TOWARDS A HEALTHIER YOUNG GENERATION

A strategy for the municipality of Rotterdam to stimulate VMBO students to make healthy dietary choices through design interventions

MASTER THESIS

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PREFACE

Dear reader,

I present to you the last part necessary for completing my master of Strategic Product Design at the Delft University of Technology. Throughout the master, I had the opportunity to learn from and work with inspiring people, exploring the field of strategic design.

This thesis is made possible through the opportunity given by the municipality of Rotterdam. The project has made me delve into the complicated world of food and its effects on people and planet. It has opened my eyes to other people and cultures, for which I am very grateful.

First and foremost, I want to thank my supervisors. Karin, thank you for this interesting and fun assignment you gave me and for your support during the project. Your enthusiasm and knowledge have inspired me throughout the project. Thank you for letting me join the meetings with the City Deal, to meet other motivated people that are willing to go that extra mile not just for themselves but for society. Rick, thank you for your feedback during our meetings, your push in the right direction sometimes but also for the space you left me to explore on my own. Thanks also for your energy and trust, which gave me a lot of self-confidence during the project. And last but definitely not least, thank you Anna for providing me with solid guidelines and feedback to make sure I was on the right track. You have been a major support during my graduation, not only for the academic content, but also for my personal journey. I must admit that I have never meditated in the past six months as you suggested, but now might be the time.

Secondly, I want to thank the people that were willing to participate in my research, who were kind enough to dedicate time and effort to help me: the Lekker Fit! team, Voedingscentrum, JOGG, VMBO schools, parents, caterers and many more strangers. A special thanks to all VMBO students who participated in my interviews and co-creation session. Your quotes, ideas and smiles were very much needed!

Lastly, thanks to everyone who was willing to listen to my graduation struggles and stories over and over again. You gave me energy, laughter and hugs when needed.

Enjoy reading!

Evelijn Savalle

EXECUTIVE SUMMARY

We live in a world where our plates are filled with convenience and our choices are influenced by an environment full of temptation. The current food system places immense pressure on planetary boundaries and affects people's health.

A large portion of the Dutch population does not stick to healthy diet guidelines, including the citizens of Rotterdam. This city has the highest national rates of overweight and obesity among adults and children. In recent years, major changes have occurred in the city's food landscape. The number of fresh food providers has decreased by 38 percent, while the number of fast-food locations has increased by 46 percent, especially noticeable in low socioeconomic status (SES) neighbourhoods (Mölenberg, 2021). This, coupled with rising food prices and limited financial resources, leads to less healthy lifestyles and increased health risks among citizens of low SES neighbourhoods.

The municipality of Rotterdam has the responsibility to secure the health of the city and its citizens. Among initiatives undertaken, the municipality takes part in the City Deal 'Healthy and sustainable food environment', to improve the food landscape in collaboration with other municipalities. Within this framework, and in partnership with the municipality of Rotterdam, this project has been initiated with the research question:

"How can the municipality of Rotterdam stimulate VMBO students toward adopting a healthier and more sustainable diet?"

Literature and field research findings reveal that VMBO students' dietary choices are influenced by individual factors, their social environment, and the physical environment. VMBO students are in the midst of their development, in which their friend group and social status are important. Consequently, a design statement addressing these aspects has been created using the Social Implication Design (SID) method (Tromp & Hekkert, 2014):

"To ensure VMBO students will make healthy dietary choices, I want them to feel cool among their friends by making healthy choices tempting."

The final concept, developed in co-creation with the target group and in line with the design statement, includes two design interventions to promote healthier dietary choices among VMBO students. The first intervention is the 'Eat to your Beat' food festival at school. Through a variety of festive activities, VMBO students gain knowledge and skills related to healthy eating. The first intervention aims to actively engage students to experience and discover that healthy food can be tasty and fun. The second intervention, 'Eat smart, Play hard', uses street art to draw the attention of VMBO students to healthy food choices. The art is linked to an online challenge complemented by a social media campaign. This intervention aims to seductively showcase healthy foods and engage with the target group in their online world.

Lastly, a roadmap presents the required steps for the municipality of Rotterdam to implement the design interventions. The first horizon of the roadmap focuses on laying the foundation, the second one is on expanding the concept, and the last horizon is on optimising the performance.

The concept aims to activate the municipality and improve the health of VMBO students in Rotterdam South by making healthy food cool!

READING GUIDE

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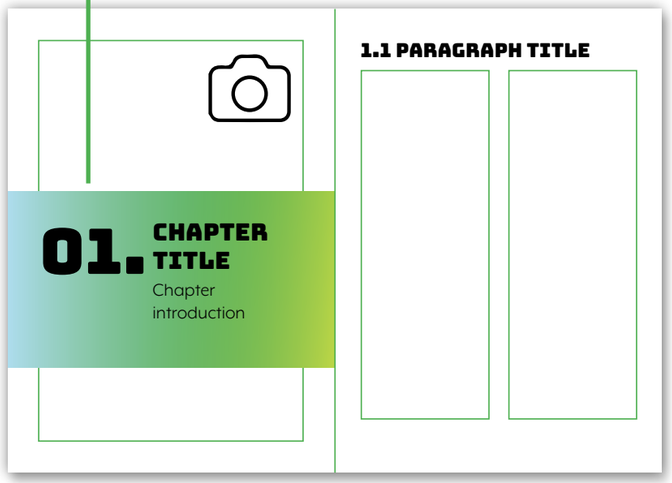
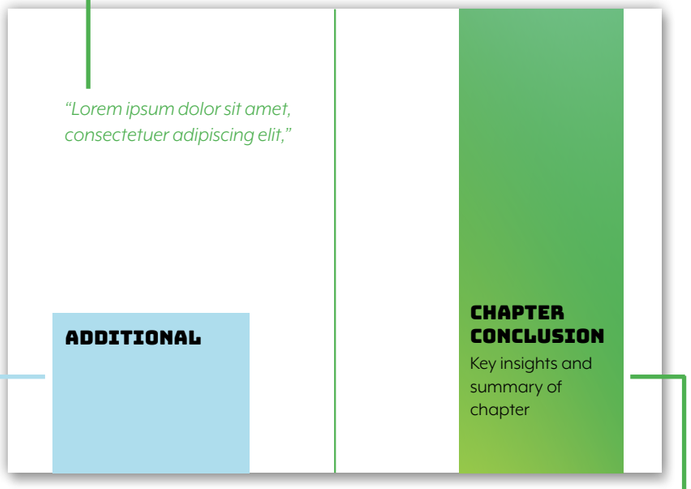


If a sentence is light green and italic, it is a personal quote.



Light blue boxes share additional information on terms or topics in the report.

Every chapter ends with a paragraph that summarises the information and highlights key insights.

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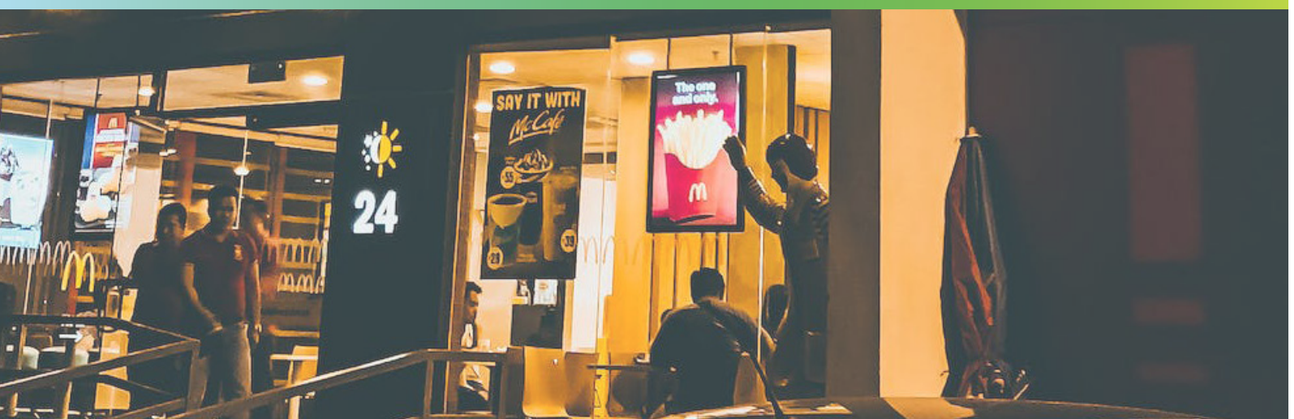
01. INTRODUCTION

In this opening chapter, the relevance of the graduation project will be displayed by describing the current food system and its destructive effects on people and planet. Thereafter, the food environment and its consequences in the Netherlands, and particularly in Rotterdam, will be discussed. Finally, the mission of the municipality of Rotterdam to improve the well-being of its citizens will be elaborated on, which prompted this project and gives rise to Chapter 2 *Assignment & approach*.



