ideation Session was conducted to ideate possible solutions that can be realised by AI technology. Design for AI is centred around introducing elements and techniques from human-centred design into an AI development process. Seeing opportunities, considering user needs, and predicting societal/personal implications in addition to pure engineering decisions can enable the construction of systems that are finely tuned for the contexts and purposes they are designed for (Piet, 2022). Application of an AI Ideation Card Deck technique is useful in helping designers make use of AI capabilities in an appropriate way, for social, personal, or business value (AI x Design, 2021). Therefore, this was done in this session - an overview can be found in Appendix F.

The online session was structured in the following steps (Piet, 2019):

Frame challenges: Scope the design challenges by framing them in “How Might We” (HMW) statements;

Select AI cards: Select AI cards representing different AI capabilities;

Brainstorm: Generate ideas that can cope with design challenges by leveraging these AI capabilities;

Select ideas: Use C-Box Method (Byttebier & Vullings, 2009) to assess and select ideas based on innovativeness and feasibility;

Develop concepts: Develop an initial concept based on the selected ideas.

4.2.2 DESIGN CHALLENGES

The defined design vision and goals brought the following design challenges, which were framed in How Might We (HMW) statements:

How might we facilitate socialisation so that users can enjoy the company of friends or family during a meal?

How might we provide a joyful service with a sustainable effect so that users can feel more engaged?

How might we encourage healthy eating without restricting diets so that users have more freedom in food choices?

How might we promote mindful eating and encourage users to reflect on what they eat so that they can build a better relationship with food?

These design challenges served as starting points for the brainstorming session in the following.

4.2.3 PROCESS AND RESULTS

After brainstorming using the AI ideation cards, as many ideas as possible were generated to cope with the design challenges (see Figure 27).

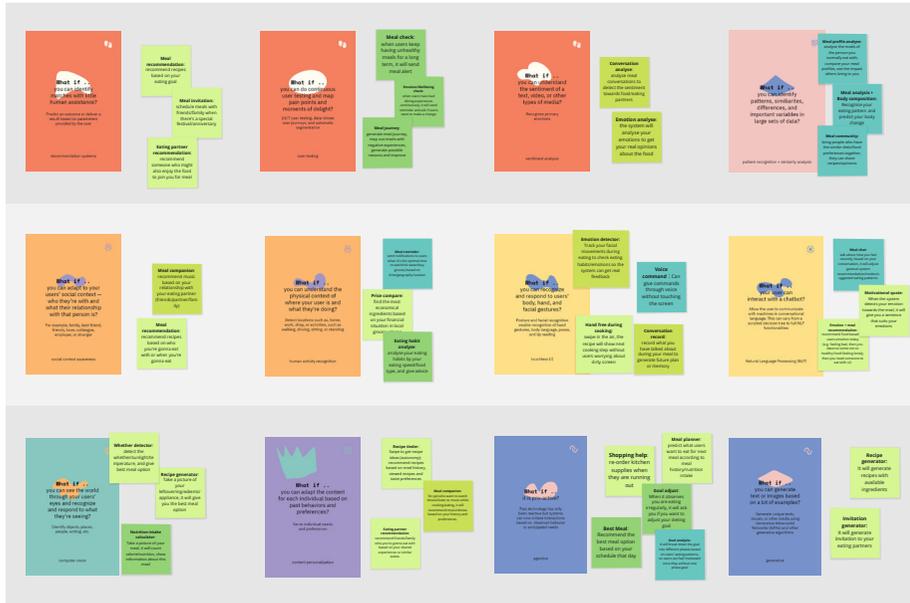


Figure 27. Selected AI Cards and Ideas

To evaluate and select from all these ideas, a C-Box method was used, which is also known as Creadox (Byttebier & Vullings, 2009). C-Box is a method that helps designers categorise and evaluate numerous ideas via a matrix. The X-axis represents novelty; the Y-axis feasibility. The ideas in the yellow region - referred to as the sweet spot - were selected to proceed with (see Figure 28). The sweet spot is usually at the intersection of the axes, representing a good balance between novelty and avoiding being too futuristic (van Boeijen et al., 2014). It is not in the upper left sector, since these are typically "low-hanging fruit" - the easiest to implement - or are overly innovative when it may not be necessary - the most outlandish ideas are rarely the best.



Figure 28. C-Box for Selecting Ideas

4.2.4 INITIAL CONCEPT

By combining all the selected ideas, an initial concept was developed based on the consideration of design goals and requirements; see Figure 29.

This concept is a mobile application - driven by AI - that can recommend personalised recipes based on parameters including users' preferences and the in-time environment such as meal time, eating partners, and daily schedule. The recipes it provides are not just varied, but tailored to instant needs.

It consists of five main modules, and functions during two main stages: before eating (1, 2) and after eating (3, 4, 5).

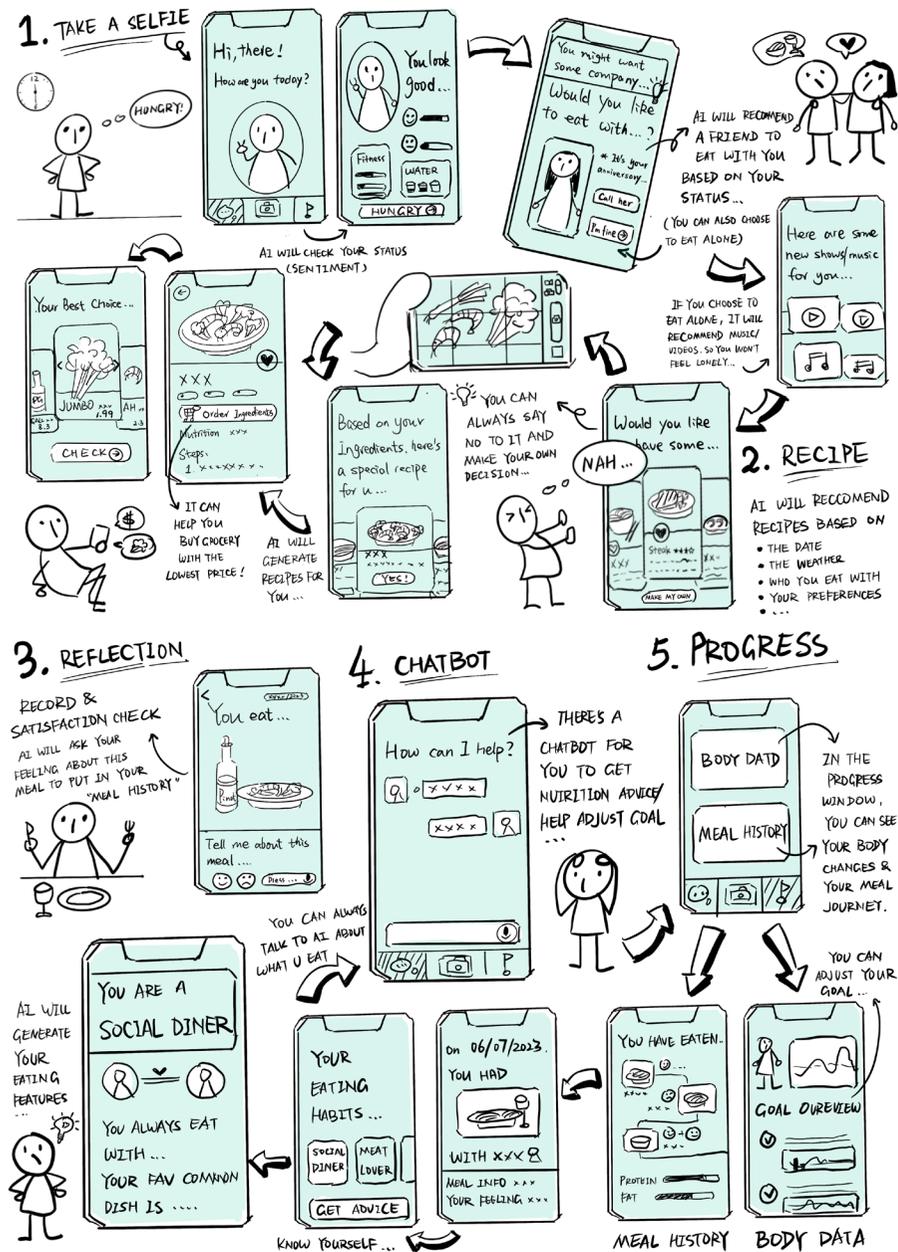


Figure 29. Concept Sketching

01 Taking a selfie

The main feature of this module is the user taking a selfie with their surroundings. The AI system will recognise the environment and the user's emotions, via **emotion recognition** and **social context awareness**. After analysing and processing the captured data, the system will make recommendation and help facilitate. For example, by asking if the user wants to invite someone over for the meal when the user is alone in the selfie. If the user chooses to eat alone, it will give suggestions on music and videos based on the user's emotion and what they have recently viewed via using **content personalisation**.

02 Recipe recommendations

This module is the main part of the whole system, and works by applying **content personalisation**, **anticipatory capability** and **machine learning**. The system will offer a wide range of recipe options, not just based on users' basic dietary preferences but also the dining context. For example, if a user is eating with a friend who has the same love for pasta bolognese as the user, then the system will have this meal as the first option, without the user searching manually. It will also make assumptions regarding recipes they may both enjoy. To ensure there is full autonomy, the system can also generate customised recipes: users only needs to take a photo of the ingredients, and AI will help generate a recipe that fits. This relies on **computer vision** and **content personalisation**.

03 Reflection

To meet the design requirement of minimised disturbance, the app won't interact with the user during the meal - the reflection module happens after the user finishes eating. The system will ask users to report on the dining experience, including information on emotions and thoughts about the meal. The system will update the recommendation module based on user feedback via **machine learning**.

04 Chatbot

The system also contains a chatbot module that allows the user to communicate with the machine in conversational language by integrating **natural language processing (NLP)**. The system will update the recommendation module and even interactions based on the conversation through **machine learning** and **sentiment analysis**.

05 Progress

To help establish a balanced mindset in the bigger picture, the progress module helps users reflect on what they have achieved and how their bodies and minds may have changed as a result of what they have eaten. This module contains two main parts: body data and meal history. In the body data part, users can check on progress towards the set goal(s). The system will also help users to adjust the goal to a realistic level depending on their progress. This feature involves **agentive capability**. In the meal history part, the user can see an overview of all past meals and experiences. AI can analyse users' eating patterns and habits, giving meal advice based on **pattern recognition** and **similarity analysis**.

Note: Bold terms here are current AI capabilities retrieved from the AI Cards; for more details see there.

4.3 CONCEPT ITERATION

4.3.1 CONCEPT DETAILING

User Flow

The initial user flow for the app is presented in Figure 30. It can be seen that different modules in the system promote different aspects of wellbeing as defined in Chapter 3.3.

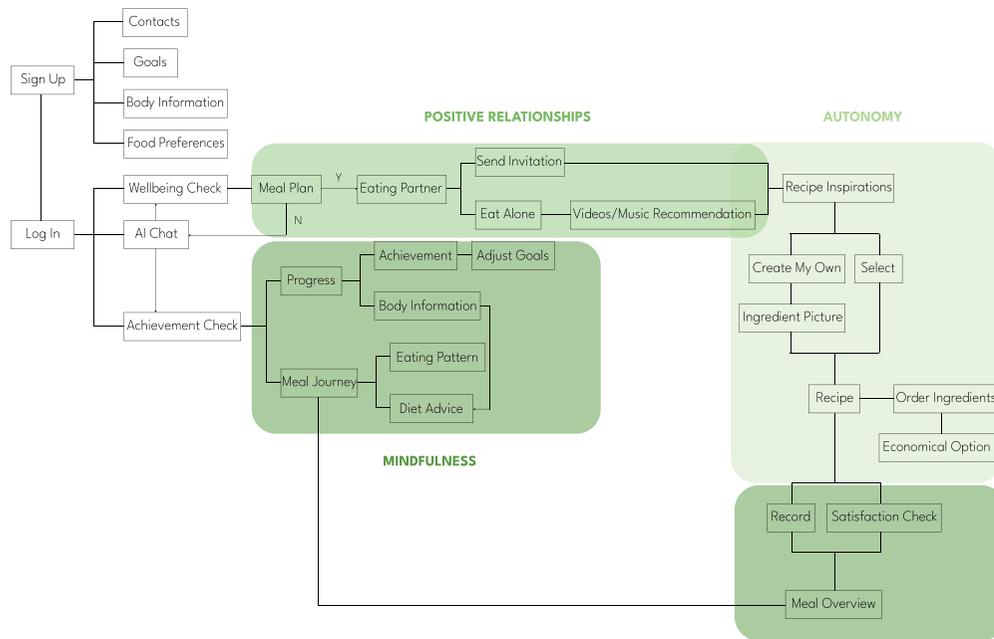


Figure 30. User Flow

Prototyping

A set of wireframes was created to test the concept. The first working prototype was developed separately in ProtoPie and Figma. The camera feature can only be realised in ProtoPie. Due to technical limitations, the picture detection function (for the number of people in the photo) cannot be achieved in any current prototyping programs. Therefore, two separate flows were developed in Figma to simulate eating alone versus eating with others (see Figure 31). The prototypes can be viewed via the QR codes below.

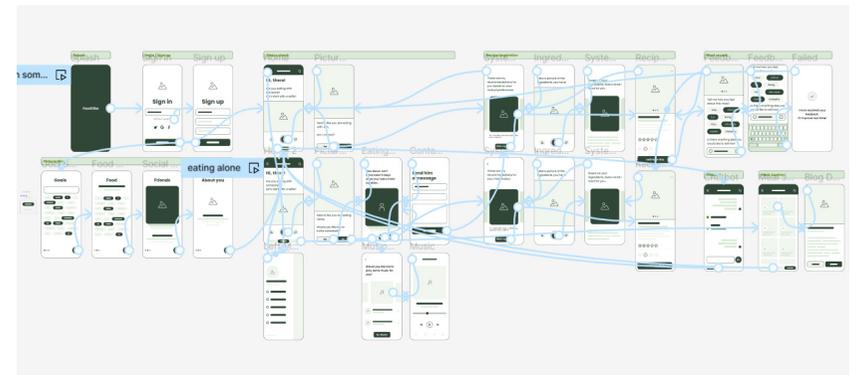


Figure 31. Prototype: Two Flows in Figma



Scan to try the prototype in ProtoPie



Scan to try the prototype in Figma

Wireframe Detail

The details of the wireframes are presented in Figure 32.

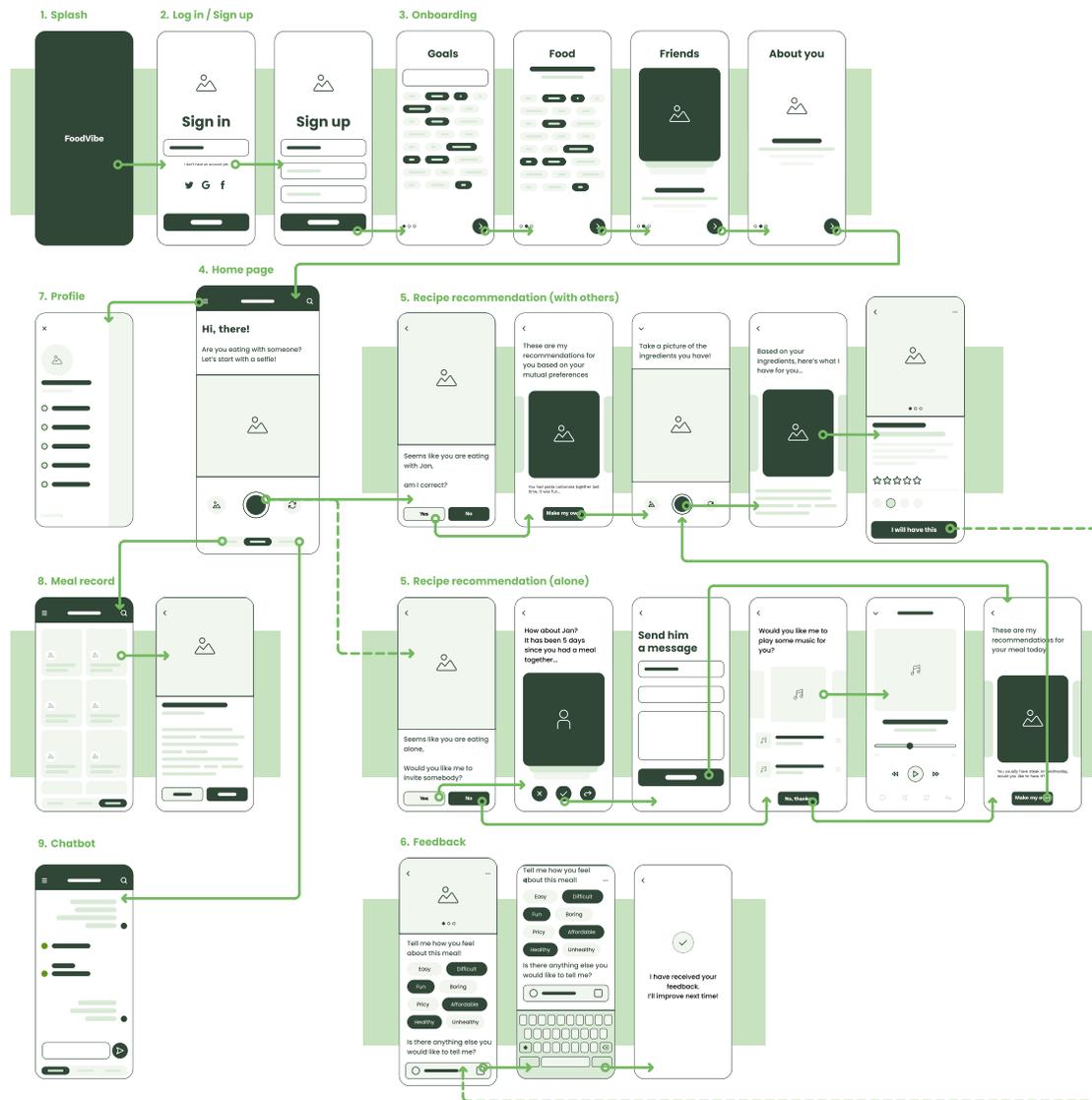


Figure 32. Wireframes and Flow

4.3.2 ITERATION RESULTS

An informal iterative test was conducted in order to obtain some feedback on improvement areas within the initial concept. Three participants were invited to use the app prototype, with the main goals being to gain feedback on how intuitive the user flow was and how accessible features were. Prototyping and coach meetings also raised several areas for improvement at this stage.