1.1 A FAILING FOOD SYSTEM

The production, consumption, and loss and waste of food largely shape the health of both people and planet. Currently, the global food demand is rapidly increasing due to the growing population, which has been projected to peak at 11 billion at the end of this century (Hollander et al., 2017). To provide enough food for this entire population, the food output needs to double if people stick to current consumption patterns (Gladek et al., 2017). However, continuing this behaviour is not feasible, because the planetary boundaries will be exceeded even further than they already are.

The effect on the planet

The present food system places huge demands on the planet. Global food production is the single biggest contributor to environmental degradation and the exceeding of planetary boundaries, which also endangers climate stability and the adaptability of ecosystems (Willet et al., 2019). Several major effects on the planet are listed below:

- Food is responsible for 25-30% of the total greenhouse gas emissions (GHGE)
- 60% of all biodiversity loss is caused by the food system
- Agriculture occupies half of the habitable surface of the planet
- Industrial fishing and the increased demand for seafood caused a collapse or exploitation of almost 90% of all marine fisheries
- About 70% of the accessible freshwater is used in agriculture
- Livestock counts for 94% of the non-human mammal biomass

(Ocké et al., 2018; Gladek et al., 2017; Ritchie et al., 2022)

The effect on people's health

Apart from its impact on the planet, the current food system has a noticeable effect on people. In the developed world, over-consumption takes place alongside a simultaneous increase in the number of overweight individuals. While 9.8 percent of the global population faces malnutrition (World Health Organisation, 2022), 2.5 times as many people are overweight (Gladek et al., 2017). Over-consumption is also experienced in the Netherlands, primarily driven by the large consumption of non-nutritious food as people are still not eating healthy enough. Boer et al. (2017) have found that the majority of Dutch citizens do not meet the guidelines for a healthy diet. Only a few adults consume enough fruits, vegetables, whole grain products, and fish as shown in Figure 1. In addition, the Dutch population has a higher intake of saturated fats and alcoholic drinks than recommended. This excessive consumption leads to higher health risks and diseases.

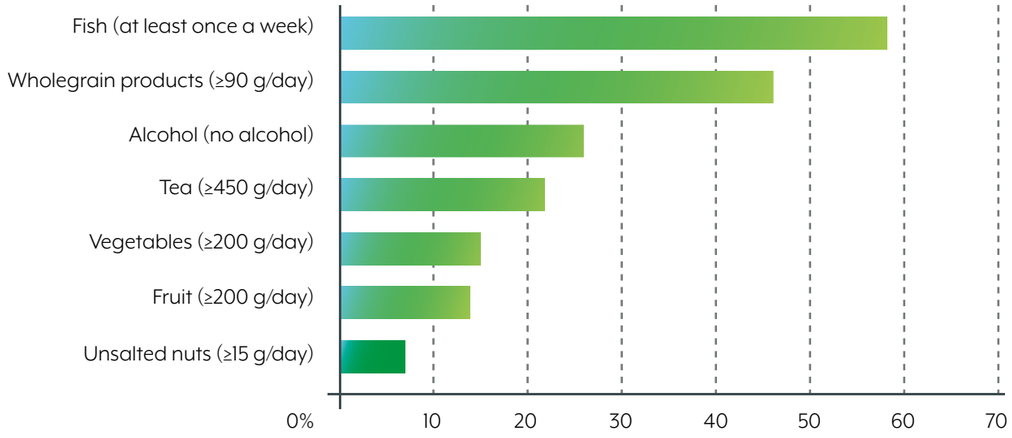


Figure 1. Percentage of adults consuming the recommended amount per food category (Boer et al., 2017)

1.2 THE FOOD ENVIRONMENT

The physical environment of the food system plays an important role in food-related behaviour since most of the decisions are made through impulsive thoughts and actions linked to external cues. This environment includes the availability, information, pricing, promotion, and visibility of food and food retail locations. (Rijksinstituut voor Volksgezondheid en Milieu, 2020).

The obesogenic environment of Rotterdam

In the city of Rotterdam, the food environment has changed enormously in the past fifteen to twenty years. The research of Mölenberg et al. (2021) shows a growth in the number of food providers throughout the municipality of Rotterdam. Within this growth, the number of fresh food locations has declined by 38 percent and the number of fast food locations has increased by 46 percent. This growth in fast food locations is especially significant in low socioeconomic status (SES) neighbourhoods (67 percent) in comparison to high SES neighbourhoods (4 percent).

Furthermore, there is a notable increase in the availability and accessibility of processed and convenience foods in larger portion sizes and with relatively low prices (Story et al., 2008). Additionally, portion sizes continue to grow, with large portions now becoming the norm (Voedingscentrum, n.d.-a).

The marketing and promotion of food also plays a major role in the food environment. Currently, 75 percent of the money spent on food advertising goes to the promotion of unhealthy foods (Kamsa, 2023) and 80 percent of all products that are promoted in the supermarkets are stimulating consumers towards an unhealthy food choice (NOS, 2021). In addition, the amount of advertising for unhealthy foods through social media platforms like TikTok and Instagram is increasing (Kamsa, 2023).

The growth in the availability and marketing of unhealthy products are signs of the obesogenic environment of the Netherlands, which is an environment that stimulates people to eat more and exercise less. The excess of calorie-rich food and the limited need to exercise are causing overweight and obesity (Voedingscentrum, n.d.-a). This situation also applies to Rotterdam, with approximately half of the adults in the city being overweight, of which 14-16% are severe (i.e. obese) and 20% of the children aged between 4-11 years old are overweight, with 5% being severe. Rotterdam has the highest obesity rates compared to national statistics. (Mölenberg et al., 2019).

SOCIOECONOMIC STATUS

The position of an individual or group in a society which is determined by wealth, occupation, education and living area (Sarsani, 2011).

1.3 ROTTERDAM'S MISSION

The municipality of Rotterdam is working through various ways to secure and improve the health of its citizens. The municipality has established the Gezond010 agreement to make healthy choices easier, encourage healthy behaviour, and build a healthy environment, and by this prevent instead of cure diseases. With Gezond010, Rotterdam builds on the national prevention agreement of the Dutch government. The municipality collaborates with various stakeholders to take responsibility for creating a vital and healthy city, including Greendish, Ikazia hospital, Voedingscentrum, and various educational institutes and health insurers (Gemeente Rotterdam, 2019).

City Deal 'Healthy and sustainable food environment'

The municipality of Rotterdam is part of the City Deal 'Healthy and sustainable food environment', which aims to make the food environment healthier and more sustainable in the Netherlands in 2030. Together with other municipalities, knowledge institutes, the state and private parties, the municipality of Rotterdam is working in three strategic pathways to achieve this goal (City Deal Voedsel op de stedelijke agenda, 2021; Gezond010, 2021; Staatscourant, 2021).

- Improving the current food environment by focussing on the physical environment, but also researching the possibilities in the digital landscape.
- Changing culturally determined food routines, social norms and moments of choice, and making healthy food appealing for people by connecting to motivations and lifestyles.
- Strengthen pathways 1 and 2 by making a short supply chain and local consumption available for people.

GEZOND 010
VITALE MENSEN IN EEN VITALE STAD

City Deal
Gezonde en duurzame voedselomgeving
Agenda Stad

CITY DEALS

City Deals are means of Agenda Stad to help achieve the objectives of the organisation: strengthening growth, innovation and liveability in Dutch cities. City Deals facilitate cooperation agreements among cities, national government, local governments, businesses, and organisations. These agreements aim to foster innovative solutions to social challenges and strengthen the economic ecosystem of urban regions. By connecting influential stakeholders within the urban network, City Deals drive collaboration for positive urban development (AgendaStad, 2019).