What Works

It turned out that the logic of the system already worked well in the intended way. Users reported enjoying the selfie feature since it streamlined data collection, saving them time and effort, thus aligning with the design requirement. The socialisation aspect of the app was also well received, with users reporting that it felt more inclusive than other apps used before. They felt interested to use the app in the future and see how it could affect their social interactions. Features were clear and easy to access/navigate within a short period, reportedly. In this iteration, the level of autonomy could not yet be measured due to missing functionalities.

What Must Be Improved

Add filters to recipe recommendation part

Some filters are subjective, so when a user wants to filter for "Easy-Cooking", it must be based on what they considered easy or difficult in the past.

Stimulate AI chatbot conversations

Users were not aware of how an AI chatbot could be useful, so example prompts should be added.

Add labels to meals/recipes

Manual input can be reduced by adding a labelling module which can quickly sort meals into groups for future reference.

Add contextual results

Examples of how recipe suggestions depend on the context - especially who a user is eating with. In this iteration the interface did not highlight this distinction.

Emotion detection removal

The emotions detected by the AI are not always valid. It is easy to 'trick' the AI by pulling a face, and it may not be accurate in detecting subtle facial cues. Presently, this issue is technologically impossible to sufficiently correct, and so this feature must be removed in order to avoid issues resulting from inaccuracies, which would render the service pointless.

Discard body data incorporation:

Use of body data does not contribute to the design goal, since it tends to increase anxiety or negative feelings, whilst not being necessary. For example, goal setting is completely possible without basing the goals on body metric targets.

4.4 CONCLUSION

This chapter introduced the concept development process, starting with forming the design direction and goals. These are crucial since the fields of wellbeing, eating, and service design are so broad; it is necessary to form a relatively narrow focus area. An app form was selected based on criteria relating to these, with the aim of making the goals most achievable. An initial concept was then formed through an ideation period, user flow was mapped, and wireframing and a prototype were created. This was then iterated and tested, however these two steps were kept quite limited as the final design stage was expected to be much more time/effort consuming.

Through this process, the final design focus module was altered to focus on recipe recommendation in the form of meal inspiration, as opposed to being a diet planner; there will be less focus on tracking achievement or body changes. In the next chapter, this will be developed into a final design, based on a proposed structure as mapped out in Figure 33, which will be further expounded upon in the following chapter.

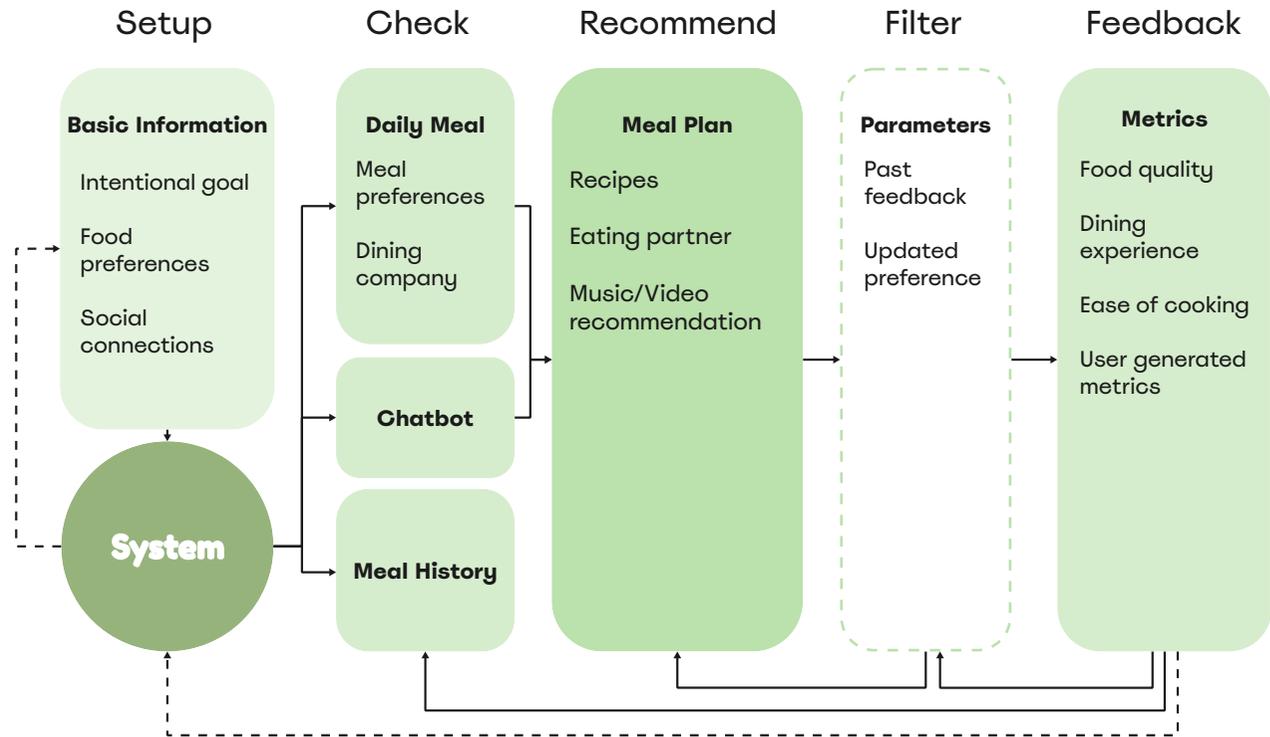


Figure 33. Proposed Final Service Structure

FINAL DESIGN: FoodVibe

05

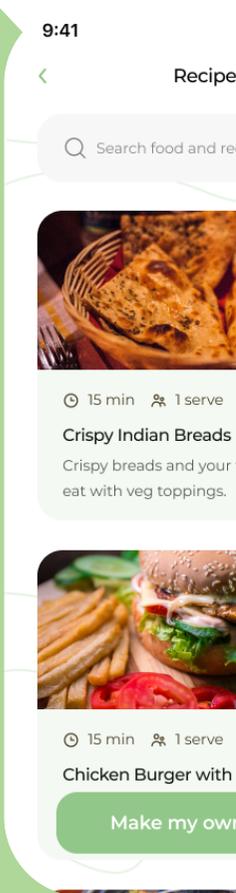
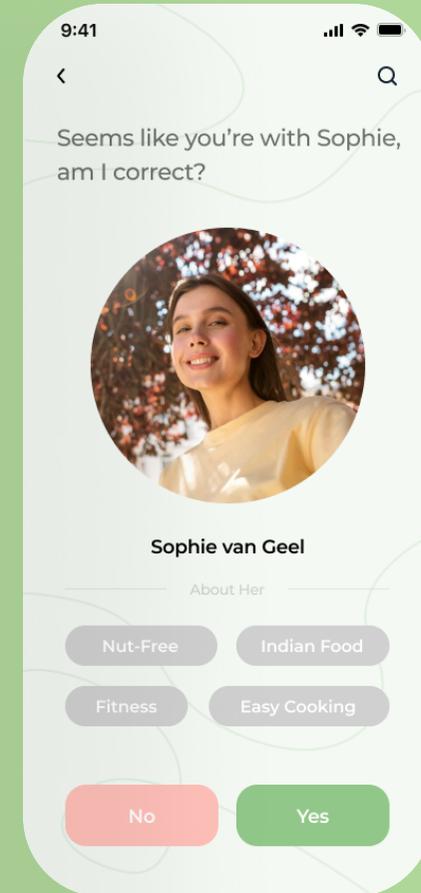
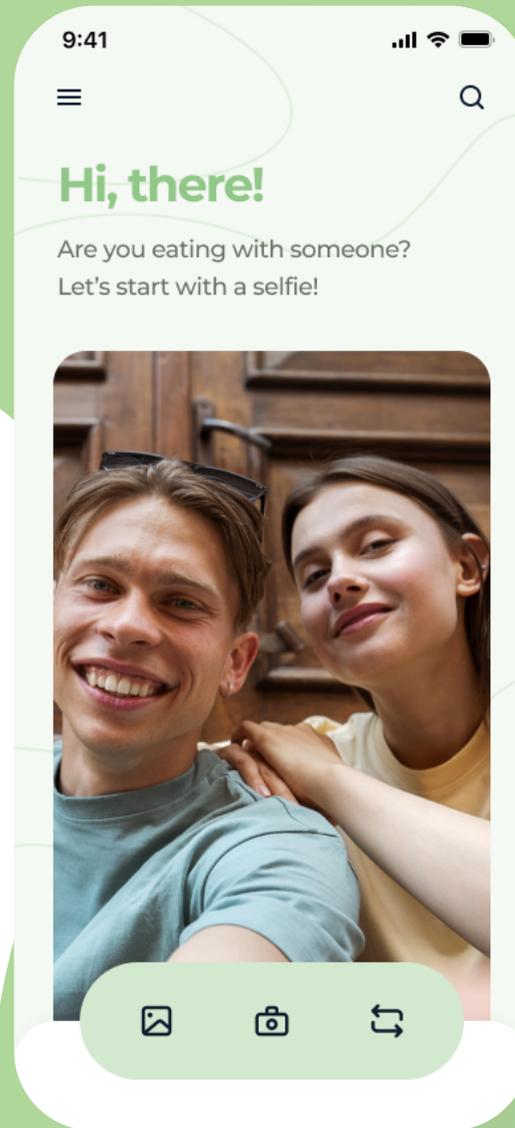
This chapter introduces the final design solution - FoodVibe, an app which harnesses AI power to facilitate wellbeing by bringing people together for more joyful and mindful meal experiences. Information architecture and feature details of the app are presented.



FoodVibe

“The Taste of Wellness”

A meal inspiration app to nourish
the mind and body,
bringing people closer together



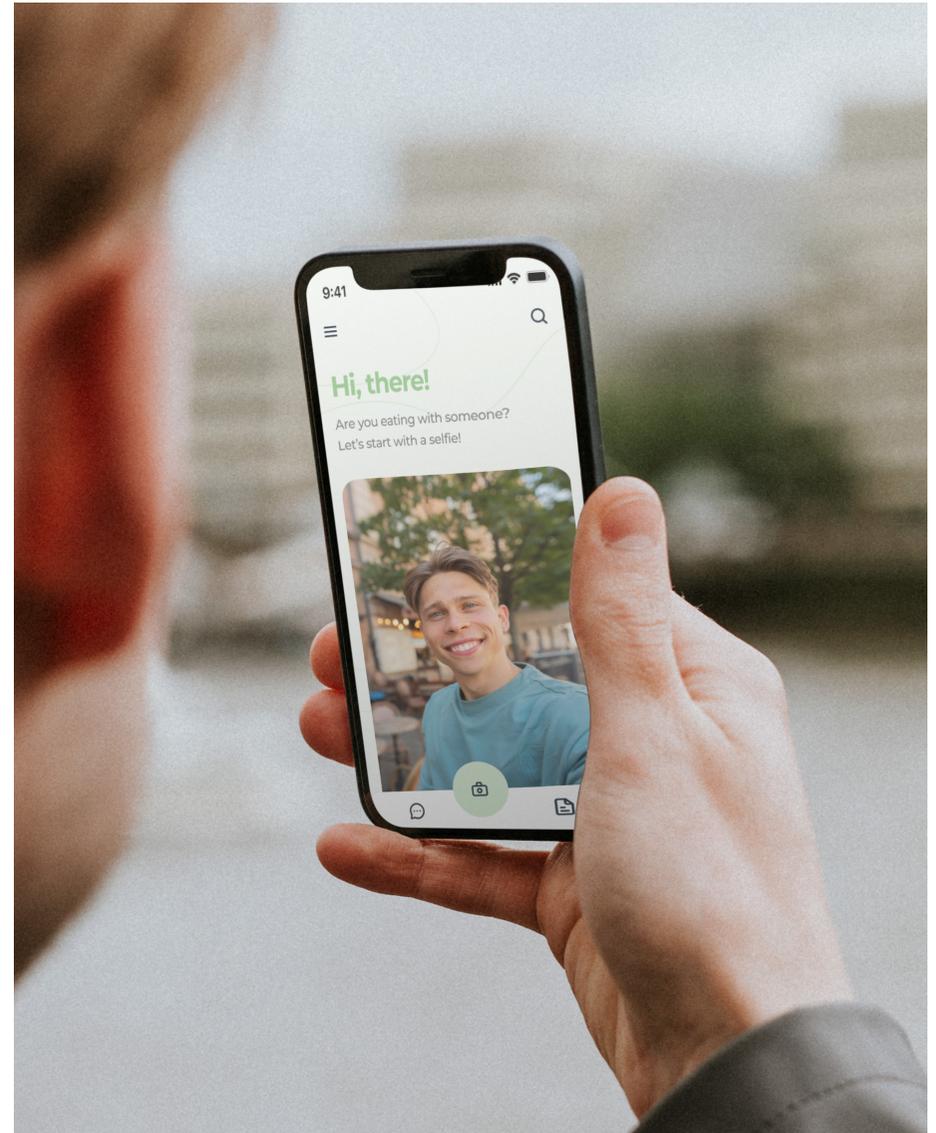
5.1 INTRODUCTION TO FOODVIBE

FoodVibe is an app which harnesses AI power to encourage better wellbeing by bringing people together for more joyful meal experiences, and then reflecting on them. It continuously learns from past experiences through reflection and gives new recommendations for future experiences. By understanding the types of meals a user enjoys, and with whom, it can recommend experiences for the future which increase different aspects of wellbeing.

The final design - FoodVibe - is an app which facilitates more mindful and personal home-dining experiences. The name is a play on “good vibes”, which gives a feeling for what the app is all about. By taking into account preferences, past feelings, and behaviour trends, the app recommends changes - such as new meals, more suitable methods, or partners - and lets users reflect on these for future improvement.

FoodVibe encourages more joyful experiences with friends and family by utilising AI to increase factors contributing to wellbeing, based on the past reflections. Users can self-report on their experiences in a number of ways, and the app considers everything for the next time. For example, it recommends recipes based on who you are with and what is likely to please everyone, and recognises when you might want to invite someone to join you. It even recommends ways to boost wellbeing in the case that a user wishes to eat alone, with music or movie suggestions. The intuitive interface makes using the app on a daily basis unobtrusive and overwhelmingly positive in its effects.

All along, users maintain autonomy by not being restricted whatsoever. They can still choose to eat whatever and with whomever they wish, and FoodVibe will consider their reflections nonetheless.



5.2 DESIGN DETAILING

5.2.1 INFORMATION ARCHITECTURE

FoodVibe provides personalised meal recommendations based on machine learning, and adapts according to users' past experiences and self-reports. The app's information architecture is shown in Figure 34. All features and loops are justified by the earlier research results and insights, and are guided by the design direction mentioned in Section 4.1.