CHAPTER CONCLUSION

The current food system is not sustainable and harms both people and planet. Global food production is the biggest contributor to the exceeding of planetary boundaries. Furthermore, the food system influences people's eating patterns. The physical food environment in which people live is predominantly unhealthy, leading to high numbers of overweight and obesity in Rotterdam. Due to the need for change, the municipality of Rotterdam is dedicated to tackling the insufficient food environment. Although the municipality has already taken initial measures, a continued need for improvement in both the food environment and diets of Rotterdam's citizens remains.

02. ASSIGNMENT & APPROACH

In this chapter, the assignment of the project will be explained along with the research question. After that, the approach used will be elaborated on by introducing the double diamond and the Design Journey for Complex Systems.

2.1 ASSIGNMENT

The focus of this project is the food environment of secondary school students in the city of Rotterdam. The project originates from the second pathway of the City Deal 'Healthy and sustainable food environment' explained in the previous chapter. The following research question was formulated in discussion with the municipality of Rotterdam:

"How can the municipality of Rotterdam stimulate secondary school students toward adopting a more sustainable and healthier diet?"

During this project, the food environment and behaviour of the secondary school student will be taken into account. The needs and preferences of secondary school students and important actors in the system will be considered to identify opportunities for change. Through exploration of opportunities and barriers, interventions suited for secondary school students will be designed in co-creation with the target group and will be part of a strategy for the municipality of Rotterdam to bring about the change to a more sustainable and healthier food environment.

Project scope

Sustainability & health

A significant number of people living in Rotterdam, including both adults and children, struggle with being overweight or obese. Studies indicate that individuals with a non-Western migration background, which constitutes a considerable portion of the city's population, are more likely to be overweight or obese (Mölenberg et al., 2019). The current dietary patterns in Rotterdam not only pose risks to people's health but also contribute significantly to greenhouse gas emissions, exceeding the limits of the planet's resources. Therefore, this project aims to enhance the sustainability and health of diets among secondary school students of Rotterdam.

Target group & stakeholders

The municipality of Rotterdam already has programs targeting the health of young children and an external organisation has joined the City Deal specifically focusing on MBO and HBO students. However, secondary school students have received less attention thus far, making them a promising target group for this project. The municipality of Rotterdam is a key player in this research since it has a responsibility to safeguard and improve the social well-being of Rotterdam and its citizens. Furthermore, other actors potentially influencing the behaviour of secondary school students will be taken into account when researching the food system of Rotterdam for this project.

Purchase & consumption of food

The food system of Rotterdam is a large multi-aspect system and therefore, this project specifically concentrates on examining the food purchasing and consumption behaviour of secondary school students. To accomplish this, the project assesses the food environment in which secondary school students encounter food products. This environment plays a significant role in shaping food-related behaviour, through the influence of personal, social, and physical factors (Story et al., 2008).

2.2 APPROACH

It can be concluded that the food system in Rotterdam is a complex system, because of the multiple levels and interrelated actors in the system, exerting influence on secondary school students. To unravel the system and find opportunities for change, a systemic design approach will be followed by using information and tools obtained from the book: Design Journeys for Complex Systems (Jones & Van Ael, 2022). The steps of this 'journey' are shown in Figure 2, from which mainly steps 1 to 4 are used as a resource and inspiration for this project. Systemic design takes into account the complexity and unpredictability of systems with the goal to guide human-centred design for multi-stakeholder challenges (Jones & Van Ael, 2022).

Double diamond

To guide and structure the project, the double diamond model is used, as developed by the Design Council (2004), divided into four phases (see Figure 3).

1. Discover

In the first phase of the research, the food system is reviewed as a whole. Multiple actors are involved and the interrelationships between the actors are considered and mapped out by framing the system. Through literature, different topics such as the current food system, behavioural formation, the municipality of Rotterdam, and cultural influences are discovered. In addition, observations of, street encounters with and interviews with the target group and other key actors provide a deeper understanding of the needs and preferences of actors in the system.

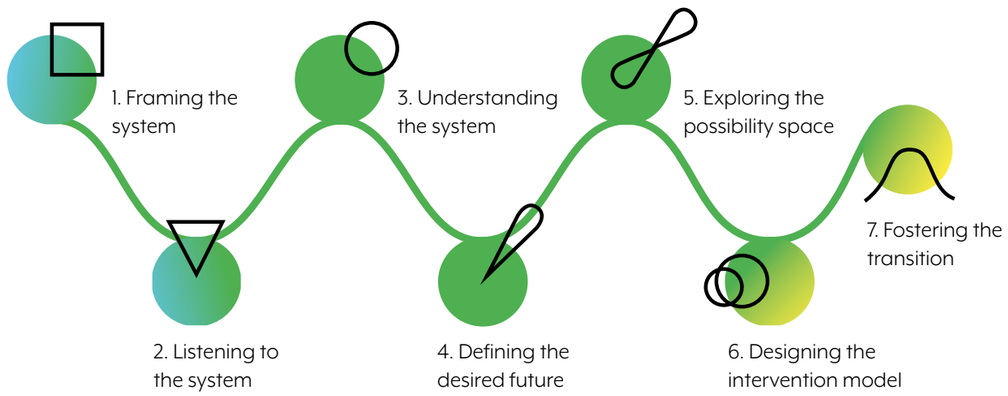


Figure 2. Design Journey for Complex Systems (Jones & Van Ael, 2022).

2. Define

During the second phase, the information collected will be structured and analysed using the Social Implication Design (SID) method (Tromp & Hekkert, 2014) and customising it to this project. The data collected through the literature and field research will be clustered into themes, leading to a worldview that leads to design criteria followed by a design statement, which aligns with step 4 of the Design Journey of Complex Systems.

3. Develop

The third phase involves designing in collaboration with the target group. During a co-creation session, ideas will be created and multiple iterations will be done. By creating together with the target group, concepts will be developed that match their needs, preferences, and overall lifestyle.

4. Deliver

The final phase of the project is about concepting and validating. In the first part of this phase, concepts will be selected, iterated on, and developed further toward the final design. The second part covers the detailing of the implementation through a tactical roadmap and validation interviews with stakeholders of the system leading to limitations and recommendations to eventually arrive at an appropriate strategy for the municipality of Rotterdam including design interventions to ensure a positive change in the current food system.