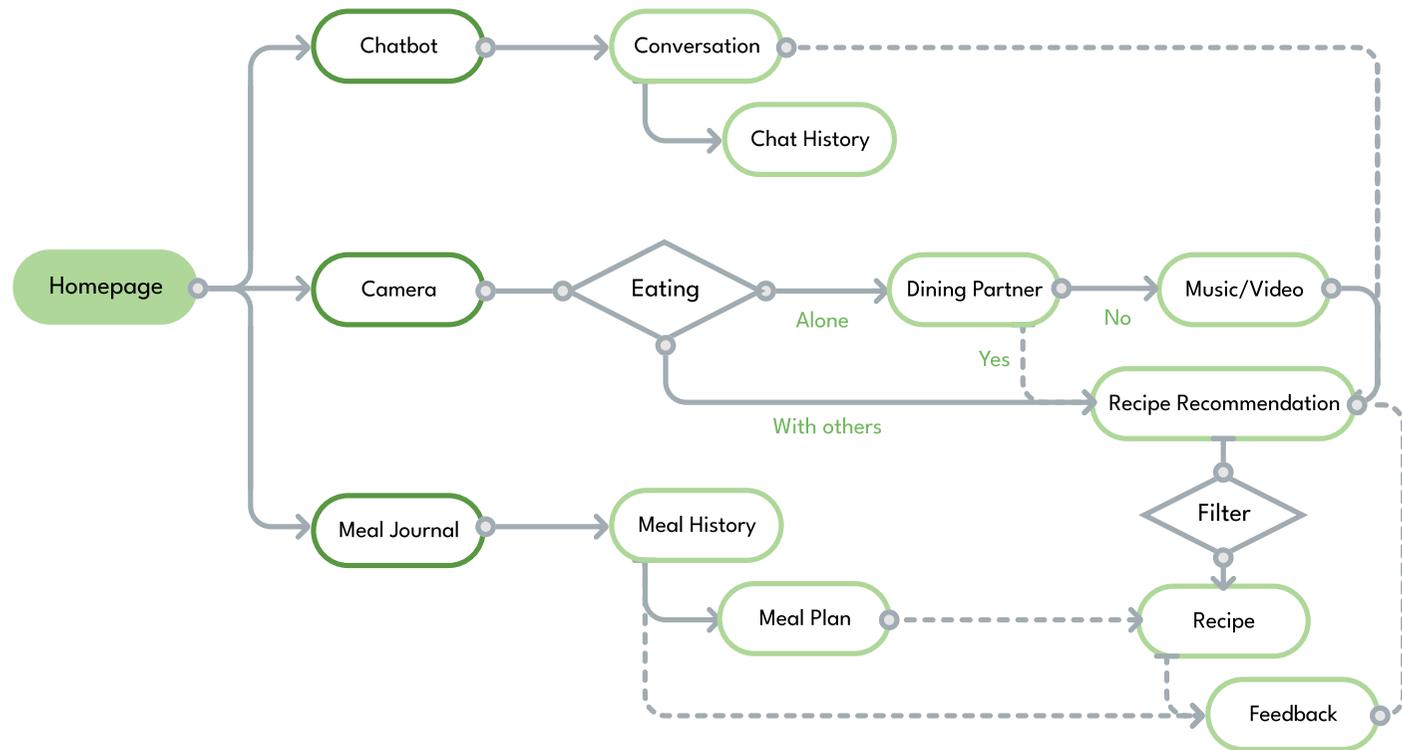


Figure 34. Information Architecture

5.2.2 FEATURES

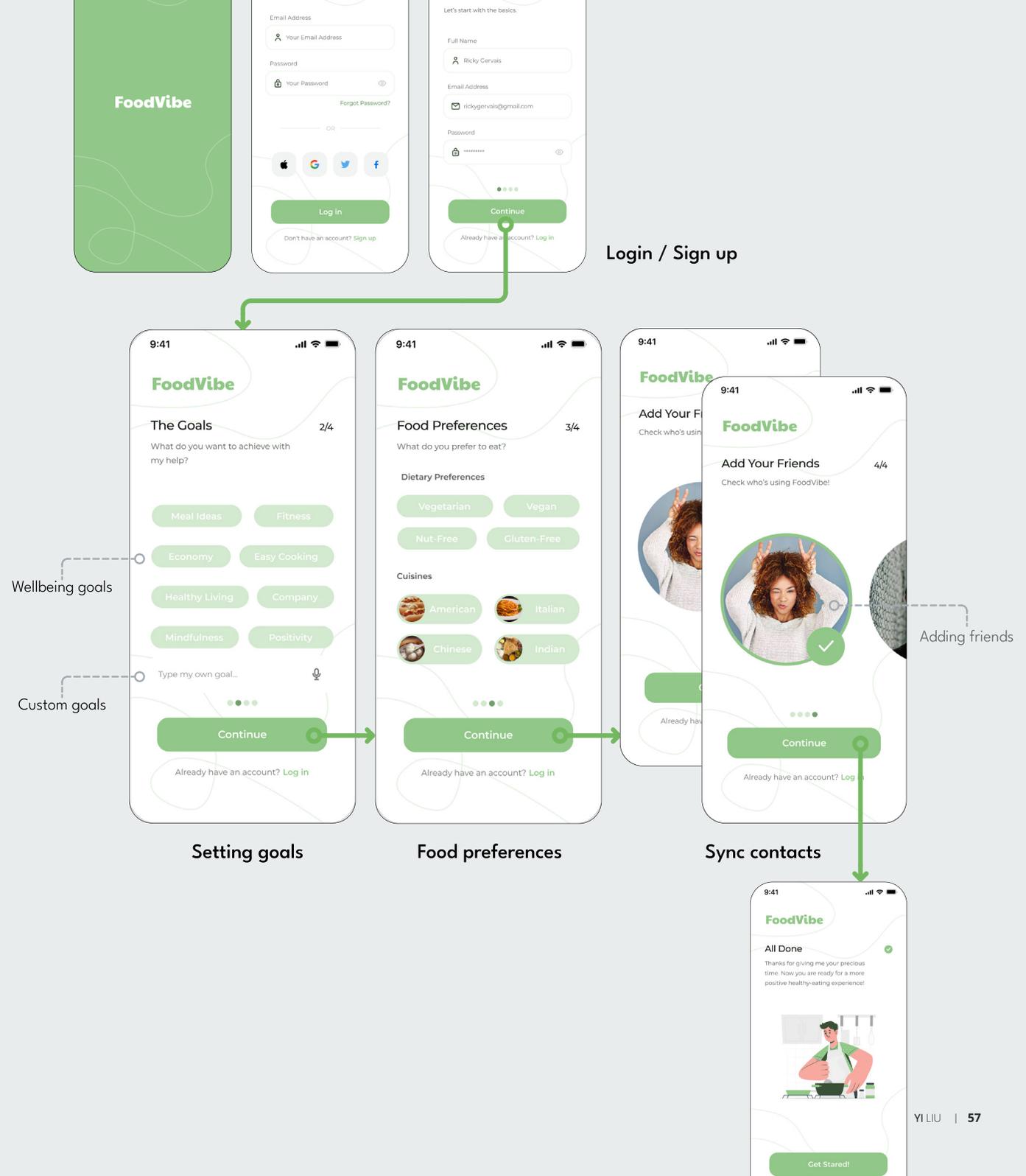
Onboarding

After first downloading FoodVibe, the user is prompted to create an account by providing basic information, such as a name, email address, and password.

After this, the user is guided to set a goal related to their health or wellbeing expectations. This could be increased fitness, sticking to a healthier diet, or simply dining with friends and family more often. The app presents a selection of predefined goals, but also allows users to enter a custom goal.

Next, FoodVibe prompts the user to indicate any food preferences. This could involve dietary preferences (e.g. vegan, gluten-free) or specific cuisines they like. Users have the option to choose from a list of predefined but extensive preferences here.

To enhance the social aspect of the app, users are given the option to sync contacts and find friends who are also using FoodVibe. The app asks for permission to access contacts on the user's device and provides an option to select which friends to connect with.



Selfie Check

An innovative feature is that the app prompts the user to take a selfie each use, both to verify their identity and also detect whether they are eating alone or with others. The app utilises facial recognition technology, both to identify the user and recognise companions for use in the recommendations algorithm.

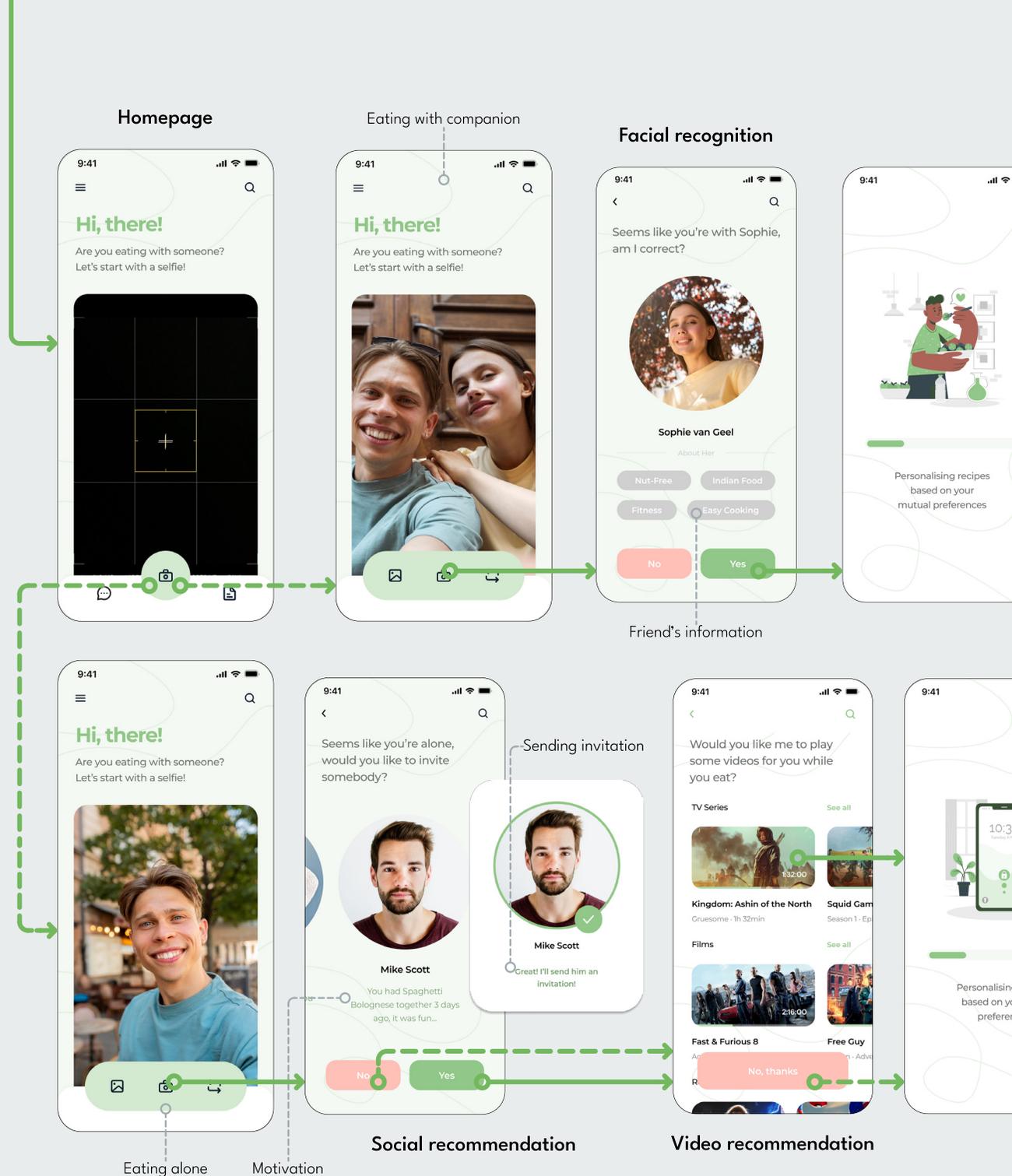
Eating with a companion

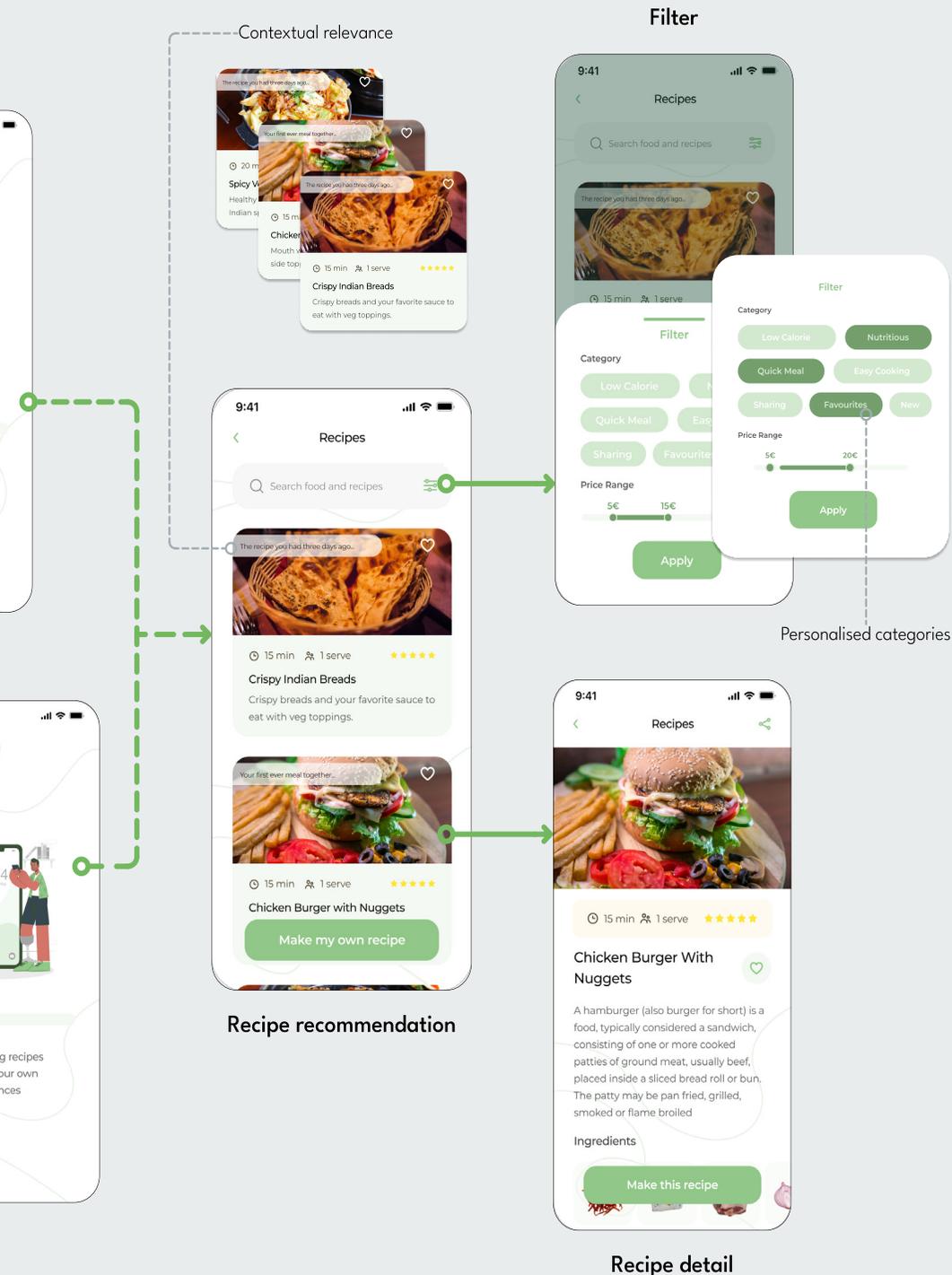
If FoodVibe detects that the user is eating with a friend, it may ask the user to confirm the friend's identity. The app displays the friend's name, image, and a brief summary of their meal preferences. This information helps the user connect with their friend's preferences and align their food choices better, exploring mutual interests.

Eating Alone

If FoodVibe sees that the user is eating alone, it can offer various options tailored to their preferences. For users who prefer socialising, the app may suggest friends or contacts with similar food preferences who they can invite to eat together. If the user wishes to eat alone, FoodVibe offers recommendations such as videos to watch, articles to read, or other personalised content to keep them entertained during the meal.

For users who prefer to focus solely on their food without distractions, FoodVibe provides the option to decline recommendations or social interaction prompts. If this is selected, FoodVibe remembers and reduces the frequency of future recommendations, allowing them to enjoy their meal peacefully.





Recipe Recommendation

In FoodVibe, the recipe recommendation module is central and offers a unique approach compared to other similar recipe apps. It considers the user's dining context and aims to provide recipes that align with their specific situation. An overview of how the recommendation system works follows.

Contextual Relevance: FoodVibe recognises the importance of dining context and personal memories associated with food. When a user is dining with their grandmother, for instance, the app's algorithm takes into account the special connection and potential nostalgic value of that experience. It prioritises recipes which may evoke pleasant memories, such as a "the one" recipe that a user has highlighted as something their grandma once taught them, or other mutual favourites.

Recommended Filter Categories: To further enhance user control and personalisation, FoodVibe offers filters on recipe recommendations. This filtering is based on user preferences and past interaction trends. Users can select filters based on their dietary preferences, allergies, allotted cooking time, or other relevant criteria. FoodVibe's algorithm considers these filters when providing recipe recommendations, and meets each user's specific requirements.

By incorporating contextual considerations, personalisation, and customisable filters, FoodVibe aims to elevate the total recipe recommendation experience. It considers the emotional connection between food and memories, allows users to revisit cherished moments through recipes, and enables them to discover new culinary experiences tailored to their preferences and constraints.

The commitment to understanding users' ever-changing dining contexts and to providing diverse recipe options distinguishes FoodVibe as a platform that fosters not only delicious meals but also meaningful experiences tied to food and personal connections.

Recipe Generator

FoodVibe stands out with its AI-driven platform and innovative capabilities, including computer vision, which can generate recipe lists based on a given restricted set of ingredients. This feature offers a convenient solution for users who require recipe suggestions tailored to their available or preferred ingredients. Here's how it works:

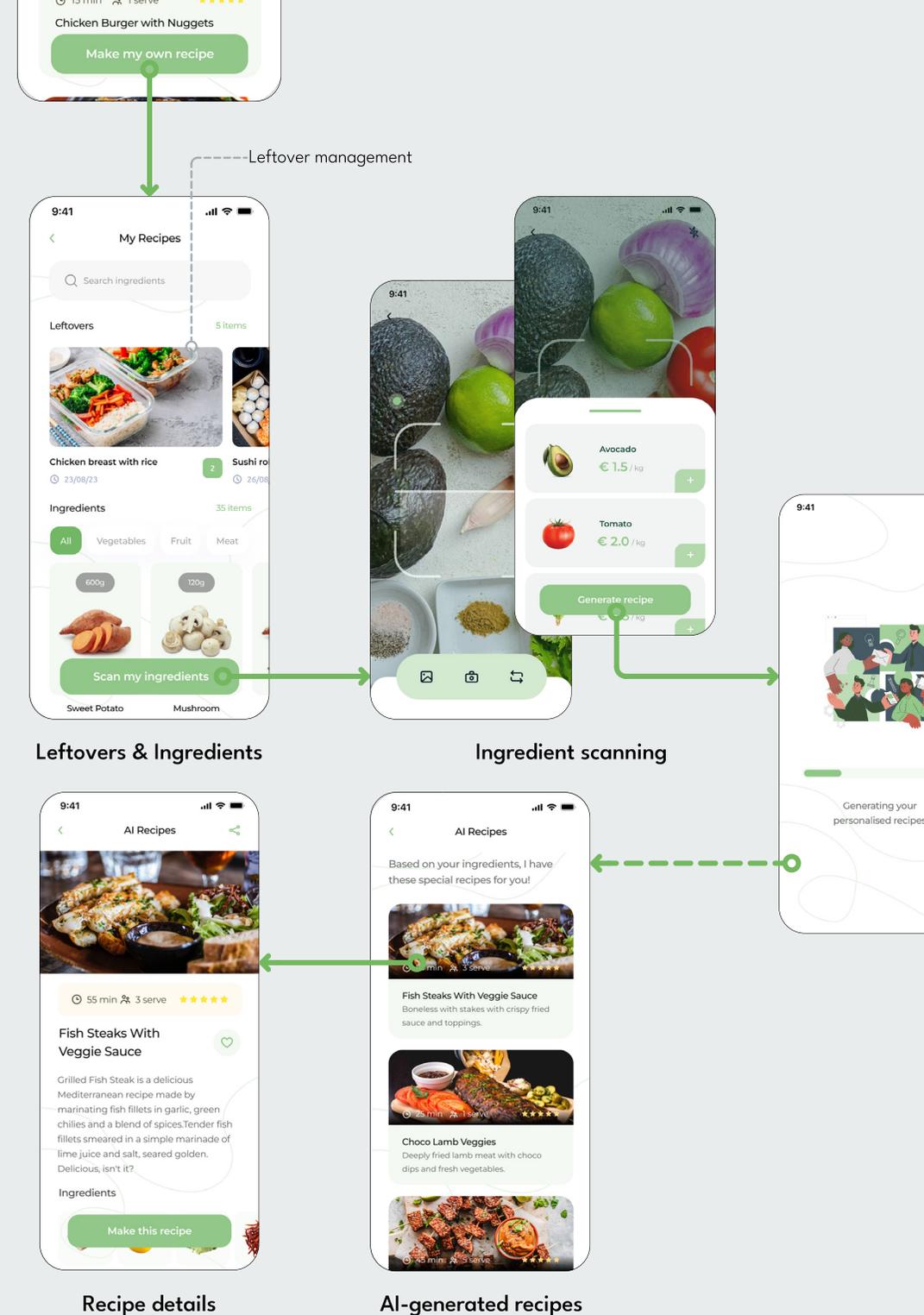
Ingredient Scanning: FoodVibe incorporates computer vision technology, allowing users to take a photo of their ingredients. The app analyses the image to identify the present ingredients and extracts relevant information.

AI-Generated Recipes: Based on the scanned ingredients and the user's preferences, FoodVibe's AI algorithm generates a recipe list that utilise the available ingredients. Some recipes in the list will be human-generated, and others AI-generated, where the AI has adapted another recipe to suit the available ingredients. These provide users with a variety of options to choose from, in consideration of their taste preferences, dietary restrictions, and cooking styles.

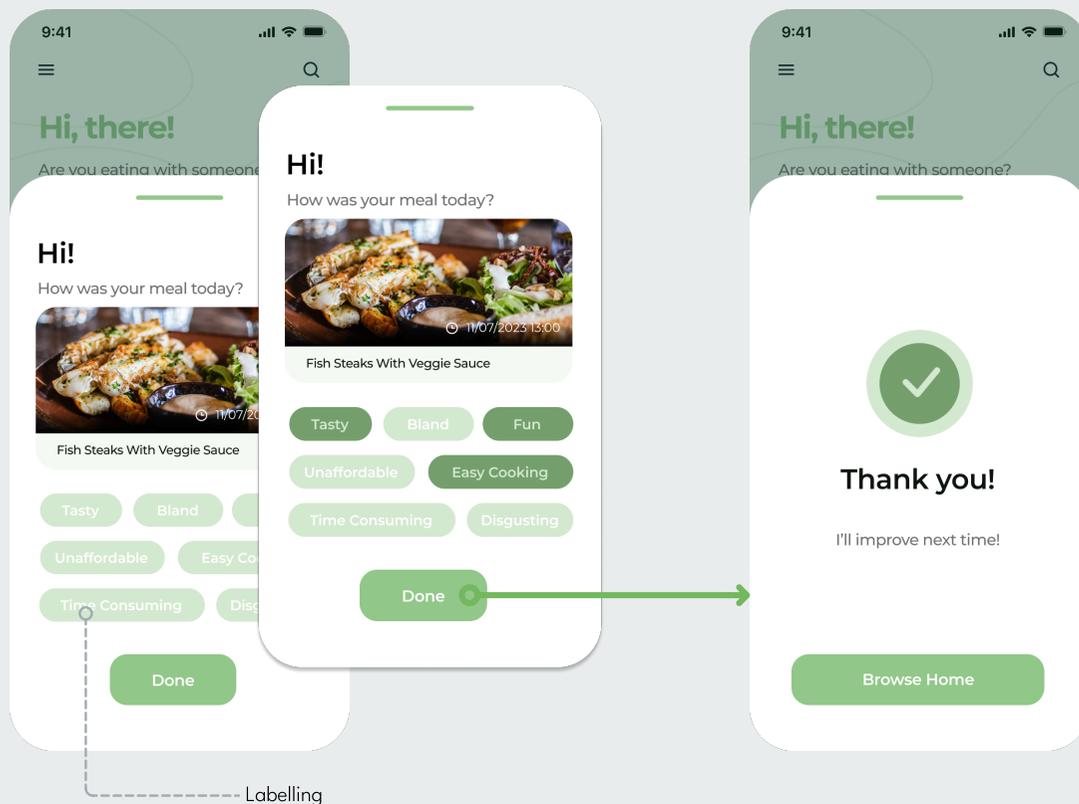
Simplified Interaction: By utilising computer vision and AI-generated recipes, FoodVibe simplifies the interaction burden for users. Instead of manually inputting each ingredient or searching for specific recipes, users can quickly scan their ingredients and access a range of options.

Ingredient Management and Waste Reduction: FoodVibe's platform also includes a feature to store ingredient information, including the amount that is left after each use. This functionality helps users keep track of their ingredients, reducing food waste by ensuring they utilise ingredients before they expire. The app knows how much of various ingredients are available, and may suggest meals which use only those amounts without any waste, for example.

The combination of computer vision, AI-generated recipes, and ingredient management creates a seamless and user-friendly experience. FoodVibe empowers users to make the most of their available ingredients, discover new recipe ideas, and reduce waste by optimising ingredient usage.



Feedback



Feedback through labelling

FoodVibe features a user-friendly feedback mechanism that simplifies the process of documenting meals and gathering user input. After each meal, a convenient pop-up appears, allowing users to provide feedback by simply labelling. This efficient method ensures that the meal is quickly recorded and sorted into their history. It also stimulates reflection on the meal straight away - users must consider their thoughts on various aspects.

The meal labels serve as valuable wellbeing metrics that help categorise the recipes in FoodVibe's database. By collecting users' subjective opinions on their meals, the system gains insights into their preferences, tastes, and satisfaction levels. These feedback data points contribute to the system's ability to understand individual user preferences and refine recipe recommendations for future meals.

FoodVibe's approach minimises the burden of providing detailed manual input while still capturing essential points. By streamlining the feedback process, users can effortlessly contribute to the system's understanding of their culinary experiences and receive even more personalised recipe and experience recommendations tailored to their preferences.

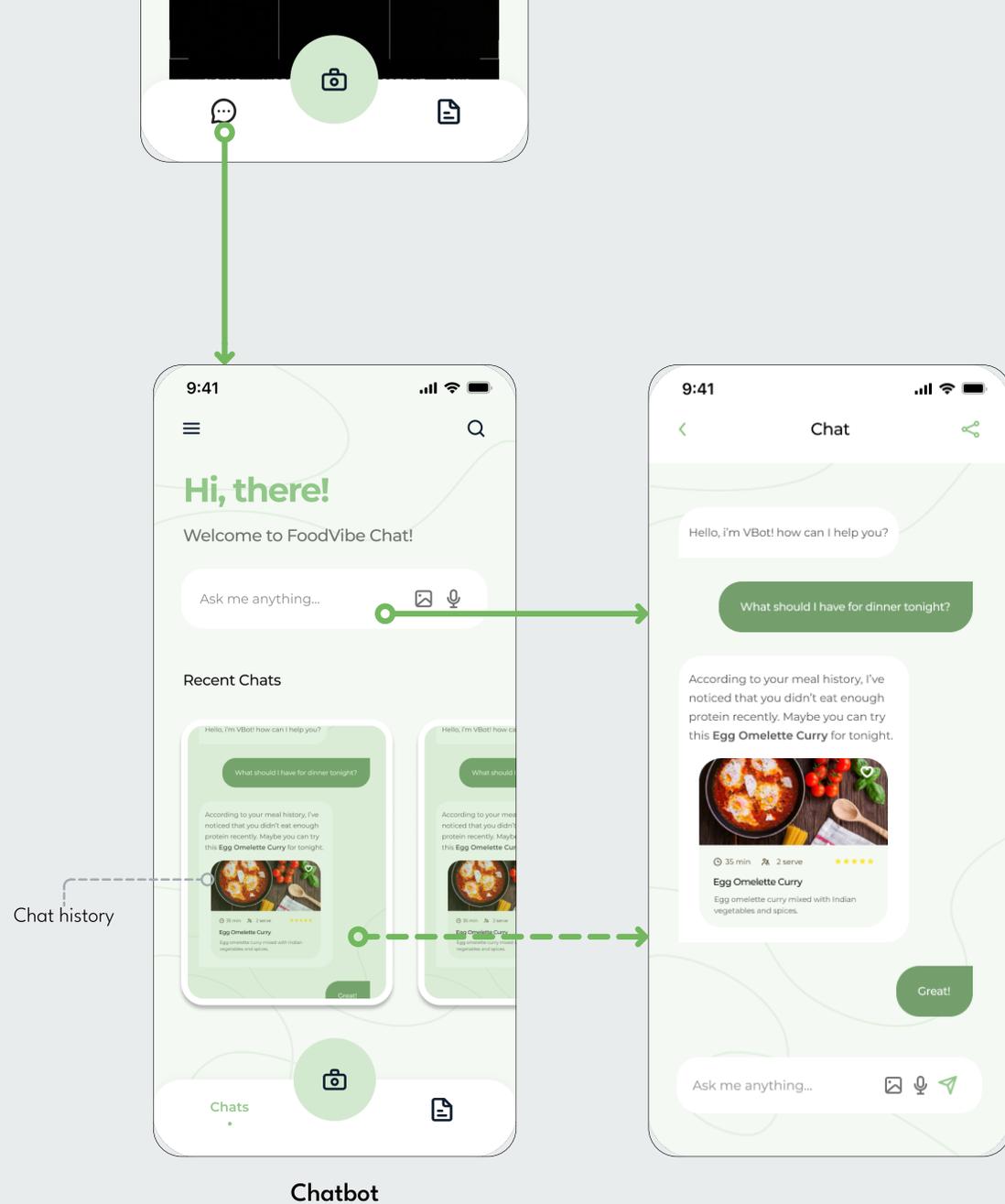
Through this user-centric feedback mechanism, FoodVibe continuously learns from user input, enhances its recommendation algorithms, and ensures that the suggestions align closely with users' subjective preferences, resulting in more satisfying and enjoyable dining experiences.

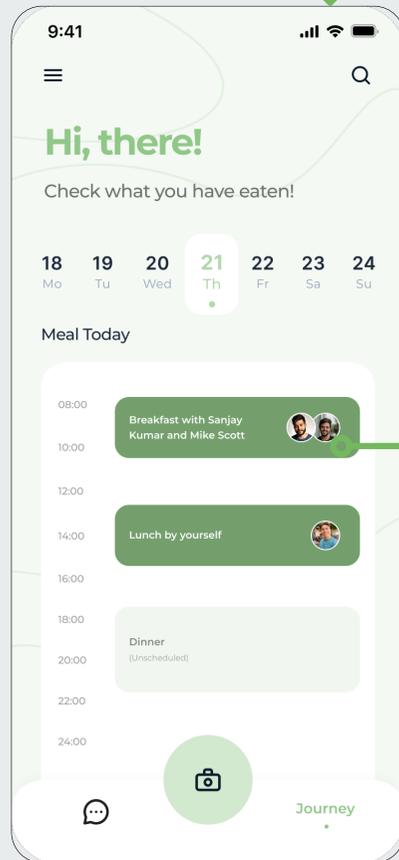
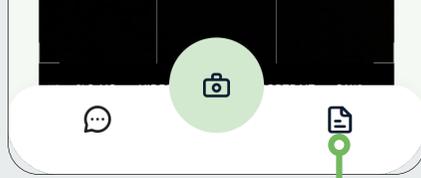
Chatbot

In addition to its core features, FoodVibe incorporates a chatbot as a supplementary component within the system. The chatbot serves as a convenient and accessible virtual assistant for users to self-report issues and seek assistance.

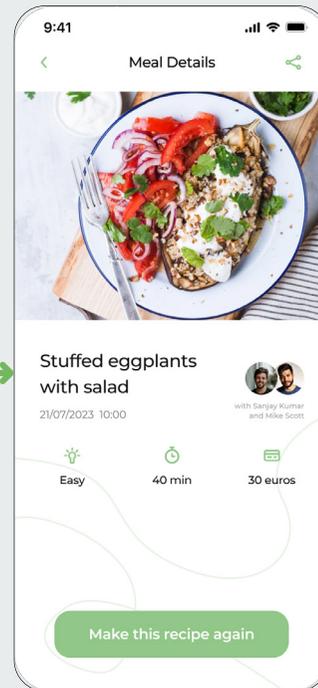
Users can communicate with the chatbot to report any issues they encounter while using the app. Whether it's a technical problem, a suggestion for improvement, or a question about the app's functionality, users can easily convey their concerns. Not only this, but users can directly tell the chatbot about their preferences or needs from FoodVibe, and the AI will save what is said for future reference. For example, a user can just tell the bot that they wish to have some particular meal the following week, and the AI will plan it ahead.

Feedback and interactions with the chatbot contribute to the system's continuous improvement. User inquiries and reports help identify areas for enhancement or bug fixes, allowing the app to be refined and address any issues promptly. This feature enhances the overall user experience and ensures that users feel supported and empowered throughout their interaction with the app.





Meal history



Meal detail

Meal Journal

FoodVibe also includes a meal journal feature that promotes mindful eating by enabling users to review and reflect on their eating experiences. The meal journal serves as a tool for users to record details about their meals, including who they ate with, what they consumed, and their feelings or thoughts related to the meal. Here's how the meal journal feature works:

Reflection and Feelings: The meal journal encourages users to reflect on their eating experiences by expressing their thoughts and emotions regarding the meal. Users can describe how they felt physically, emotionally, or mentally during and after the meal in the feedback session, and the system will add these to the relevant meal overview automatically.

Mindful Awareness: By regularly reviewing their meal journal entries, users develop a heightened sense of mindful awareness around their eating habits. They can observe patterns, identify triggers or habits, and gain insights into the connections between their food choices, social interactions, and wellbeing.

Repeat Positive Experiences: The meal journal provides a means for users to replicate enjoyable dining experiences. If a user had a particularly positive meal with specific individuals, the app allows them to invite those people again for future meals, helping to recreate moments of connection and pleasant memories.

Personal Growth: Over time, the meal journal becomes a personal record of eating habits and experiences. Users can track their progress, set goals, and identify areas for improvement in their relationship with food, social interactions, or overall wellbeing.

The meal journal feature encourages users to develop a mindful and reflective approach to their eating habits. It fosters self-awareness, supports positive changes in eating behaviours, and promotes meaningful connections with others through shared meals. By leveraging the insights gained from the meal journal, users can consciously make informed decisions, nurture healthier relationships with food, and cultivate enjoyable dining experiences.

5.2.3 USER SCENARIO



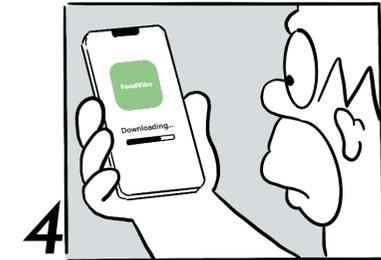
You're at home, feeling bored and unmotivated, when hunger strikes.



There's nothing in the fridge; you can't cook since you didn't plan ahead.



You don't feel good and are left alone and hungry.



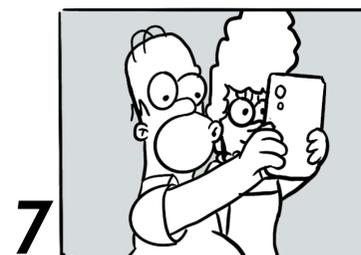
Downloading the FoodVibe app: you want to improve your wellbeing and eat better!



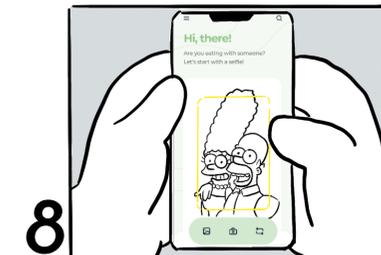
You use the app for a few months.



Now you're with a loved one, and you're thinking about what to eat.



You take a selfie with them in the FoodVibe app.



The app detects who is in the selfie.



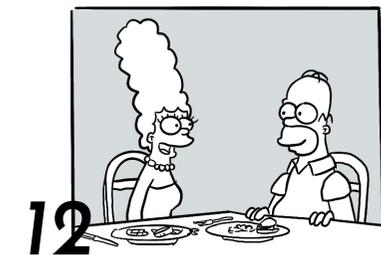
It confirms who you're with, and displays the important info from their profile about dietary preferences/restrictions.



FoodVibe presents recipe options specific to you and the one you're with, such as their favourite meal or the one you had last week which you loved.



One of them evokes a lovely forgotten memory with the person; it's the meal you had together the first time you met.



You're happy as you bond and reflect on great times over a favourite meal with a loved one. You can't wait to use the app again!