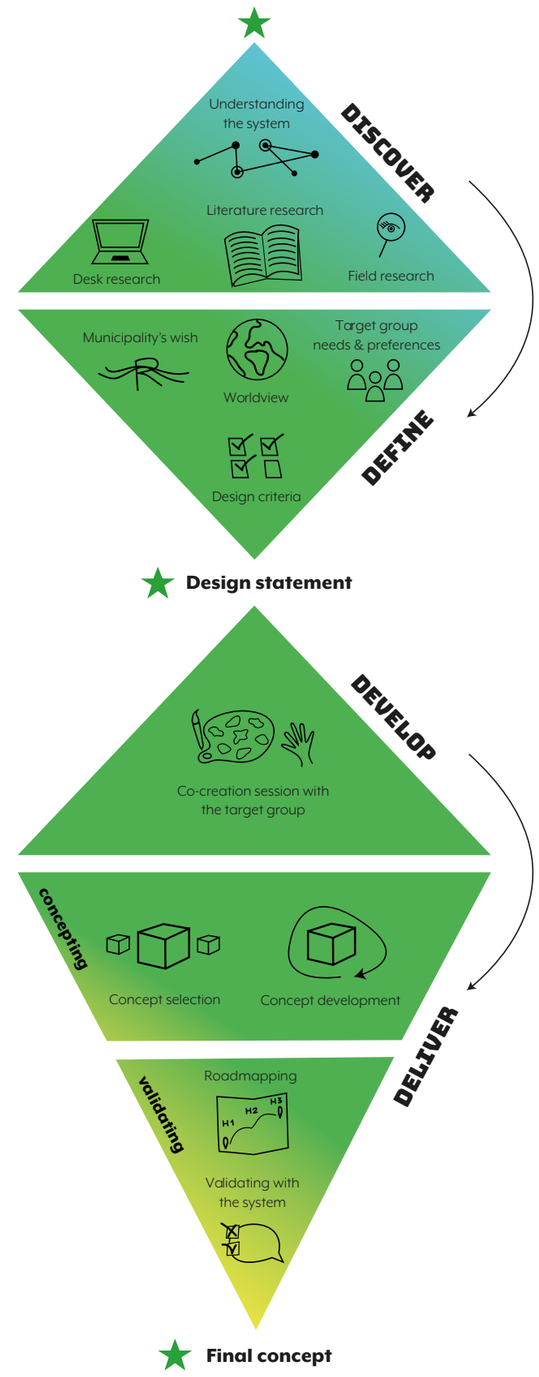


Figure 3. Double diamond model

CHAPTER CONCLUSION

The research question for this graduation project is as follows: “How can the municipality of Rotterdam stimulate secondary school students toward adopting a more sustainable and healthier diet?” A combination of the double diamond and the Design Journey for Complex Systems is used as an approach for this project. In multiple phases, a deep understanding of the target group’s world will be developed and in co-creation with students concepts will be created leading to a strategy for the municipality of Rotterdam including design interventions for sustainable and healthy change among the younger generation.

03. THE MUNICIPALITY OF ROTTERDAM

This chapter will explore the municipality of Rotterdam, emphasising its role in safeguarding the well-being of its citizens. The chapter begins by highlighting the various municipal instruments that have the potential to influence the food system. Subsequently, an overview of the municipality’s ongoing programs will be provided aimed at fostering a more sustainable and healthier food environment.

3.1 MUNICIPAL INSTRUMENTS

On the basis of international and national fundamental rights, including the International Covenant on Economic, Social and Cultural Rights (ICESCR), the government has the responsibility to ensure a healthy food environment. Under the Public Health Act and the Youth Act, the municipality of Rotterdam must implement measures to reduce health threats, such as obesity (Verhoeff et al., 2021). However, the municipal instruments to influence the physical food environment towards a more sustainable and healthier one are limited and are not aimed directly at food providers. Key instruments and their limitations are outlined below:

Destination plan

The municipality lists the use and building possibilities for a specific area in a destination plan. This plan describes whether the area is intended for living, work, leisure or sports (Kenniscentrum InfoMil, n.d.). Sectoring in the food environment through the destination plan is possible with spatial arguments like nuisance. The healthiness of food offered at a (gastronomy) location has no spatial component, which makes it spatially irrelevant and therefore cannot be regulated through the plan. The food environment can be influenced by including a spatial argument when a destination plan is rewritten. However, a destination plan does not assess a development for its health impact due to the absence of a legal basis (Verhoeff et al., 2021).

General local regulation

(In Dutch: Algemene Plaatselijke Verordening (APV))

The APV includes regulations on public order and safety in its broadest sense. Various food-related actions can be regulated through the APV. Nevertheless, the APV relates to public order and safety and does not include health. Therefore, health is not an argument for refusing a permit, unless there is direct danger for public health (Verhoeff et al., 2021).

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Location prohibition

An operating business (gastronomy or itinerant trade) needs a permit for trading at a specific location, which can be prohibited by the municipality. However, the municipality is unable to make a distinction between the type of trade and as a consequence of a permit being turned down no trade at all can take place in the specific area. Therefore, this instrument is not used that often by the municipality (De Jager, personal communication, 2023).

Bidding process

In case of scarce permits, bidding criteria can be set up on which a selection of specific characteristics of the business can be determined, which can include health aspects (Verhoeff et al., 2021).

Subsidy

Through subsidies entrepreneurs and businesses are mainly tempted to trade in a specific desired offer (Verhoeff et al., 2021).

3.2 EXISTING INITIATIVES

In addition to Gezond010, discussed in Chapter 1.3 *Rotterdam's mission*, the municipality actively participates in more projects aimed at becoming a healthy and sustainable city. These initiatives target the city as a whole, including the gastronomy industry and its residents. By adopting a holistic approach, the municipality strives for positive transformation in urban life both societal and individual levels.

JOGG municipality

Rotterdam is a JOGG municipality, which means that the JOGG foundation (Young people at healthy weight, Dutch: Jongeren op Gezond Gewicht) advises and supports the municipality in improving children and teenagers' lifestyles. JOGG is a network of the local government, social organisations and the business community. One of their commitments is improving the eating environment of young people. They bring together the municipality, schools and food providers for an integrated approach to the problem. The JOGG foundation actively addresses health inequalities, especially at schools with smaller budgets (JOGG, n.d.; Stuffers, personal communication, 2023).

HUIZEN VAN DE WIJK

Meeting places in specific neighbourhoods, where local residents can participate in activities or get advice on everyday issues.

Lekker Fit!

The 'Lekker Fit!'-initiative is the tailored JOGG program in Rotterdam, designed to improve the lifestyle of children in primary schools and daycare centres. The approach consists of three components; nutrition, physical activity and relaxation. In collaboration with schools, daycare centres, 'Huizen van de wijk' and sports centres, the municipality educates children on healthy behaviour and its importance (Lekker Fit!, 2023).

Nieuwe Nassen

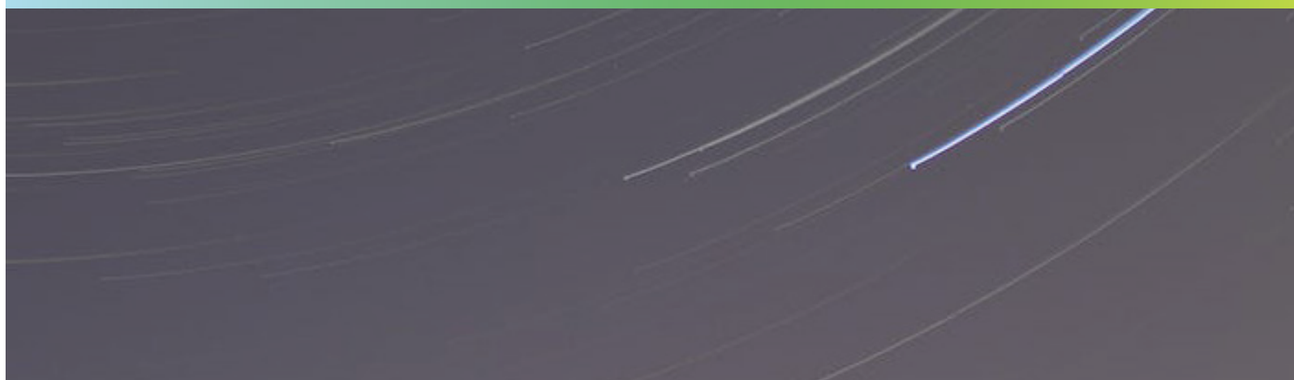
'Nieuwe Nassen' is a program initiated by the municipality in collaboration with food providers in Rotterdam, BlueCity and Greendish. This program guides food providers, including fast-food restaurants, to offer healthier and more sustainable menu options. It ensures a growth in awareness of healthy and sustainable food among the citizens and the gastronomy industry, aiming to create a movement and build a network of gastronomy entrepreneurs and suppliers for both healthy and sustainable businesses. Additionally, financial support is offered for this transition (Blue City, 2021).

CHAPTER CONCLUSION

Although the municipality of Rotterdam currently faces some challenges in the use of its municipal instruments, efforts are made to improve the food landscape. The municipality is proactively taking steps to ensure a healthier lifestyle in the city through various programs and initiatives, in collaboration with knowledge institutes, the gastronomy industry, the national government and organisations.

04. UNDERSTANDING ROTTERDAM'S SYSTEMS

To understand the food system in Rotterdam, this chapter dives into systems and how systems can potentially be changed, using the Multi-level Perspective model. Subsequently, the model will be used to portray the current food system in Rotterdam. The chapter concludes with two actor maps, presenting actors with direct and indirect influence on secondary school students.



The food system is an integrated whole with functions and interactions emerging from the interdependent relationship between parts and actors in the system, making it complex (Van der Bijl-Brouwer & Malcolm, 2020; Jones & Van Ael, 2022). To stimulate secondary school students to adopt a more sustainable and healthier diet, the interplay of different elements at multiple levels in the food system must be considered.

4.1 MULTI-LEVEL PERSPECTIVE THEORY

To better understand systems and how they can be changed, the Multi-Level Perspective (MLP) theory and model are explained (see Figure 4). This theory evaluates socio-technical transitions by viewing a system through three different interdependent levels at the same time (Geels, 2006).

1. Landscape

The wider environment in which a system is working and influences socio-technical developments (macro-level). Actors within the MLP have less direct influence on this level. The landscape includes environmental and demographic changes and new social movements, for example.

2. Regime

The level coordinates the activities of actors and social groups and accounts for the dynamic stability of the system (meso-level). It includes the current way of realising societal functions.

3. Niche

A protective space for radical innovations to emerge and to gain momentum before competing with the current regime (micro-level).

System shifts are the result of interactions among developments on all three levels. These include the emergence of alternatives in niches as well as favourable opportunities in the landscape (Geels, 2006; Smith et al., 2010). The MLP divides this transition process into five phases (Sovacool et al., 2017).

1. Developments at the landscape level put pressure on the current regime, which opens up, creating windows of opportunities.
2. Radical innovations emerge in niches.
3. The strongest innovations enter small markets for further protected development.
4. The innovation starts to break through and challenges the current regime.
5. Niche innovations tap into the windows of opportunity. The innovations develop further in the current regime, changing the regime and therefore the system.

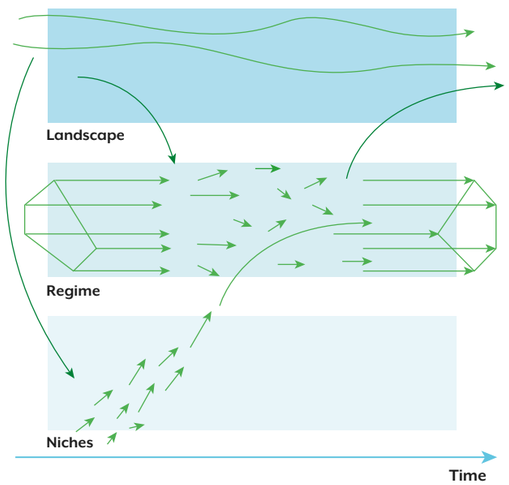


Figure 4. The Multi-Level Perspective model

The Multi-level food system of Rotterdam

The MLP model is used to capture the current food system of the Netherlands, and specifically Rotterdam, on all three levels (Figure 5). Elements within the MLP model are technology, user practices, cultural discourses, politics, markets and science (Sovacool et al., 2017).

At the landscape level, developments like the growing world population, migration, transgression of planetary boundaries and social economic health differences between low and high-income populations put pressure on the current regime. These advancements at the macro-level have sparked counter-movements, including a growing environmental awareness and the slowdown movement to decelerate people's busy lifestyles.

At the niche level, innovations are emerging as a response to these macro changes and growing towards the regime. For instance, Nieuwe Nassen was launched by the municipality of Rotterdam to make the food offered in the gastronomy industry healthier and more sustainable. Additionally, CityLab010 offers opportunities for small-scale initiatives like 'Korte keten: van bodem tot bord' to develop.

Some innovations have already made it into the regime in recent times, such as the collaboration with JOGG leading to the development of Lekker Fit!. But alongside these initiatives, the negative side of the regime can also be felt. For instance, the growth of fast food providers turning Rotterdam into an obesogenic environment, unhealthy behaviours mired in culture and tradition, and current municipal instruments with little impact on the food landscape.

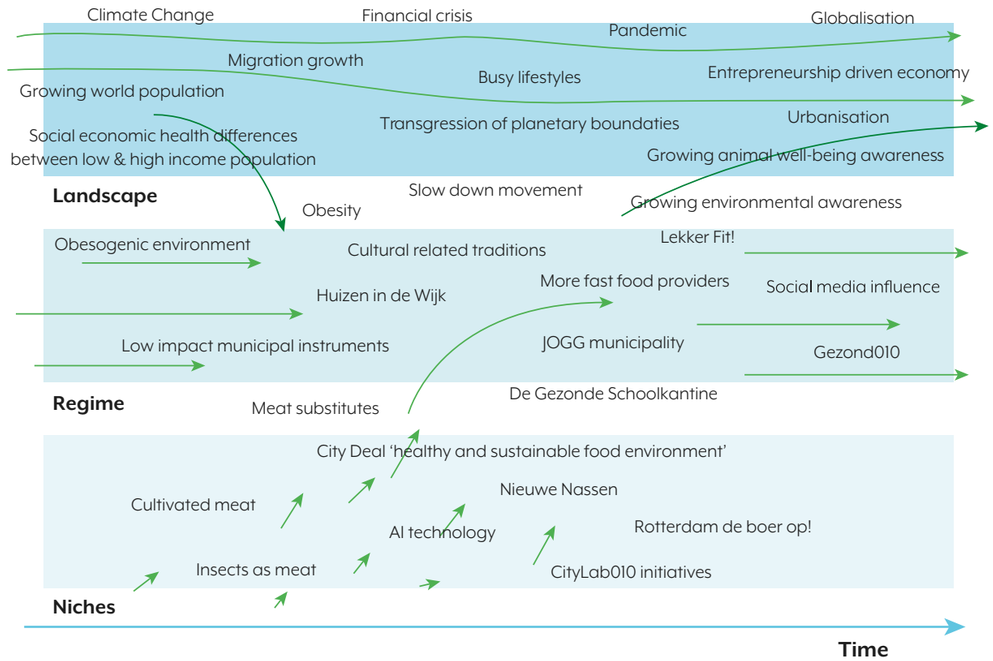


Figure 5. The multi-level food system developments of Rotterdam

4.2 ACTOR MAPPING

The micro, meso, and macro levels can also be applied to different layers of system actors. These are not so much linked to the regime, landscape or niches, but they do show a varying influence on the food system and secondary school students. When focusing on the target group, actors can be identified with different degrees of knowledge and power (Jones & Van Ael, 2022) (see Figure 6). Key actors in the food system of Rotterdam related to secondary school students are close friends, parents, school, social media, the gastronomy industry (including supermarkets) and the (local) government. After identifying the most influential actors, their interrelationships in the food system were determined, as shown in Figure 7.

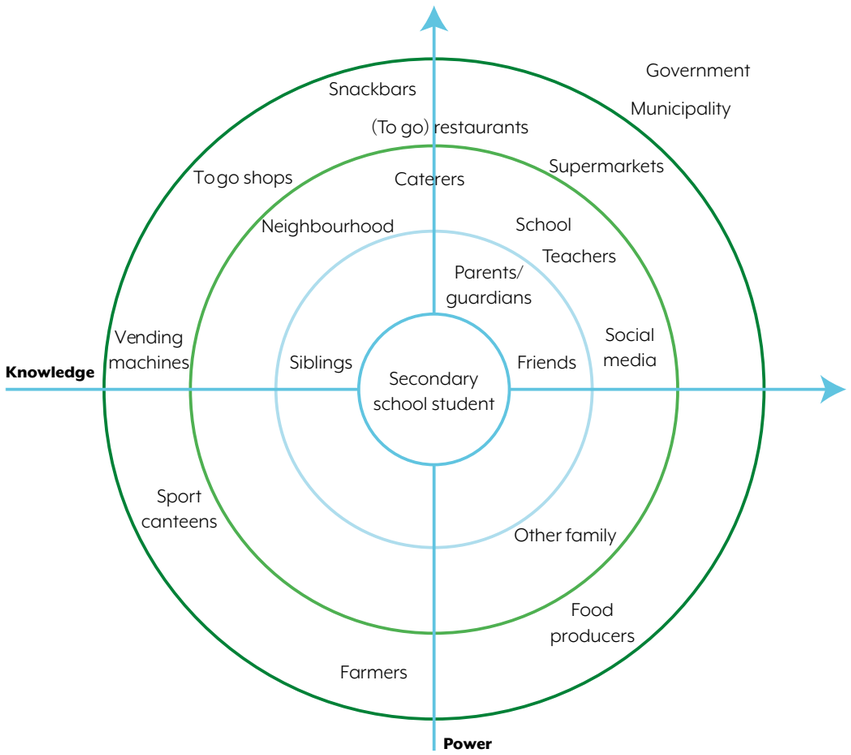


Figure 6. Actor Map (Jones & Van Ael, 2022)