FINAL EVALUATION

06

This chapter demonstrates final testing and evaluation of FoodVibe. First, evaluation metrics are derived based on the design vision, goals, and requirements from Chapter 4. This is in order to understand the value gained and useability level of the final design. Results from user feedback are discussed both qualitatively and quantitatively to compare the effectiveness of FoodVibe with effects from other apps. These are analysed and discussed to generate recommendations for future development of the project.

6.1 EVALUATION METRICS

The final design is evaluated based on the effectiveness with which it achieves the goals outlined by the design vision and design requirements of Section 4.1. The design vision was

“to promote mindful home-dining experiences by providing a service in which users can feel in control of what they eat and closer to their loved ones”,

and the design requirements were to **minimise input and disturbance**, and **increase fun and adaptability**. This can be rephrased as measuring whether/the extent to which the product improves eating experiences and perceived wellbeing of healthy-eating-app users; whether interactions with the product are perceived in the desired way by users. The established metrics and corresponding description statements are presented in Figure 35.

The first part refers to the value of the design itself, but users’ key wellbeing aspects - autonomy, positive relationships, and mindfulness - must still be tested. Therefore, these are formulated into metrics which are more measurable; level of feelings of control over what users eat, levels of reflection on foods, and relatedness/closeness to social connections. For example, a measurable statement for the latter is “I feel closer to family and friends when I use this app”. Engagement is also an essential wellbeing aspect to test, however the effect on engagement can only be assessed in a long-term evaluation. Nevertheless, evaluation of needs described in the SDT (Autonomy, Competence, and Relatedness) can serve as a way of predicting engagement levels (Niemic & Ryan, 2009). Next, levels of fun is a simple requirement to measure since humans have an accurate assessment of their joy levels, and so they can be asked.

The usability and desirability of the design is tested regarding the levels of disturbance users felt when using the app (during their eating time especially), and the input burden they felt. Whether users felt that the app easily fit into their routine, or was disruptive and time/energy consuming to use has an important effect on whether wellbeing is positively affected. Finally, opinions on the app’s aesthetics are collected.

Before/After interacting with the prototype...	
Autonomy	1. I feel in control of what I eat when I use this app.
Positive relationships	2. I feel closer to family & friends when I use the app.
Fun	3. This product adds fun to my eating experiences.
Mindfulness	4. This product helps me reflect on what I eat.
Competence	5. I feel confident in achieving my wellness goals with the help of this product.
Desirability	6. I would like to use this product.
Usability	7. The features are easy to use/locate.
Disturbance	8. The app is a disturbance while eating.
Input burden	9. The input burden (manually uploading information) is high.
Aesthetics	10. The product looks aesthetically pleasing.

Figure 35. Evaluation Metrics and Statements

6.2 PROCEDURE

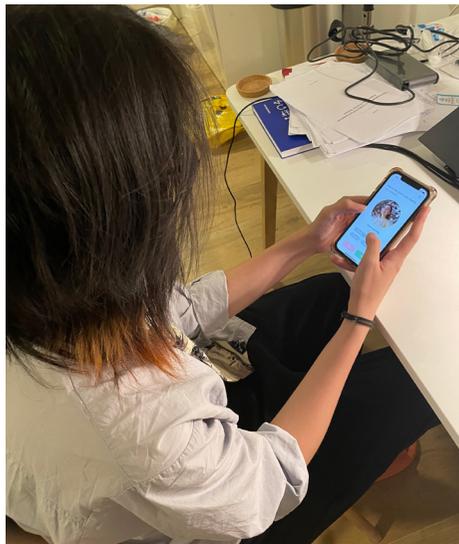
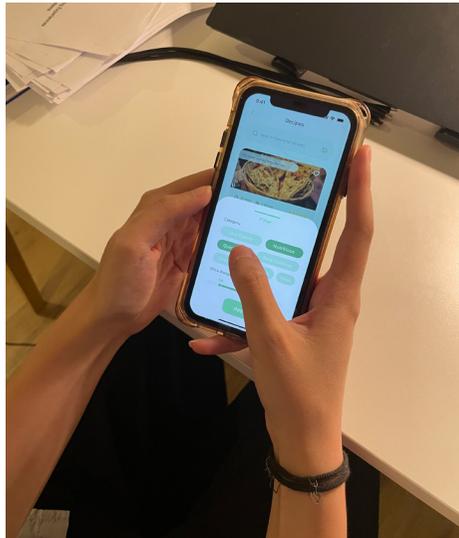


Figure 36. Testing Scenes

Ten participants - all of whom had eating-related app-using experiences in the past - were introduced to the app prototype and interviewed (see Figure 36). Since the testing is to determine impact on individuals' perceived wellbeing, one list of statements was responded to prior to interaction with the prototype, regarding their use of another app. Another identical questionnaire was given after interaction with the FoodVibe prototype. Participants responded to 10 statements each time with a Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree) (Likert, 1932). The questionnaire can be found in Appendix G.

Since the evaluation objectives remain quite subjective, two open questions were asked after participants interacted with the prototype in order to gain feedback regarding improvements to the concept, design form, or anything else. These were: "Which feature(s) did you like in the

app? Why?"; and "What would you change about the app?".

The design was presented as a clickable, high fidelity prototype (see Figure 37) in which users could simulate the scenarios of eating alone or with others. There were corresponding different interfaces depending on the scenario.



Figure 37. High Fidelity Prototype



Scan to try the prototype

6.3 RESULTS

Both the quantitative and qualitative test results can be found in Appendix H, which includes 10 participants' Likert scale ratings for 10 statements (both for before and after interacting with the prototype), and their general opinions about the concept. An overview of the score range of all 10 statements in both pre- and post-intervention questionnaires is presented in Figure 38. The prior questionnaire pertained to their experiences with other, existing apps and provides a baseline to compare with their impressions of my design. For all statements, 5 reflects a positive impression of the app in question, except two (8 and 9) which refer to the input burden and level of disturbance.

The overall results from questions which implied whether the intervention contributes to wellbeing aspects (namely autonomy, positive relationships, mindfulness, and competence) scored in the range 3.6-4.4. This means that users perceived a positive contribution to their wellbeing in eating experiences. Notably a large disparity, positive relationships scored 4.2, compared with just 1.4 for current (other) designs. Autonomy and mindfulness both scored a strong 4.4. This together implies that the concept fulfils the design goals relating to promoting these wellbeing aspects.

Competence only scored 3.6, which is likely a reflection of it not being one of the design goals and therefore not being emphasised in the design. It was assessed here solely in order to (along with autonomy and positive relationships) predict engagement (see Section 6.1). Still, the score is above neutral which implies that it does contribute to engagement.

What's more, the score for input burden for current existing designs reached an extreme 4.8, implying that users are almost never satisfied with this shortcoming of healthy-eating apps. After interacting with the design prototype, they scored 3 points less. This demonstrated that my design reduces the burden significantly, meeting the design requirement.

In general, the quantitative data shows that this concept indeed matches well with the design vision and goals, and satisfies the design requirements laid out.

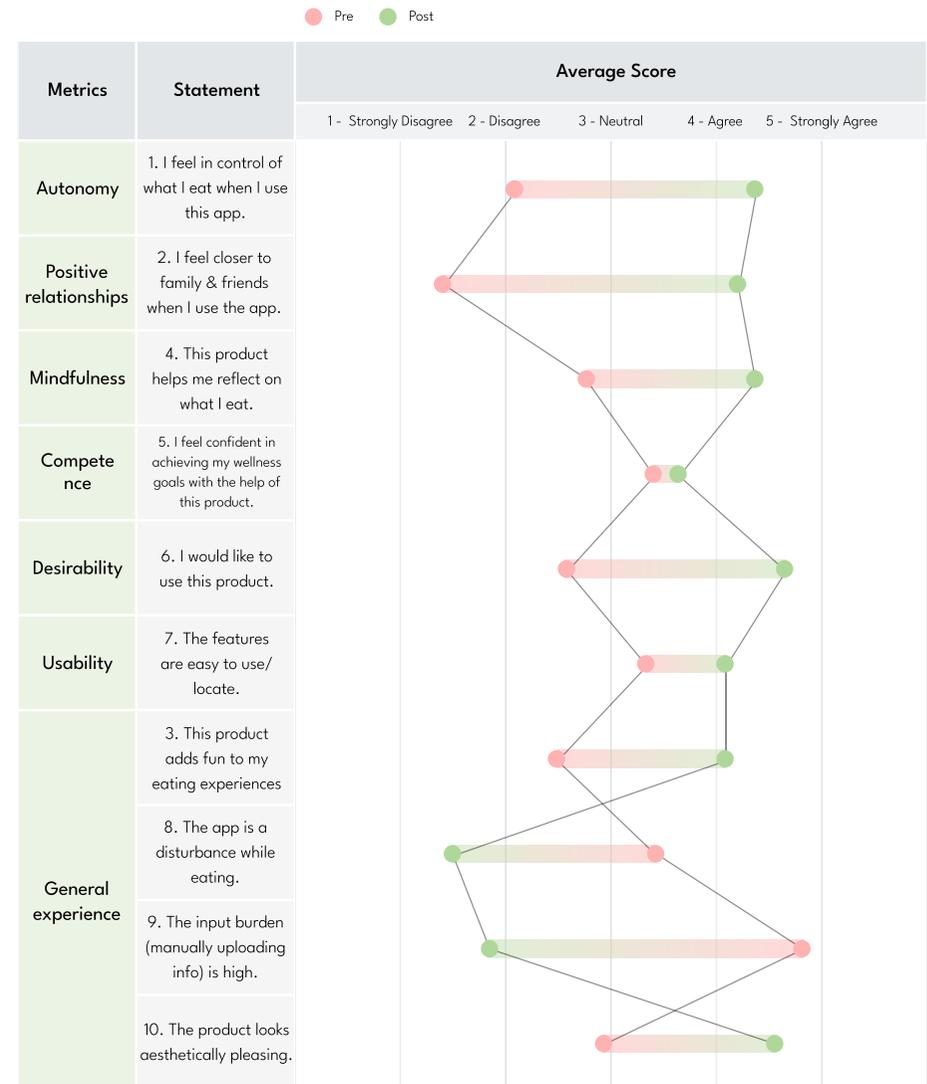


Figure 38. Overview of Test Results

In addition to the quantitative results, the post-intervention questionnaire asked open-ended questions to increase understanding of the general experiences with the product and to explore opportunities for further improvement. Participants' answers were clustered into different themes, and are presented below along with direct quotes.

Ideal Experiences

Reduced Input Burden



“ The photo recognition was nice, since it would save me a lot of time.”

“ I like to save time a lot so the ability to take photos seems great.”



Half of the participants reported that they liked the time-saving aspect of the photo recognition features - both to detect food that a user has and to detect who a user is with - since the alternative is entering all of the information manually. One participant also mentioned how taking a selfie at the beginning of a meal could have a nice social impact as well - but now there is added practical value when they receive food recommendations.

Tailored Recipe Suggestions



“ Ingredients are hard to find so if i can tell the app what i have then that's cool.”

“ I like that my friends and I can get some food options in the app which are tailored, since we always have disagreements for ages about what to eat.”



A majority of users mentioned tailored recipes being an attractive feature, in particular when they are based on ingredients in a photograph, since participants did not want to waste food when possible. Participants also thought it would be very convenient to receive recipes based on social contexts, which can save time on discussing everyone's preferences, and help find common ground when users with different backgrounds want to eat together.

Enhanced Social Bonding



“ It's valuable to think about my relationships and first meal together ever can be a nice memory recall point.”

Three participants mentioned liking the idea of the tracker recording pleasant moments with friends/family, and being reminded in the future. Remembering happy times can be a strong way to bond with others.

Facilitated Mindfulness by Journaling Meals



“ I like the calendar function, because it reminds me of what I have eaten, and could provide me with insights later on if cooking again.”

“ I like the diary function, because it can sync up with friends to record great moments.”



Four participants also noted that the food journal feature is nice not just for storing memories, but for helping to reflect on what they are eating and how they feel when they eat. This feature helps to see exactly how contexts (where/with whom) affect feelings when eating. By reflecting on what they have eaten in the past, users can be more aware of what their diets are really like and how they can balance their composition. Participants mentioned that it had made them realise that most meals of

theirs were forgotten very easily.

Undesirable Experiences

Awkward Feeling Towards Selfie Feature



“ Sometimes it's a bit awkward to take pictures of every meal with friends.”

Some participants noted that the concept of taking a selfie with a meal may feel awkward, in contrast to others who felt it was fun and innovative. This feature depends on personality as well as context (perhaps it is unusual to take a selfie with others one has just met) to feel natural. This suggests that an improvement would be that the selfie feature is an alternative/optional feature which can be turned off as needed, instead of being mandatory to the functionality.

Unnecessary Video Recommendation



“ The video recommendation feature is not really valuable to me because I would rather just focus on my food instead of getting distracted by videos.”

Two participants mentioned that video recommendation for eating alone is not entirely necessary since some would like to focus on food or often already have preferences for what to watch. Some also do not enjoy watching television at all when eating. The system should be more adaptable to these preferences in future iterations.

Additional Needs & Ideas

More Available System Colour Sets



“ I didn't really like the colours - I prefer darker tones so maybe an option would be cool.”

One participant mentioned that they did not like the colours so much - it overly reminded her of salads and green foods, similar to many other apps. Further, this does not reflect the goals of the app as an autonomy-allowing intervention. It would also be interesting to differentiate with other colour schemes.



“ Creating the virtual character instead of selfie would be acceptable for me.”

Using Avatars Instead of Taking Selfies

Two participants raised that an alternative to photos of users could be personalised avatars, similar to some online games. This could be a fun, interactive alternative to recognising who a user is eating with, whilst preserving more privacy - a possible area of concern for users. An improvement in the future may be to “drag and drop” guests avatars to tell the system who is present - this may be more accurate than facial recognition additionally.



“ Maybe the app could give me some stats about how often I eat different foods, so I can see which I eat too much of or something.”

Providing Overview Information of Past Meals

Some mentioned that they would be interested in some general statistics, such as total intake of particular foods or changing trends in eating habits. This could give a larger picture of the state of their diet and be interesting as well as useful - for example in the cases where users care a lot about progressing in some way.

6.4 CONCLUSION

In this chapter, the evaluation process was presented. Regarding the obtained qualitative and quantitative analysis, it can be concluded that the final design can meet the design goals well. The results show that the intended wellbeing aspects are improved after participants use the service. The logic of the system is also found to be understandable and effective; all participants could independently go through the process without becoming confused or lost.

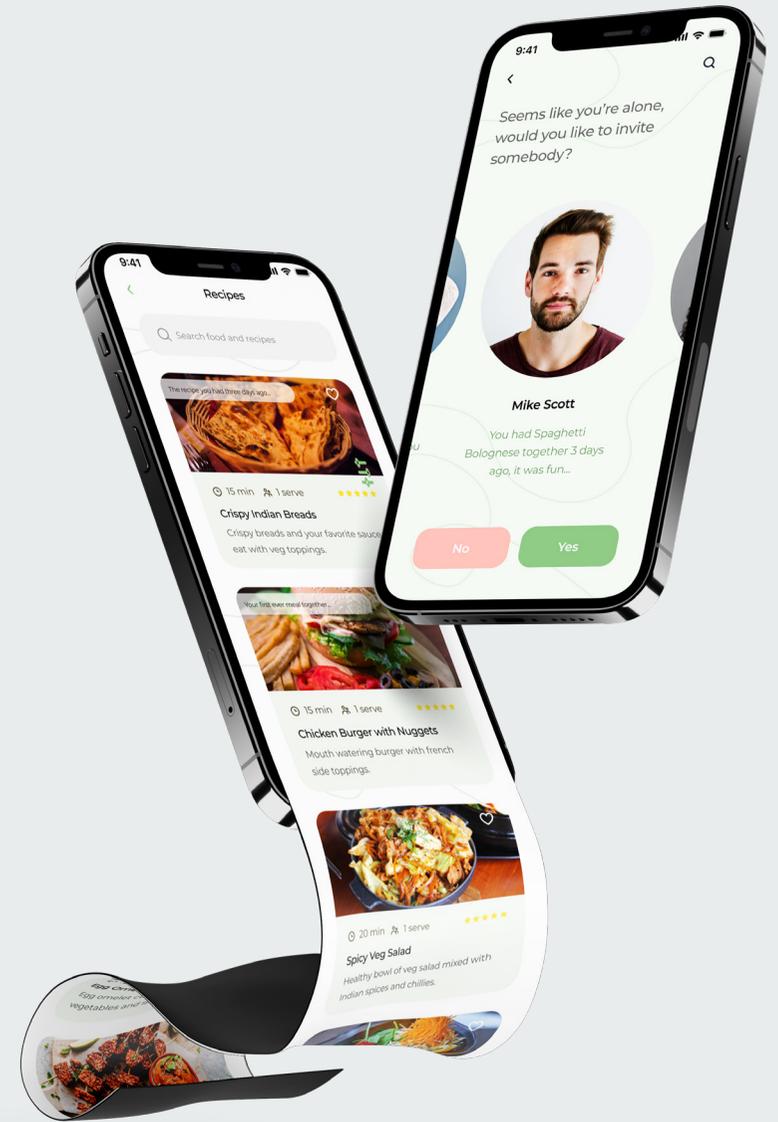
Overall, the design is attractive and innovative to participants; they all suggested that they would like to download it if it were available today. Moreover, this evaluation in itself helped participants realise what they had ignored in their eating practices, i.e. reflecting on what they eat, and focusing on the essential components for a pleasant and joyful meal experience.

Limitations

Due to time-frame restrictions of this project, sample size in the evaluation was relatively small: only ten participants were recruited for the final evaluation test. The sample size is sufficient to test the approximate value and usability of the design with both qualitative and quantitative data, however it is likely insufficient for reliably drawing deeper quantitative conclusions.