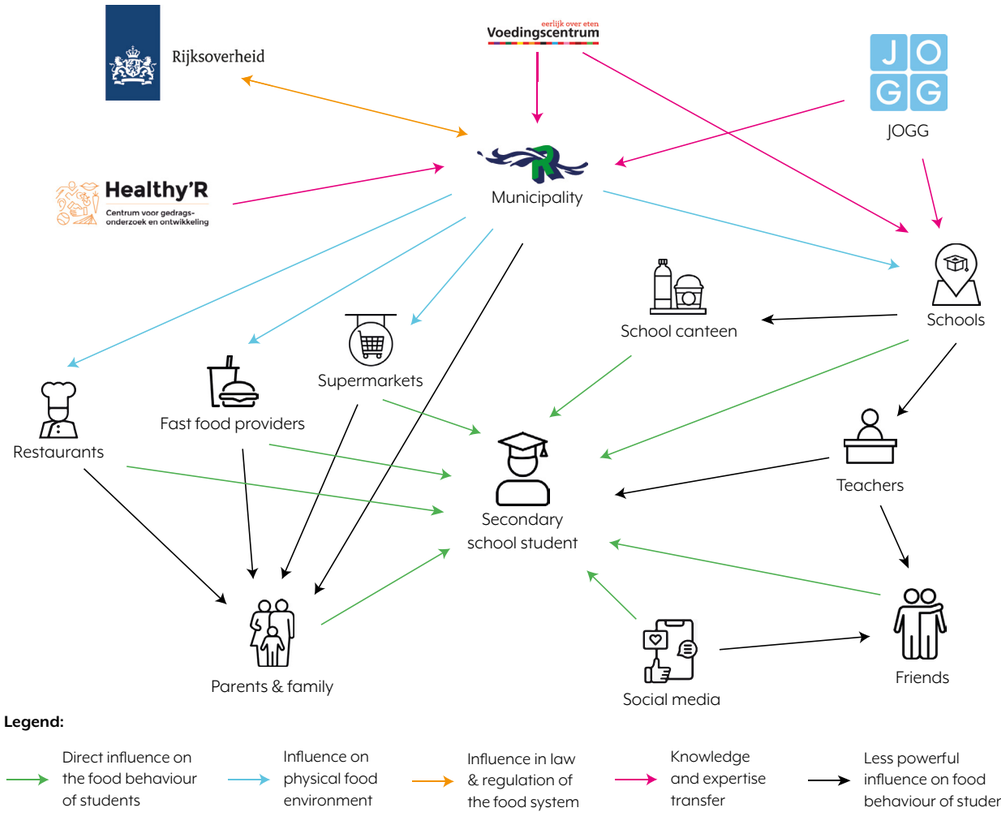


Figure 7. Actors and their relationships

CHAPTER CONCLUSION

The food system is a complex and multi-layered system. Different developments at macro, meso and micro levels create pressure on the current food system. The need for change is noticeable, leading to the first niche innovations already. By plotting the MLP of Rotterdam's food system, an overview is created providing a deeper understanding of the current state of the food system. This analysis reveals the interconnections among developments and the collaborative dynamics among the system levels. Additionally, key actors and their relationships with secondary school students are presented in actor maps. By including the diverse actors who can impact secondary school students in further steps of the project, opportunities for change will be identified where designable impact can be made.

05. UNDERSTANDING CONSUMPTION BEHAVIOUR

In this chapter, behaviour theories will be discussed to gain a better understanding of underlying cognitive processes influencing food-related decisions. The Integrative Model of Behavioural Prediction and the Ecological Framework, two theoretical frameworks providing insights into factors that influence behaviour, will be explained related to food. In addition, the principle of habits and their formation will be explored. Finally, the process of making healthy and sustainable choices and overcoming potential barriers will be elaborated on.

5.1 IMPULSE OVER THOUGHT

Food-related choices are influenced by many factors, both from within oneself and from the external environment. By examining the underlying cognitive processes that influence decision-making processes, a better understanding of potential areas for change will be formed.

Every day, people make around 200 food-related decisions, most of which are routine-based and require little effort, controlled by the impulse system (system 1). This system is influenced by external cues from the social and physical environment and by habits. System 1 constitutes about 95 percent of all choices made each day. On the other hand, system 2 operates rationally, requiring conscious thought and consideration of information, knowledge and motivation, constituting about 5 percent of all decisions made. This rational system has a minor role in individuals' eating behaviour in comparison to system 1 (Ocké et al., 2018; Trudel, 2019; Kahneman, 2011). To establish new behaviours and choices, including sustainable ones not previously considered by consumers, system 2 is crucial. In order to set up these new choices as the norm, it is necessary to overwrite the familiar patterns of system 1 and develop new patterns (Trudel, 2019).

5.2 THREE LEVELS OF BEHAVIOURAL INFLUENCE

The Integrative Model of Behavioural Prediction (IMBP) by Fishbein & Azjen (2010) captures factors shaping people's behaviour. Behaviour is dependent on internal motivation, formed by the attitude people have towards a specific behaviour, perceived norms and self-efficacy, as described in the Theory of Planned behaviour (Azjen, 1991). Self-efficacy is the perceived ease or difficulty of performing a behaviour. Besides internal motivation, the performance of an intended behaviour is stimulated by non-motivational factors (Ajzen, 1991), described as skills and environmental constraints in the IMBP (see Figure 8). Three categories of influence are distinguished from the model:

- Internal factors: attitude, self-efficacy and skills
- Social factor: perceived norms
- Physical factors: environmental constraints

These three categories are also identified by Story et al. (2008) in the Ecological Framework for food and eating behaviour change, shown in Figure 9. This framework highlights the influences from four different levels on food-related behaviour; individual factors, the social environment, the physical environment and the macro-level environment. For this project, only the first three levels are elaborated on.

Individual factors

The individual factors influencing behaviour include one's behavioural capability, the attitude towards a behaviour and self-efficacy. Behavioural capability includes a person's knowledge, demographics and lifestyle, playing a role in their ability to perform a behaviour. Individual factors also include psychological barriers, such as a lack of knowledge on how to execute a behaviour or difficulties in adopting a future perspective (Verplanken, 2018).

Social factors

In the IMBP, social factors include perceived norms (Figure 8), representing unwritten rules that are formed by the social group to which individuals belong or want to belong and are based on what other people do or think is needed to do (Trudel, 2019; Verplanken, 2018). People conform to these norms to fit in with the group (Yanovitzky & Stryker, 2001). Teenagers are strongly influenced through social norms established by important people in their lives like parents and peers (Damon, 2004; Mamede Soares Braga et. al., 2020). Peer behaviour often leads to the adoption of similar behaviour among teenagers (University of Minnesota, 2020). Additionally, social media platforms, like TikTok, Instagram and Snapchat shape behaviour among youth by influencing the social norms (NOS, 2023).

Physical factors

As explained earlier in Chapter 1.2 *The current food environment*, the physical environment has a significant influence on food-related behaviour, which includes the availability, information, pricing, promotion and visibility of food and food retail locations. (Rijksinstituut voor Volksgezondheid en Milieu, 2020). The ability to control oneself is challenged when being exposed to temptations. With prolonged exposure, these temptations become overpowering, leading people to give in to the influences of the physical environment (Bovens et al., 2017).

School environment

The physical environment is also an important obstacle for secondary school students in Rotterdam to eat healthier (Polychronakis et al., 2022). Schools in Rotterdam have a wide range of gastronomy locations in their neighbourhood, including fast food, seducing school students to unhealthy foods (Locatus, 2019; City Deal Voedsel op de stedelijke agenda, 2021). The food offered in schools also plays a significant role, since secondary school students have reported being seduced by the unhealthy options in school canteens (Veldhuis et al. 2017).

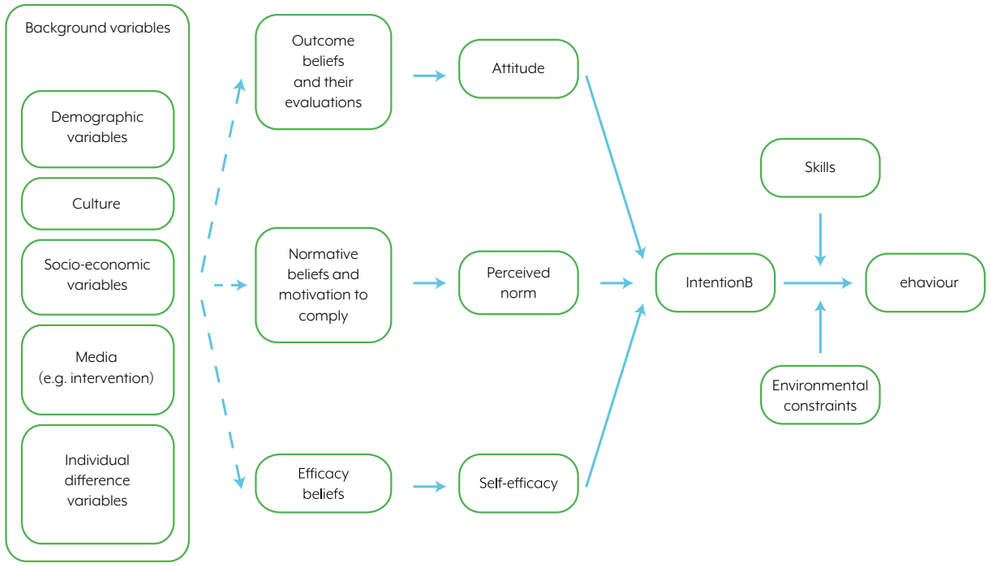


Figure 8. Integrative Model of behavioural Prediction (Fishbein & Azjen, 2010)

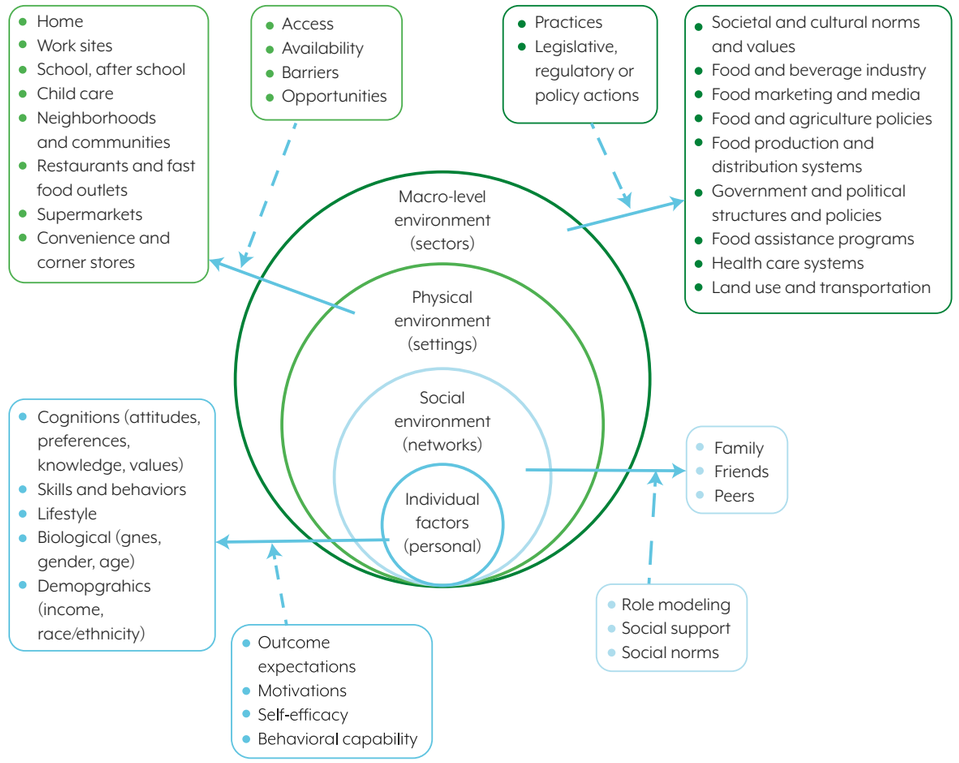


Figure 9. Ecological framework (Story et al., 2008)

5.3 THE ROLE OF HABITS

Habits, which play a big role in decision-making through system 1, are behaviours that become fixed through repetition. As action is repeated sufficiently, the need for conscious decision-making decreases and the behaviour emerges automatically (Reinaerts et al., 2007; Heimlich & Ardoin, 2008). Repetition is an important factor in habit development. While people may have the capability, opportunity and drive for a specific behaviour, they often fail to maintain it over time, falling back into old patterns (Gardner & Rebar, 2019). Changing habits can be challenging, as they are impulse responses triggered by situational cues (Verplanken, 2018; Gardner & Rebar, 2019). Prochaska & Diclemente (1983) have proposed the Transtheoretical Model of Change, which outlines the process of habit formation in six stages as illustrated in Figure 10.

1. Precontemplation

No intention to take action or change the current behaviour.

2. Contemplation

Awareness of the current behaviour and intention to change it.

3. Preparation

Intending to take action and prepare before changing the behaviour.

4. Action

Changing the behaviour and taking steps.

5. Maintenance

Preventing relapse and maintaining the new habit.

6. Relapse

Failing to maintain the behaviour over time.

Figure 10. Transtheoretical model of change (Prochaska & DiClemente, 1983)

5.4 HEALTHY & SUSTAINABLE BEHAVIOUR

Many difficulties are faced when performing and maintaining healthy and sustainable behaviour. Firstly, the constant influence of the surroundings plays a significant role, as discussed earlier in this chapter. Unhealthy food options tempt and encourage people to make unhealthy food choices (Middleton et al., 2013).

Furthermore, a decrease in the adherence to healthy behaviour occurs when interventions aimed at promoting this behaviour are scaled back or discontinued. This decline can be attributed to the lack of support to sustain healthy choices. The time required to establish new healthy behaviour varies from person to person, making it challenging to implement an intervention for a sufficient duration for everyone (Wood & Neal, 2016).

Another reason for these difficulties is the absence of knowledge. Many people are unaware of what a healthy lifestyle is and how to make better choices. Consequently, when health information is not shared, individuals stick to their old patterns (Middleton et al., 2013). This situation also applies to sustainability. Consumers are information-dependent since they cannot evaluate this attribute personally. They are often unable to understand the benefits of sustainable products, making it difficult to make informed decisions (Vermeir & Verbeke, 2006).

Moreover, when the final purchase decision is made, other product characteristics, such as price, size and convenience, weigh more heavily leading to the purchase of less sustainable and healthy options (Ocké et al., 2018).

Towards sustainable & healthy behaviour

To encourage sustainable and healthy choices, various approaches can be used. First of all, adopting a future-oriented mindset can help individuals to better envision their contributions and understand their impact thereby boost their sense of self-efficacy (Trudel, 2019). Additionally, setting short-term goals further improves the feeling of self-efficacy for healthy behaviour (Middleton et al., 2013).

Furthermore, aligning the behaviour with the social norms of the desired social group can be an enabler. Peer pressure can be a major determinant, as learning about sustainable behaviour from peers encourages pro-environmental behaviour (Lazaric et al. 2020). Moreover, receiving support from others in adopting healthy behaviours increases the adherence of it (Middleton et al., 2013).

For health-related habits, the frequency of interventions matters. Long-duration interventions with frequent exposure to cues tend to be more successful in habit formation compared to shorter, less repetitive interventions (Wood & Neal, 2016).

CHAPTER CONCLUSION

Consumers' food behaviour is highly influenced by individual, social and physical factors. Enhancing self-efficacy and gaining skills and knowledge is essential in the change towards healthy behaviour on a personal level. Furthermore, opportunity lies in creating new social norms through peer and social media influence, since individuals, and especially secondary school students, are sensitive to the social norms written by the desired social group. Moreover, a transformation of the physical environment is crucial, because the availability of unhealthy foods in this environment leads people to indulge in the temptation of unhealthy foods, which also applies to secondary school students in school environments.