In addition, although participants went through the whole process of obtaining a recipe and reflecting on a meal, the long-term effect could not be tested during this process. The dining situation was hypothetical for participants, and therefore the results may be different in reality.

Nevertheless, results were strongly skewed in the positive direction regarding several metrics tested, and were in line with expectations, so it is reasonable to consider the results valid - a successful validation of the final design.



DISCUSSION

D07

In this chapter, conclusions regarding the overall project are presented. Limitations - both of the final design and the design process - follow, before recommendations to inspire future design researchers.

7.1 PROJECT CONCLUSION

Context and Goals

This project set out to foster wellbeing within and through healthy-eating experiences, supported by an AI-driven system. A severe, widespread lack of AI application to this context had been identified, exacerbated by recent technological advancements which made the missed opportunities appear great. Trends in positive design, whilst seemingly being considered in every other area of human life, had not found their way to wellbeing in eating, except in very limited capacities.

With the aim of understanding the issue, wellbeing theories were studied from several angles, along with their relations to the chosen context of eating. Different ideas regarding the connections between eating practices and wellbeing were considered - namely intuitive and mindful eating - and a theoretical model of wellbeing comprising of 6 core aspects (see chapter 2.6) was produced. The theoretical model allowed for the design to be founded on psychological evidence, as wellbeing can be unobvious to influence.

Next, the context was further studied through analysis of five existing similar diet-related solutions in app forms. These overwhelmingly focused greatly on nutrition, fitness, and weight loss to the detriment of wellbeing considerations, which were only given cursory treatment, if at all (see chapter 3.1.6). User research was conducted to gain understanding of the connections between various factors affecting wellbeing, and features in apps through the Experience Sampling method. Results mostly aligned with the established theoretical model, but brought up some necessary changes (see chapter 3.2.6). This was used to produce an updated, more precise theoretical wellbeing model on which design goals could be based. These were determined to be: to facilitate positive relationships, facilitate autonomy, and facilitate mindfulness (see Chapter 3.3).

Design Specifics and Ideation

Based on the literature and context studies, a design vision was proposed.

Recap of Design Vision:

"To promote mindful home-dining experiences by providing a service in which users can feel both in control of what they eat and closer to their loved ones."

Design requirements were also laid out, namely to minimise disturbance and input burden, and increase fun (in a broad manner) and adaptability (see Chapter 4.1). A technology evaluation procedure was completed, resulting in an app being finally confirmed as the most ideal format through which to design the interventions.

An AI ideation session was then conducted in order to generate ideas aimed at achieving the goals. From this, an initial concept was formulated through synthesis of the ideas. In the concept detailing phase, the system became more concrete. This was ideated, outlined, and iterated by running a several user tests via a low-fidelity prototype. Some fundamental changes were identified, including alterations to the final design module - shifting focus onto recipe recommendation in the form of meal inspiration, as opposed to diet planning (see Chapter 4.3.2). Improvements to the design were identified, removing superfluous aspects and defining the core necessary components. Ways to make these main aspects of the design more efficient or prominent were identified for later addition, and any "low-hanging fruit" was determined for alteration.

This allowed the service and information structure - loops of which data is used where, and how users interact with this flow - to be defined. This served as the skeleton on which the design was built.

The Final Design and Evaluation

The final design, FoodVibe, was then introduced: an application based on a personalised recipe and holistic experience recommendation system. Feature demonstrations and user scenario examples were also given, crystallising the essential elements (see Chapter 5.2.2). The core function is to recommend daily recipes based on specific social occasions, in order to enhance positive relationships while still granting users full autonomy.

The final design was evaluated, both quantitatively and qualitatively, through further user tests with an interactive prototype, highlighting ways that the design fulfilled design goals adequately (see Chapter 6.3). In particular, testing participants indicated that the final design was desirable, and their data suggested that use would lead to joyful and reflective dining experiences. No test data suggested that there would be effects on users counted to the design visions and intention, meaning earlier design alterations were successful in enhancing desired effects.

Furthermore, several improvements and proposals for future development were outlined, along with justification. One example is to implement an avatar system - cartoon characters - in place of facial recognition. Users may be sensitive to being asked to take selfies mandatorily, whether for personal or online privacy concerns. Designers should consider these. It is crucial for designers to be considerate and ethical when implementing wellbeing (D'Alfonso, 2020). This is especially true in the context of wellbeing, where failure to do so would be directly counter to design intentions.

7.2 LIMITATIONS

The final design contains several limitations due to the inherent nature of the context and solution, but also the design/testing procedure. These are important to bear in mind both to have an objective evaluation of the design and to understand why future recommendations are necessary.

Wellbeing as a concept remains somewhat difficult to measure, and so the theoretical model from which the design is based (see section 3.3) may be not completely accurate or uniformly applicable from a scientific viewpoint; it may not be the same for all people, it may not always incorporate sufficient wellbeing factors, or it may overemphasise some factors which are not as relevant in the specific context of eating at home, for example.

Early user research did not include a great number of samples: just five participants took part. This may suggest that the statistical significance of results obtained lacks. Additionally, a majority of participants involved were students, and so similarity in their eating habits due to lack of diversity may mean the results are not representative of the wider target group. Similarly, participants were limited in nationality to Dutch, Chinese, and Irish; cultural backgrounds may have influenced the results, but this was not considered sufficiently. On the other hand, these do represent a somewhat diverse range of eating cultures.

The context chosen was relatively narrow. Eating at home remains an important context to consider, however future iterations of this design may incorporate a broader spectrum. Alternatively, this context was chosen to gain more focused insight into wellbeing in an eating context without outside complications, and so it served a useful purpose.

The post-design evaluation phase was not sufficiently extensive. Although the testing showed clear trends (through influence on wellbeing metrics), further testing on a longer time scale (to measure wellbeing change once the novelty is reduced, and to

measure engagement over time), and with more participants would be beneficial. This is particularly important since the design vision included a “sustainability” measure - whether or not users sustain their use in the long run. Specifically, the statement questionnaires used in the final user testing were likely too brief, only asking 1-2 questions pertaining to each aspect of wellbeing, whereas more should be scattered in order to verify each result. These shortcomings may exacerbate the effects of the early user research limitations, and so must be considered.

Finally, some AI features themselves are not fully tested as of date. Reliability concerns are therefore real - for example, whether copyright issues would occur. Since this project relies on the incorporation of AI into solutions for wellbeing, the seamless use of these capabilities is expected and necessary.

7.3 RECOMMENDATIONS

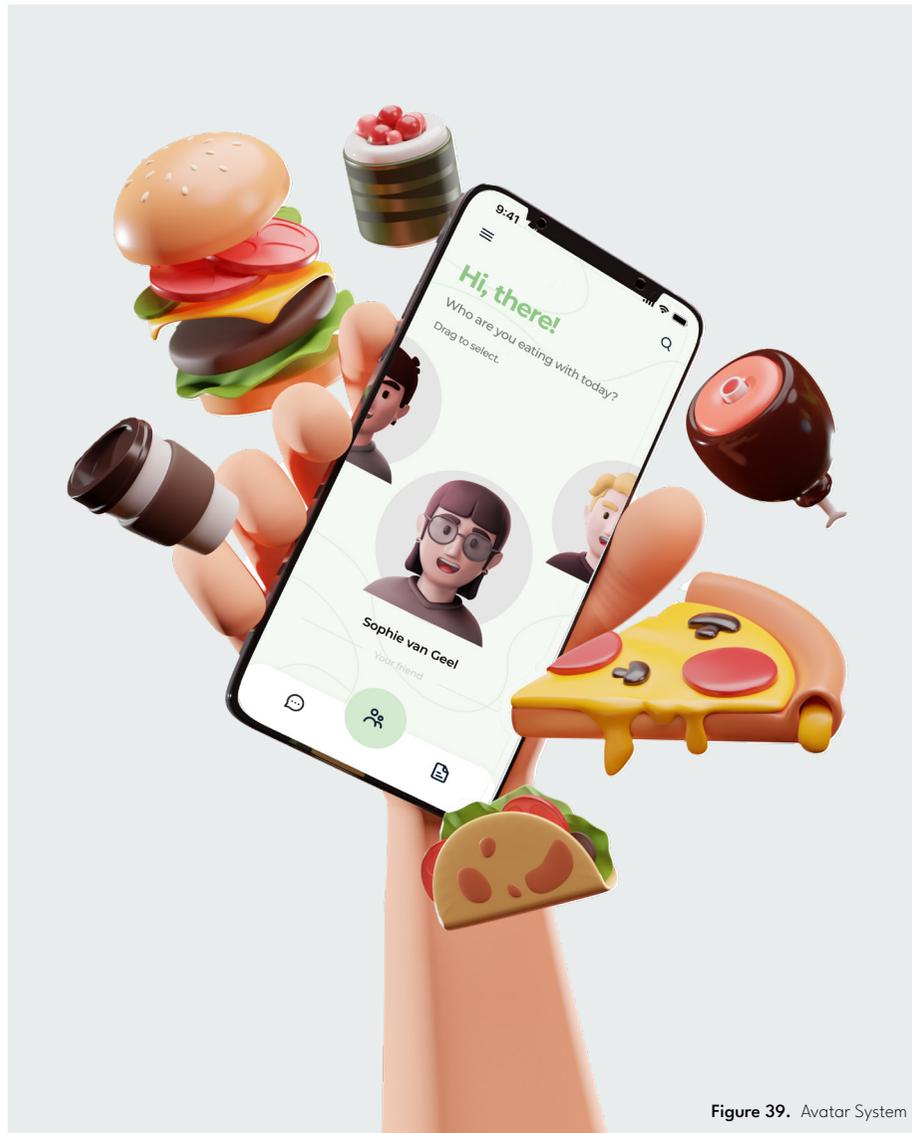


Figure 39. Avatar System

This project's vision does not stop with a final concept and prototype. The design is a platform for future iterations and improvements, both in scope and precision within the specific context.

Feature Improvements are an obvious consideration. User testing highlighted several features which could be altered for an improved user experience (and therefore higher engagement). These are mentioned in the Section 6.3 summaries, and vary from conceptual to simple aesthetics. A conceptual improvement may be to use avatars as opposed to image detection in real images of users - a drag-and-drop system to add friends or family to the plans could be a simple solution to implement this (see Figure 39), for example. As mentioned, this solves both reliability and privacy concerns raised. Aesthetic considerations were less urgently mentioned in testing, relating to colour scheme or larger font size options, for example.

Wellbeing theories within the eating context should be further optimised. In this project, wellbeing aspects were determined based on those which are already focused on in eating services which exist. However, different wellbeing aspects may be more or less crucial within different types of eating contexts - for example eating out in restaurants, eating at a different friend's house, or eating whilst commuting. In order to expand the context from just eating at home, this must be further investigated and a revised theoretical model should be justified based on each new context.

The current app relies on data to make accurate predictions and recommendations. Thus, it may take some weeks of use before the true value is perceived - trends require time to become clear. It may be useful in later iterations to include the option to enter some information regarding habits and recent meal experiences, so that FoodVibe can instantly understand the needs of the user. This would reduce the barrier to entry and facilitate communities of users, since otherwise each new user in a group requires their own buffer period.

An underlying requirement for these improvements is the need for more reliable user testing and evaluation procedures. The current user tests were restricted both in time-scale, number of participants, and depth, as laid out. In order to reliably predict the ways in which users interact with design choices, and the subsequent effects on wellbeing, more expansive user testing is required. In particular, there is no data thus far on whether users obtain long-term benefits to their wellbeing from use of the solutions designed in this project. Data on this may inform changes which are crucial to the design goals, since if long term, consistent use is not likely, the app functionality inherently suffers (due to data reliance).

FINAL WORDS

This project has finally come to an end. Looking back at the past 6 months, I would say that my graduation project was the most challenging project I have worked on so far. I experienced many, many setbacks from the beginning. Because this project is based on positive psychology, which was a brand new area for me, I immersed myself far too deep in literature research that I couldn't start the design phase as early as I would have liked. Moreover, the psychological terms and theories confused me a lot as an engineering student with no prior background knowledge. Luckily, by the end of the project, all these challenges enabled me to gain valuable professional knowledge that I wouldn't have learned about if not for this project. My original motivation was rather personal and vague: to improve daily eating experiences, which comes from my own experiences. After this project, my opinions towards food have honestly changed greatly, since I know and have thought about the deeper relationship between food and wellbeing in my own life. I can finally accept eating what I feel like without feeling too guilty and worrying intensely about weight gain!

Apart from the academic aspect, I'd like to talk about some more personal feelings towards my graduation. I have never been a very chilled person, which meant I was stressed all the time along this project. I felt nervous when my perfectionism and limited ability collided. There were so many things that I could not control as a student. I could not get a satisfying number of participants to complete the test materials; I could not satisfy everyone in my supervisory team with choices of direction; I could not spend as many months as I would have wanted due to the high cost of the study fee. All of these small things caused frustration that only be dealt by myself. I have to admit that I'm not very good at dealing with stress and my own emotions very well. But my mind has become stronger after experiencing this project. This project is not just a school project, it feels more of a heads up before my working career starts. In the future, there will be more situations like this, and even more challenging. I have to make myself stronger to deal with this, and I am sure I can.

Plus, I am grateful to the great people around me during this project. How my supervisory team was willing to devote their time, even during their vacations, to help me graduate on time and achieve my goal. As one of the last bench of graduation students in his teaching career, I hope I didn't fail my chair Stefan. Thank you to Willem's guidance throughout, even though he was very busy. For my mom, whom I haven't seen in two years, and supported me greatly, financially and with my motivation and stress - I hope can graduate soon and get a good job. My boyfriend supported me the most during these tough 6 months, cared for me every time I had setbacks, and cooked for me whenever I stayed up late for the project. Thank you all so much - I wish you all good luck in your lives.

By the end of this project, my time of being a student is likely finished. I know I will definitely miss this time. Looking back at these two years of studying in the Netherlands as a Chinese girl who never went to any other countries before, the things I have gained in this land are so much more than just two years of studying. I wish I could write them down, but no words can express this special, unique, totally personal, experience. Future life is a huge unknown, and I'm anxious but excited at the same time!



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APPENDIX

- A. Project Brief
- B. Wellbeing Mindmap
- C. Feature Analysis of Current Apps
- D. Experience Sampling
- E. Qualitative Analysis
- F. AI Ideation Session
- G. Evaluation Questionnaire
- H. Evaluation Results (Pre and Post)

A. PROJECT BRIEF

DESIGN
FOR OUR
future



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 to 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!

<p>family name <u>Liu</u></p> <p>initials <u>Y.</u> given name <u>Yi</u></p> <p>student number <u>5</u></p> <p>street & no. <u>P</u></p> <p>zipcode & city <u>Z</u></p> <p>country <u>N</u></p> <p>phone <u>+</u></p> <p>email <u>Y.L</u></p>	<p>Your master programme (only select the options that apply to you):</p> <p>IDE master(s): <input checked="" type="radio"/> IPD <input type="radio"/> DfI <input type="radio"/> SPD</p> <p>2nd non-IDE master: _____</p> <p>individual programme: _____ (give date of approval)</p> <p>honours programme: <input type="radio"/> Honours Programme Master</p> <p>specialisation / annotation: <input type="radio"/> Medsign <input type="radio"/> Tech. in Sustainable Design <input type="radio"/> Entrepreneurship</p>
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SUPERVISORY TEAM **

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

** chair Stefan van de Geer dept. / section: HCD

** mentor Willem van der Maden dept. / section: DA

2nd mentor _____

organisation: _____

city: _____ country: _____

comments (optional)

⋮

- 1 Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..
- 1 Second mentor only applies in case the assignment is hosted by an external organisation.
- 1 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



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

chair Stefan van de Geer date 03-04-2023 signature [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)?

Content: APPROVED NOT APPROVED

• Is the level of the project challenging enough for a MSc IDE graduating student?

Procedure: APPROVED NOT APPROVED

• 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?

comments

name _____ date _____ signature _____

IDE TU Delft - E&SA Department /// Graduation project brief & study overview /// 2018-01 v30 Page 2 of 7

Initials & Name Y Liu Student number 5570085

Title of Project Fostering Wellbeing in Domestic Eating Experiences Through AI System

Fostering Wellbeing in Domestic Eating Experiences Through AI System 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 01 - 03 - 2023 end date 28 - 07 - 2023

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, ...).

Food is the most fundamental consumption in people's daily life. After a hectic day, a great meal can provide ultimate satisfaction and comfort to most people. However - according to the World Health Organization (WHO) - worldwide obesity has nearly tripled since 1975; more than 1 billion people worldwide are obese. The WHO estimates that around 167 million individuals, including adults and children, will experience a decline in their health due to being overweight or obese by 2025 (World Health Organisation, 2022). Gaining weight is just one of the health consequences brought by poor eating habits, which can also have an impact on an individual's mental health. Unhealthy eating patterns may occur simultaneously with other psychological disorders such as substance addiction, leading to long-lasting emotional effects (Turnbridge, 2018). Additionally, eating contexts can also affect healthy eating. The environment in which a person eats can influence their food choices and eating behaviours. Previous studies have suggested that people who usually eat alone may experience feelings of loneliness and depression (Tani et al., 2015). All of these poor eating habits can eventually result in serious long-term eating problems such as overeating, under-eating, binge eating disorder, anorexia nervosa, nutrient deficiencies, food allergies and intolerances (BC Children's Hospital, 2016).

In recent years, there has been an increasing focus on healthy eating and holistic food experiences, which has led to a shift in the way people perceive their relationship with food (Mahr et al., 2013). However, current solutions mostly focus on helping people build a healthy and balanced diet in terms of the nutrition composition of daily meals by using smart technologies, such as the DayTwo app, which assesses various food items based on their potential impact on users' blood sugar levels and aids users in selecting healthier food options (Ravindran, 2022). One of the limitations is that current designs may not always consider individual preferences and the nature of eating experiences; in other words, not paying enough attention to wellbeing (Mahr et al., 2013). Users may not have the long-term motivation to stick to healthy eating behaviours without customised and human-centered interventions. As one of the fastest growing fields, artificial intelligence (AI) technology is promising to transform various aspects of our lives positively (McEvoy, 2022). Due to the advancements in AI technology, improving wellbeing through an AI-driven system is becoming a possibility.

This project will be developed based on "Positive AI: Key Challenges for Designing Wellbeing-aligned Artificial Intelligence", proposed by van der Maden (2023). It is suggested that wellbeing is being increasingly recognised as a key design objective within the AI field in order to facilitate the technology positively (e.g., Ozmen Garibay et al., 2023; Stray et al., 2022; van der Maden, Hekkert, et al., 2023). Currently, there is a lack of compelling examples and practical cases of Positive AI, partially due to several challenges addressed by van der Maden, Lomas and Hekkert (2023). To help fill in this gap, the preliminary Positive AI Design method has been developed. It intends to guide designers in designing interventions that promote wellbeing within an existing AI-driven system by following the structure suggested by Tromp and Hekkert (2016). In this project, I will focus on enhancing wellbeing in domestic eating experiences by creating personalised interventions driven by AI. The preliminary Positive AI Design method will guide and be assessed throughout the project.

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introduction (continued): space for images



image / figure 1: Existing app - Foodvisor tracks what you eat using deep learning (Dillet, 2019)

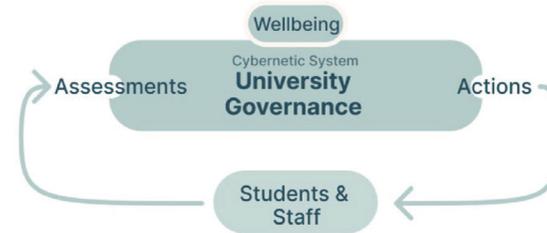


image / figure 2: An intelligent feedback loop promoting community wellbeing (van der Maden et al., 2023)

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.

Undoubtedly, poor eating behaviours have a significant impact on the overall wellbeing of individuals, both in terms of their physical and mental health. Healthy food consumption has been simply conceptualised as a matter of nutrition intake, rather than a holistic and emotional experience (Gottlieb et al., 2022). This lack of understanding of the relationship between people and food, as well as the true nature of eating experiences, can also lead to poor eating patterns. Enhancing wellbeing in eating experiences is a challenging and difficult issue to address, given that the factors that impact wellbeing are rather intangible and different to individuals. Currently, the application of AI technology to positively enhance wellbeing in domestic eating experiences has not been widely investigated.

This project will therefore focus on investigating general factors that influence wellbeing in domestic eating experiences within an AI-driven system, as well as establishing the connection between the wellbeing metrics and design directions.

Research Questions:

- What are the factors that reduce or enhance wellbeing in domestic eating experiences?
- How might we measure the causal indicators of wellbeing within an AI-driven system?
- How can design interventions facilitate eating experiences in a personalised way based on the collected data?

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.

Research the measurement of factors that impact wellbeing in domestic eating experiences within an AI-driven system. Design an intervention that facilitates wellbeing in the form of a product, service system or interaction.

Throughout this project, I will use a combination of human-centered design approach and Positive AI method. First, literature research and interviews with stakeholders will be conducted to help me understand the factors influencing people's current domestic eating experiences better. After broad research, a wellbeing model will be established most likely by using the cultural probe method. Based on the wellbeing model, wellbeing metrics will be identified contextually and globally. After analysing the survey results, design space and potential interventions will be developed. Then the interventions will be evaluated and updated through assessment. Last, a future cycle will be proposed in the evaluation phase. Eventually, a tangible intervention will be delivered as well as a proposal in a future context.

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 1 - 3 - 2023 end date 28 - 7 - 2023

Month	March					April				May				June			July					
Calendar Week	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Project Week	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Preparing																						
Choose context																						
Writing report																						
Kick-off meeting																						
Contextualising	Background & Literature research																					
	Establish wellbeing goal																					
	Build initial wellbeing model*																					
Conceptualising	User research (Cultural probes)																					
	Analyze research results																					
	Develop metrics & measurement																					
Identify design direction																						
Midterm meeting																						
Designing	Design interventions																					
	Develop user survey & send																					
	Analyze survey results																					
Green light meeting																						
Evaluating	Propose new cycle																					
	Document & Reflect																					
	Prepare for presentation																					
Graduation																						
Presentation																						

* Build initial wellbeing model means modeling the directionality of wellbeing.

The project will consist of five working days per week. The total number of working days will be over 100, which will be divided into 20 weeks. The detailed steps can be seen in the Gantt Chart provided above.

I divided the project into four main phases, which are contextualising, conceptualising, designing and evaluating. Four important meeting slots were pointed out. The kick-off meeting will occur in early March, ideally on 10th March. The midterm meeting will be right after the design space is mapped out. Shortly after, I will start designing wellbeing interventions and measuring well-being impact. The green light meeting will be planned when a tangible intervention is developed and before a new cycle is proposed. I will be writing the report during the whole project. After documenting and reflecting, the graduation ceremony will take place at the end of July.

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.

The initial idea for this project is to improve eating experiences for people in their daily lives. The motivation behind this idea is rather personal. Having spent the past 22 years of my life in China and currently being an international student in the Netherlands, I have experienced firsthand the stark differences between Chinese and European eating patterns. These variations enclose not only the food itself but also the contexts and etiquette. Fast shifting from oriental eating habits to western eating was difficult for me. Moreover, I also experienced living alone by myself for the first time, which presented its own set of challenges. Subtle things such as buying groceries, cooking, and dealing with leftovers all suddenly became difficulties for me. During this process, I have grappled with feelings of isolation brought by eating alone and discomfort in an unfamiliar environment, which in turn have contributed to my stress-eating behaviours. By any chance, this graduation project provides me with a great opportunity to solve this common problem - not just for myself - for any of those who have difficulties dealing with eating.

This project - human centered design methods and AI involved - is slightly different from the projects I did before in my Integrated Product Design courses. One of my main goals is to learn more from different areas and deliver desirable and feasible designs. I want to testify to my ability to deal with complexity and create speculative interventions to facilitate well-being as a designer. I also want to understand the methods used to measure the impact of design interventions. Specifically, I am eager to gain more insight into how designers can undertake an assignment, engage with relevant stakeholders, and inspire them to perform changes, which will be an essential skill in my designer toolbox.

FINAL COMMENTS

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

B. WELLBEING MINDMAP

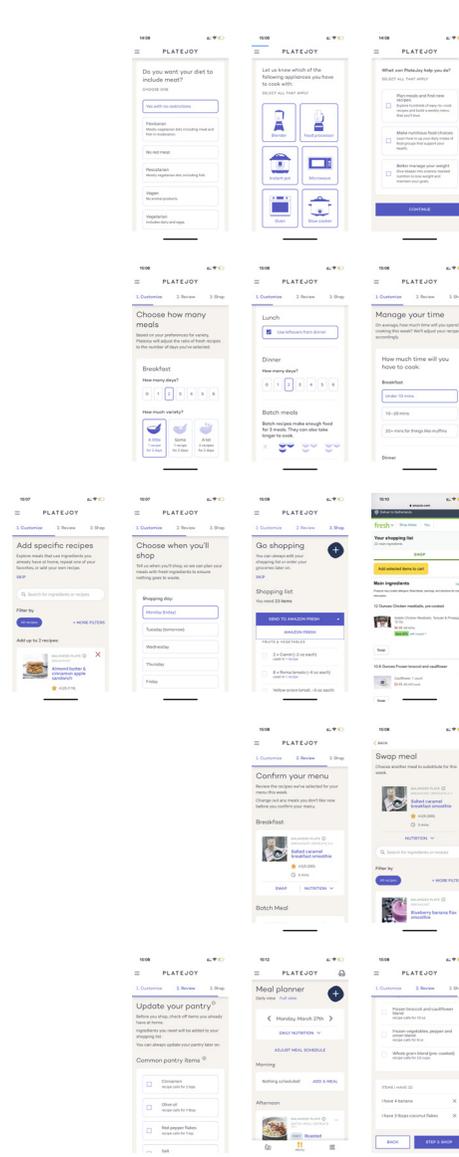


C. FEATURE ANALYSIS OF CURRENT APPS

01. PlateJoy



PlateJoy is a nutrition-focused meal planning service that creates a personalized weekly menu and helps streamline your shopping list.



Sign up - It starts with asking users' dietary needs and personal preferences, as well as interests in using PlateJoy. Options include meal planning, making nutritious food choices and managing weight.

Customise - Users can set the parameters of their weekly meal plans. This includes choosing which meals they need recipes for, how many recipes they want (or if they're OK with eating leftovers), and how much time they want to spend making each meal.

Users can also add specific recipes by choosing from the PlateJoy recipe library or uploading their own recipes.

Shopping - Users can select which day of the week they want to do grocery shopping. PlateJoy will give users a shopping list according to their menu and inventory. Users can choose to get their groceries delivered by having PlateJoy sync their list with Amazon Fresh.

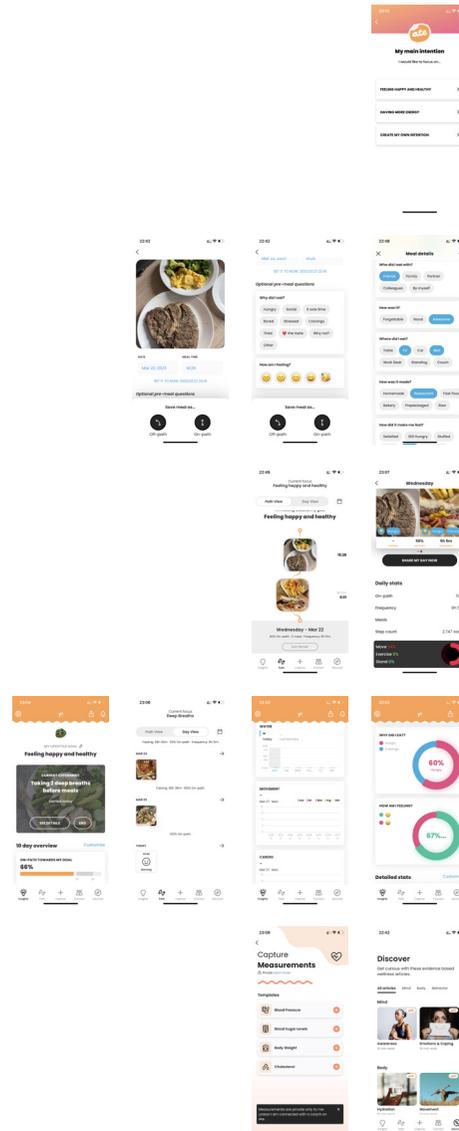
Review - Users can view their weekly menu and swap out recipes.

Users can check off any ingredients that they already have in their fridge or pantry after reviewing the menu. During the week, users can access their recipes through the weekly menu. When they are going to prepare a meal, simply click the recipe and follow the instructions.

02. Ate Food Journal



Ate Food Journal aims to help you understand why you eat certain foods and how they make you feel. The app enables you to take photos of your meals and activities to create a visual timeline of your day.



Sign up - It starts with asking users' intentions, such as feeling happy and healthy, having more energy. Users can also set up their own intentions.

Users can snap a photo of their meals and save them to the timeline (path), and add details about each meal, including who they ate with, how the food was made, and how it tasted. They can also add notes and save emotional states to see why they made that meal choice and how it made them feel.

Users can decide if that meal was #onpath or #offpath. There is no right answer, users can just be honest with themselves. For Example: Celebrating something amazing with a reasonable size dessert is always #onpath for me! The app will generate a visual timeline, which helps users stay on or get back on their path towards their chosen goal. Users can also share their daily meals with friends.

It's not just about eating. Users' personal activities are also included in the path, such as liquid intake, notes of their feelings and moods, which can help users with self-reflection and overall health. It also allows users to participate in experiments, such as taking deep breaths before eating.

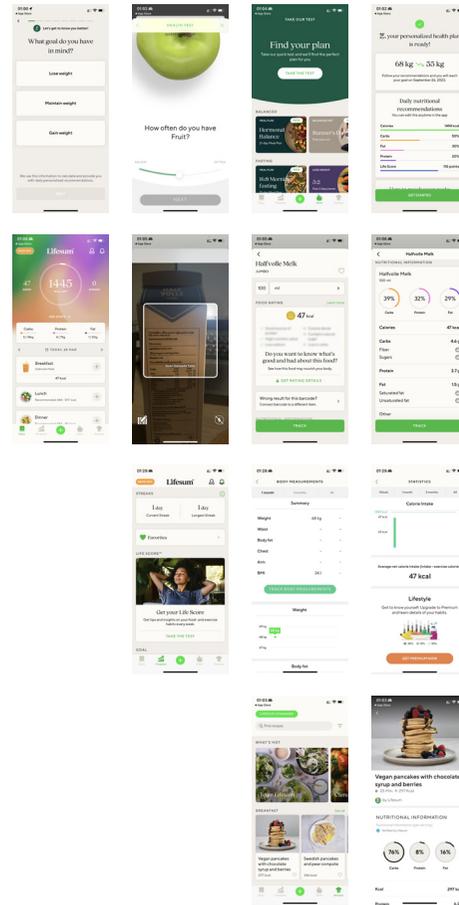
Users can also upload their own health measurement, which is completely private.

In the discover window, users can find wellness articles.

03. Lifesum



Lifesum is a calorie and macro-tracking app that was designed to help you achieve your health and fitness goals. The app is advertised as a health app that will help you become healthier by incorporating its suggested dietary recommendations.



Lifesum asks for your age, height, current weight, and goal weight to run its calculations to find your maintenance calories (the number of calories you need to maintain your weight). It also requires you to select a goal: weight loss, maintenance, or weight gain. If you select maintenance as your goal, then it will recommend your calorie goal be equal to the estimated maintenance calories it predicted for you based on its calculations.

The main page shows overall you eat today. You can add meals by scanning the barcode. It will show nutrition facts and ratings of this product.

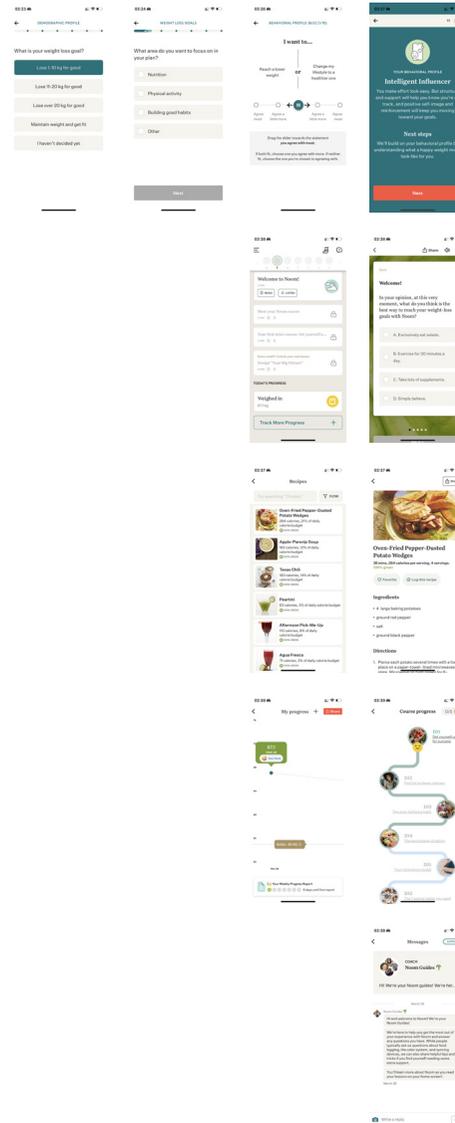
The app allows you to track waist, chest, and arm measurements and add your own custom measures, as well as calorie intake.

The app has over 250 breakfast, lunch, supper, and snack recipes to keep its users inspired and excited about the food they're eating.

04. Noom



Noom uses a psychology-based method that aims to help you make healthy eating choices and habit changes, all so you can reach your goals - weight loss included.



The first step in the program is a 10-minute online quiz that asks typical questions about your height, weight, gender, age and why you want to lose weight. It also asks how active you are, how often you eat and whether you're at risk for certain health issues like diabetes, heart disease and depression.

Noom asks you to complete 10 mini-lessons in psychology and behavioral change in 16 weeks. You decide immediately if you want to spend a minimum of five minutes to a maximum of 16 minutes a day on the lessons.

Recipe database

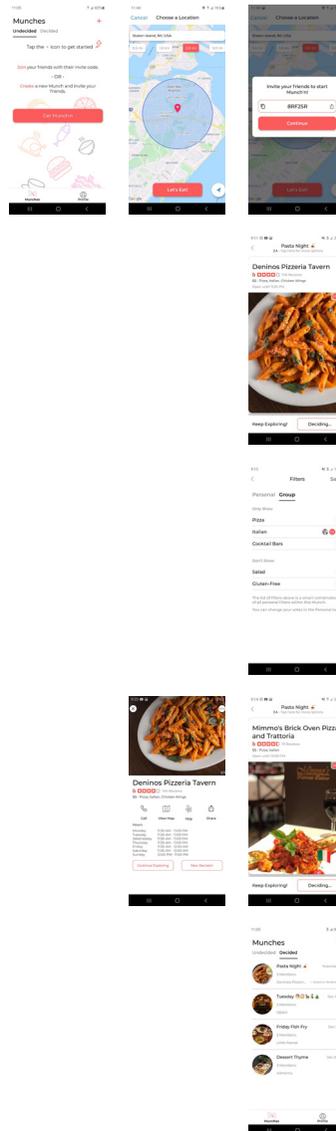
It tracks your progress.

You'll be connected with a goal coach who will personally reach out about twice a week to check in, ask about your progress and send routine encouragement. You will also be assigned to a peer group.

05. Munch



Munch is a dining decision-making app created for groups to enjoy dining together. The app features a Tinderesque experience that allows users to swipe on restaurants that they would be interested in going to.



Users can start a group of diners when they initially log in. Then they can selection a location for their dining options. After the location is set, they can invite their friends to join them on Munch.

Munch works similarly to a dating app, like Tinder, where participants log in, and “swipe” left or right to narrow their choices. But instead of potential mates, Munch users are swiping on restaurants they would like to dine in. Eventually, the group chooses a restaurant to dine in or order take-out.

Users can put their preferences and allergies in the filter, so the system won't recommend any of those options. It meets everyone's needs.

Once the restaurant is chosen, users can check the restaurant information to decide whether to make a new decision or not.

Users can check all the dining groups and restaurants they decided to go.

D. EXPERIENCE SAMPLING

PILOT TEST

Introductory card
(explain the use of the website and provide general instructions)

Resource card
(emoji stickers)

Personal information
(age, gender, nationality and occupation, living situation/family members)

Notes
(Blank for personal notes and thoughts)

Date **Which meal? (Time)**

Eating alone or with company?
(How many people?)

Dining setup
What did you do to prepare for this meal?
Why did you choose to do this activity/meal this food?
How did you feel? How did you like or dislike the setting?
How long did it take?

Eating process
How did you feel during eating?
Why did you feel this way?
What else did you do while you were eating? Why?
How long did it take?
Anything special you want to share?

After eating
How did you feel after eating?
Why?
What did you do after eating?

Eating helper
What technologies/devices/apps helped you during the whole process? (Picture)
Why did you choose to use them?
How did you feel when using them?
How satisfied were you with this meal? How much did you enjoy?

Date **Which meal? (Time)**

Eating alone or with company?
(How many people?)

Dining setup
What did you do to prepare for this meal?
Why did you choose to do this activity/meal this food?
How did you feel? How did you like or dislike the setting?
How long did it take?

Eating process
How did you feel during eating?
Why did you feel this way?
What else did you do while you were eating? Why?
How long did it take?
Anything special you want to share?

After eating
How did you feel after eating?
Why?
What did you do after eating?

Eating helper
What technologies/devices/apps helped you during the whole process? (Picture)
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Date **Which meal? (Time)**

Eating alone or with company?
(How many people?)

Dining setup
What did you do to prepare for this meal?
Why did you choose to do this activity/meal this food?
How did you feel? How did you like or dislike the setting?
How long did it take?

Eating process
How did you feel during eating?
Why did you feel this way?
What else did you do while you were eating? Why?
How long did it take?
Anything special you want to share?

After eating
How did you feel after eating?
Why?
What did you do after eating?

Eating helper
What technologies/devices/apps helped you during the whole process? (Picture)
Why did you choose to use them?
How did you feel when using them?
How satisfied were you with this meal? How much did you enjoy?

Your Ideal Meal

Use your imagination!
Ideal physical environment? (weather/time/location/ which meal)
What are you going to eat? (ingredients/meal type)
Why?

Let's make it even better!
What technologies/help would you like to use? / do you think can enhance your satisfaction?

Avoid these!
What could possibly ruin your eating experiences in your imagination?
Is there anything can affect you negatively?

Interview questions
What do you care the most when it comes to eating?
Do you have any eating problems?

TEST RESULTS (Personal information has been removed)

12/04/2023 **Lunch! (14:30)**

Eating alone or with company?
(How many people?)
Eating with my girlfriend.

Dining setup
I had to walk to Jumbo since we had no food, and then I cleaned the air fryer and collected the pan/bowls necessary.
We were both hungry since we hadn't had a meal yet, and wanted to cook something filling but without too much effort.
How did you feel? How did you like or dislike the setting?
About 25 mins to prepare the food, and 15-20 minutes to eat.

Eating process
Satisfied, interested.
I was really hungry, and interested because I found a new movie to watch whilst we ate.
Watched "Tales from Earthsea" on a laptop.
Only about 15 minutes, since we were both hungry.
I was very grateful my girlfriend cooked the egg/boast and organised the desk so that we could eat in a nicer environment.

After eating
I felt very full, since I probably ate too much. I also felt satisfied and relaxed since I was no longer hungry and can now focus on other things for the afternoon other than eating.
Layed down for a while, and dozed my eyes.
Since I had over-eaten a bit, I felt that I needed to rest and wait for the feeling to pass. I also felt a bit sleepy, which is common after eating a big meal.

Eating helper
What technologies/devices/apps helped you during the whole process? (Picture)
Air Fryer, electric stove, microwave
I used the air fryer since I believe it is a more healthy way to cook oily foods, and because it's extremely convenient. We had to use a pan for the eggs and some bowls, which I would have had to try to cook everything in the air fryer one by one.
The microwave was also used for the beans since it's quicker and easier to use by comparison, and needs no dishes for washing.
Excluded to eat, can't see
How satisfied were you with this meal? How much did you enjoy?
this confused my participant

Your Ideal Meal

Use your imagination!
Ideal physical environment? (weather/time/location/ which meal)
What are you going to eat? (ingredients/meal type)
Why?

Let's make it even better!
What technologies/help would you like to use? / do you think can enhance your satisfaction?

Avoid these!
What could possibly ruin your eating experiences in your imagination?
Is there anything can affect you negatively?

22-04-2023 **Brunch**

Eating alone or with company?
(How many people?)
Eat with boyfriend

Dining setup
Boil the eggs and steam the bapao, and make the coffee - put the table on bed
I like eating on my bed
It's cozy. I like the setting
10mins

Eating process
Satisfied and happy
I feel good when eating in a cozy environment and with companion
Chatting with my boyfriend
30mins

After eating
Satisfied & relaxed
Go back to sleep for a while
Feel sleepy after eating

Eating helper
What technologies/devices/apps helped you during the whole process? (Picture)
I like bed (only bed), no other tables
3. Easy to use

How satisfied were you with this meal? How much did you enjoy?

Your Ideal Meal

Use your imagination!
Ideal physical environment? (weather/time/location/ which meal)
What are you going to eat? (ingredients/meal type)
Why?

Let's make it even better!
What technologies/help would you like to use? / do you think can enhance your satisfaction?
Not necessarily technologies to be used in my meal but something else or devices makes the eating context cozier

Avoid these!
What could possibly ruin your eating experiences in your imagination?
Is there anything can affect you negatively?
Bad music/lighting/table setting could ruin the vibe

TEST MATERIAL - ESM KIT

Hello!

1 **Start here**

2 **Example**

Day 1

Day 2

Day 3

3 **Personal Notes**

4 **Personal Notes**

F. AI IDEATION SESSION

AI Ideation Session

based on the AI ideation cards by [AixDesign](#)

Welcome

The AI ideation cards are designed to be used in a workshop or as a self-paced activity. The cards are designed to be used in a workshop or as a self-paced activity. The cards are designed to be used in a workshop or as a self-paced activity.

- Prepare your challenge**
Select the problem or design challenge for the session.
- Related cards**
Select cards from the deck and copy them over the sheet (or understand from a specific category).
- Ideation playground**
Use the AI ideation cards to help you generate ideas for your challenge in a new, creative way. Write down any ideas that come up.
- Repeat step 2 - 3 with different cards.**
- Voting**
Vote on the ideas that you like the most.
- Questions**
Ask questions that you need to figure out to be able to build, test, and iterate.
- Repeat cards**
Put your selected cards on an impact matrix.

Notes:
All cards are designed to be used in a workshop or as a self-paced activity. The cards are designed to be used in a workshop or as a self-paced activity.

Frame your challenge

- Write down a question or design challenge as you would for any ideation session.
- Fill out the cards that you have chosen for the session. The cards are designed to be used in a workshop or as a self-paced activity. The cards are designed to be used in a workshop or as a self-paced activity.
- Repeat step 2 - 3 with different cards.

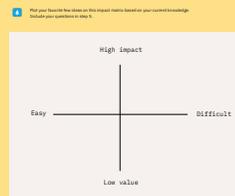
Select cards



Next steps

The ideation cards are designed to be used in a workshop or as a self-paced activity. The cards are designed to be used in a workshop or as a self-paced activity.

Impact matrix



Questions

Which questions do you have around the idea? Write down your questions in step 1.

	Feasibility	Viability	Desirability
Idea 1	?	?	?
Idea 2	?	?	?
Idea 3	?	?	?

Ideation Playground

Use the ideation cards to help you generate ideas for your challenge in a new, creative way. Write down any ideas that come up.

Voting

Vote on the ideas that you like the most. Use the stars to rate the ideas.

G. EVALUATION QUESTIONNAIRE

Before/After interacting with the prototype...	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1. I feel in control of what I eat when I use this app.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I feel closer to family & friends when I use the app.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. This product adds fun to my eating experiences.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. This product helps me reflect on what I eat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I feel confident in achieving my wellness goals with the help of this product.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I would like to use this product.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. The features are easy to use/locate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. The app is a disturbance while eating.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. The input burden (manually uploading information) is high.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. The product looks aesthetically pleasing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

H. EVALUATION RESULTS (PRE)

Participant	1. I feel in control of what I eat when I use this app.	2. I feel closer to family & friends when I use the app.	3. This product adds fun to my eating experiences.	4. This product helps me reflect on what I eat.	5. I feel confident in achieving my wellness goals with the help of this product.	6. I would like to use this product.
1	2 (Disagree)	1 (Strongly Disagree)	3 (Neutral)	2 (Disagree)	4 (Agree)	3 (Neutral)
2	1 (Strongly Disagree)	1 (Strongly Disagree)	4 (Agree)	3 (Neutral)	5 (Strongly Agree)	2 (Disagree)
3	4 (Agree)	2 (Disagree)	3 (Neutral)	4 (Agree)	4 (Agree)	3 (Neutral)
4	3 (Neutral)	1 (Strongly Disagree)	4 (Agree)	4 (Agree)	3 (Neutral)	4 (Agree)
5	3 (Neutral)	2 (Disagree)	1 (Strongly Disagree)	4 (Agree)	3 (Neutral)	2 (Disagree)
6	2 (Disagree)	1 (Strongly Disagree)	3 (Neutral)	3 (Neutral)	4 (Agree)	2 (Disagree)
7	3 (Neutral)	1 (Strongly Disagree)	2 (Disagree)	3 (Neutral)	4 (Agree)	3 (Neutral)
8	1 (Strongly Disagree)	2 (Disagree)	1 (Strongly Disagree)	1 (Strongly Disagree)	2 (Disagree)	2 (Disagree)
9	2 (Disagree)	1 (Strongly Disagree)	1 (Strongly Disagree)	1 (Strongly Disagree)	3 (Neutral)	3 (Neutral)
10	3 (Neutral)	2 (Disagree)	3 (Neutral)	3 (Neutral)	2 (Disagree)	2 (Disagree)

Participant	7. The features are easy to use/locate.	8. The app is a disturbance while eating.	9. The input burden (manually uploading info) is high.	10. The product looks aesthetically pleasing.
1	2 (Disagree)	2 (Disagree)	5 (Strongly Agree)	2 (Disagree)
2	5 (Strongly Agree)	5 (Strongly Agree)	5 (Strongly Agree)	3 (Neutral)
3	2 (Disagree)	2 (Disagree)	4 (Agree)	3 (Neutral)
4	4 (Agree)	3 (Neutral)	4 (Agree)	3 (Neutral)
5	4 (Agree)	4 (Agree)	5 (Strongly Agree)	3 (Neutral)
6	3 (Neutral)	3 (Neutral)	5 (Strongly Agree)	3 (Neutral)
7	3 (Neutral)	4 (Agree)	5 (Strongly Agree)	3 (Neutral)
8	2 (Disagree)	4 (Agree)	5 (Strongly Agree)	3 (Neutral)
9	4 (Agree)	4 (Agree)	5 (Strongly Agree)	3 (Neutral)
10	4 (Agree)	3 (Neutral)	5 (Strongly Agree)	3 (Neutral)

H. EVALUATION RESULTS (POST)

Participant	1. I feel in control of what I eat when I use this app.	2. I feel closer to family & friends when I use the app.	3. This product adds fun to my eating experiences.	4. This product helps me reflect on what I eat.	5. I feel confident in achieving my wellness goals with the help of this product.	6. I would like to use this product.	7. The features are easy to use/locate.	8. The app is a disturbance while eating.	9. The input burden (manually uploading info) is high.	10. The product looks aesthetically pleasing.
1	5 (Strongly Agree)	4 (Agree)	4 (Agree)	5 (Strongly Agree)	4 (Agree)	5 (Strongly Agree)	4 (Agree)	2 (Disagree)	2 (Disagree)	4 (Agree)
2	5 (Strongly Agree)	5 (Strongly Agree)	5 (Strongly Agree)	5 (Strongly Agree)	4 (Agree)	5 (Strongly Agree)	5 (Strongly Agree)	1 (Strongly Disagree)	1 (Strongly Disagree)	5 (Strongly Agree)
3	4 (Agree)	4 (Agree)	3 (Neutral)	4 (Agree)	3 (Neutral)	4 (Agree)	4 (Agree)	2 (Disagree)	3 (Neutral)	5 (Strongly Agree)
4	3 (Neutral)	4 (Agree)	4 (Agree)	4 (Agree)	3 (Neutral)	4 (Agree)	3 (Neutral)	2 (Disagree)	2 (Disagree)	5 (Strongly Agree)
5	4 (Agree)	3 (Neutral)	4 (Agree)	4 (Agree)	4 (Agree)	5 (Strongly Agree)	4 (Agree)	2 (Disagree)	2 (Disagree)	5 (Strongly Agree)
6	5 (Strongly Agree)	5 (Strongly Agree)	5 (Strongly Agree)	4 (Agree)	4 (Agree)	5 (Strongly Agree)	4 (Agree)	1 (Strongly Disagree)	2 (Disagree)	4 (Agree)
7	4 (Agree)	4 (Agree)	5 (Strongly Agree)	5 (Strongly Agree)	3 (Neutral)	5 (Strongly Agree)	4 (Agree)	1 (Strongly Disagree)	1 (Strongly Disagree)	5 (Strongly Agree)
8	4 (Agree)	5 (Strongly Agree)	4 (Agree)	5 (Strongly Agree)	4 (Agree)	4 (Agree)	5 (Strongly Agree)	2 (Disagree)	1 (Strongly Disagree)	4 (Agree)
9	5 (Strongly Agree)	4 (Agree)	3 (Neutral)	4 (Agree)	4 (Agree)	5 (Strongly Agree)	4 (Agree)	1 (Strongly Disagree)	3 (Neutral)	4 (Agree)
10	5 (Strongly Agree)	4 (Agree)	4 (Agree)	4 (Agree)	3 (Neutral)	5 (Strongly Agree)	4 (Agree)	1 (Strongly Disagree)	1 (Strongly Disagree)	5 (Strongly Agree)

Participant	Which feature(s) did you like in the app? Why?	What would you change about the app?
1	The photo recognition was nice, since it would save me a lot of time. The ability to get recipes depending on my ingredients was nice too, since otherwise I waste a lot... The recipe suggestions would also be helpful, since I want to find new things to cook but often can't decide.	I didn't really like the colours - I prefer darker tones so maybe an option would be cool.
2	Social connection, video recommendation, recipe recommendation. Because I think they bring convenience and are aligned with my living habits. I don't need to spend extra time thinking about these things.	Nothing to change
3	I like the calendar function, because it reminds me of what I have eaten with my friends, and could provide me with insights later on if cooking together again.	The selfie function is a bit awkward, maybe it could be changed to using avatars as representations, instead of real images.
4	I like the diary function, because it can sync up with friends to record great moments. The feature of suggesting recipes by photos of ingredients is very useful, I always have the problem of not knowing what to eat.	The selfie feature can be replaced with a personalized digital persona, sometimes it's a bit awkward to take pictures of every meal with friends. The mechanism for matching with friends I think could add the function of creating a group, just like WeChat, because sometimes it's not just dinner with one friend.
5	I like the function of scanning the food. It can help me avoid the food waste and it can help me make the recipe based on the current food. Really practical.	The function of selfie. Maybe create the virtual character instead of selfie would be acceptable for me.
6	I like the selfie part, cuz I like to take selfies when I gather around with my friends.	The green colour still makes me feel like eating vegetables and salads, maybe some warm tone like yellow can make me feel more relaxed...
7	I like the food journal feature. It's really nice to look back at what I have eaten because sometimes it's easy to forget.	The video recommendation feature is not really valuable to me because I would rather just focus on my food instead of getting distracted by videos.
8	I like to save time a lot so the ability to take photos seems great. I like how I can directly invite others to come around for a meal as well, and we can get some food options in the app which are tailored, since we always have disagreements for ages about what to eat.	I don't really like to watch movies when I eat alone, so maybe other options would be nice.
9	The recipe suggestions. I wanna expand my food repertoire but idk what to cook always. Ingredients are hard to find so if i can tell the app what i have then that's cool.	The app is very cool. Maybe the app could give me some stats about how often I eat different foods, so I can see which I eat too much of or something. I like to see the info visually rather than necessarily trusting the system to recommend stuff. I guess like the AI tells me why it did something would be interesting.
10	I like the idea that the recipe shows this is my first meal together with some certain friend; because it's valuable to think about my relationships and first meal together ever can be a nice memory recall point.	Maybe add some parts where I can see my progress in achieving my goals? Because I don't see any part now related to the goals that I put in the system when I sign up.