06. CHANGING DIETS

This chapter explores the essential change required in people's diets. It delves into the key insights and recommendations provided by the Eat-Lancet Commission and Voedingscentrum, offering guidance to people in their change towards a more sustainable and nutritious food future. At the end of this chapter, the guidelines for a healthy school canteen will be discussed, based on the Eat-Well guide of Voedingscentrum.

6.1 A HEALTHIER AND MORE SUSTAINABLE DIET

Providing the growing world population with safe, sufficient and nutritious food from a sustainable food system is one of the most important and difficult challenges the world is facing (Hollander et al., 2017; Willet et al., 2019). Willet et al. (2019) highlights the necessity of a widespread action to effectively move towards a food system that is both sustainable and resilient: The Great Food Transformation (Willet et al., 2019), for which a shift in people's diets is necessary.

As stated in Chapter 1.1 *A failing food system,* the food system is responsible for more than a quarter of the total GHGE. However, certain types of food have a disproportionate share in this, as shown in Figure 11. Changing the consumption of meat and dairy can already be game changers. Replacing 50% of the meat and dairy intake with plant-based alternatives will lead to a 40% decrease of greenhouse gas emissions caused by the food system in the EU (Westhoek et al., 2014).

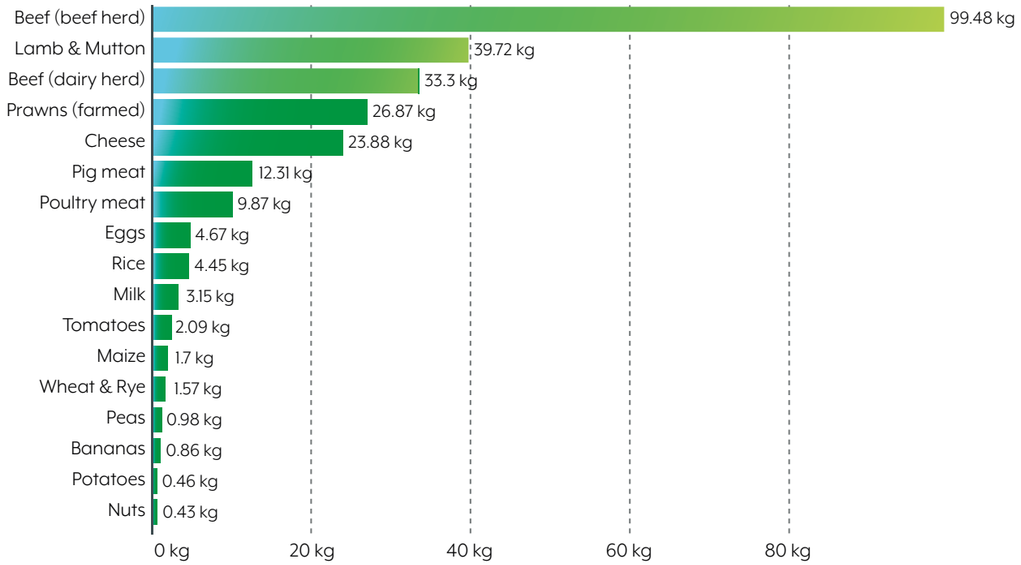


Figure 11. GHGE per kilogram of food product (Ritchie et al., 2022)
(Emissions are measured in carbon dioxide-equivalents (CO2-eq). This means non-CO2 gases are weighted by the amount of warming they cause over a 100-year timescale)

Eat-Lancet Commission

The transition from animal-based to plant-based food is also advised by the Eat-lancet commission (Willet et al., 2019). The commission does not only take into account the health of the world population, but also the planetary boundaries and social economic well-being and therefore calls it planetary health. Half of a planetary health plate should be vegetables and fruits, the other half should consist of whole grains, plant-based protein sources, unsaturated plant oils, and a small amount of animal-based protein sources, as shown in Figure 12. Furthermore, the intake of saturated fats and sugar should be limited. In Figure 13, an axis system illustrates various food categories and their impact on both the environment and mortality (Clark et al., 2019). With the advice of eating more plant-sourced food there will be a reduced risk of diseases and a lower average environmental impact.

Figure 12. A planetary health plate (Willet et. al., 2019)

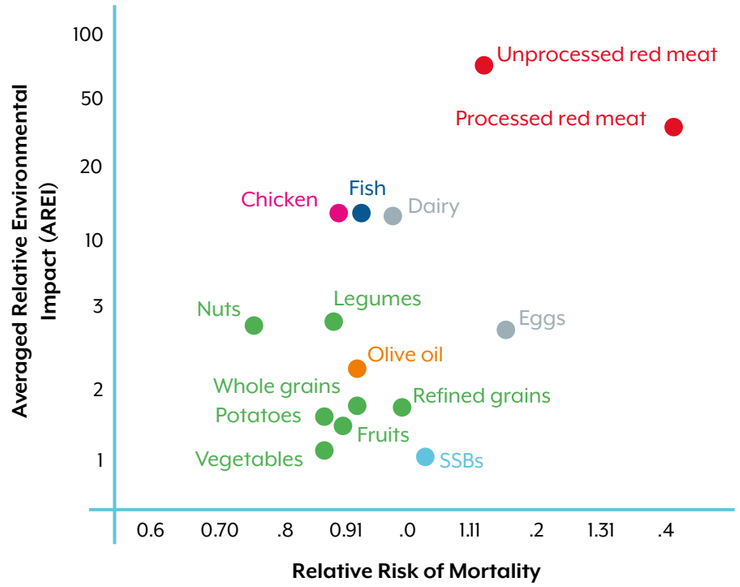


Figure 13. Association between food group's impact on mortality and average relative environmental impact (Clark et al., 2019).

6.2 THE DUTCH EAT-WELL GUIDE

In line with the Eat-lancet report, Voedingscentrum promotes guidelines for a healthy diet through the Eat-Well Guide (Dutch: Schijf van Vijf), while including sustainability as well, shown in Figure 14. Similar to the advice provided by Eat-Lancet, there is a strong emphasis on the consumption of vegetables, fruits, and other plant-based foods. The Eat-Well Guide is highly adopted by the Dutch population and is seen as one of the most trustworthy pieces of advice related to food and health in the Netherlands.

Figure 14. Eat-Well guide (Voedingscentrum, n.d.-b)

Healthy school canteens

(In Dutch: De Gezonde Schoolkantine)

Based on the Eat-Well Guide, Voedingscentrum has developed the Healthy School Canteen guidelines that will help schools improve the school canteen with different techniques to promote a healthier choice among students and teachers (Voedingscentrum, n.d.-c). An elaborate explanation of these guidelines will not be included in this report. A small overview of aspects is listed below:

- Placement of healthy products in plain sight
- Availability of fruits
- Promotion of only healthy options (within the Eat-Well Guide)
- Offering healthy snacks in vending machines
- Ratio of healthy and unhealthy products
- Healthy choice-promoting walking route

It is challenging for schools to adapt their current ways of working to these guidelines to attain a certificate, due to the lack of time, knowledge and financial resources. In addition, the absence of follow-up measurements implies that schools can have the Healthy School Canteen certificate without complying with the correct guidelines.

CHAPTER CONCLUSION

A transformation in the food system is necessary to provide the growing world population with nutritious food. A part of this transformation is a shift in people's diets. According to the Eat-lancet Commission, half of the plate should be filled with vegetables and fruits, while the other half should consist of whole grains, plant-based protein sources, unsaturated plant oils and a limited amount of animal-based protein sources. Voedingscentrum has integrated similar guidelines into the Eat-Well Guide. Additionally, Voedingscentrum has created the Healthy School Canteen guidelines to improve the food environment at schools. Given that the advice from Eat-lancet and Voedingscentrum are regarded as trustworthy perspectives, also by the Dutch citizens, these guidelines will be considered and followed in the future design process when needed.

07. TARGET GROUP

This chapter will discuss the specific target group chosen for the project, highlighting the disparities between low and high SES neighbourhoods. Furthermore, the influence of the different cultural backgrounds in this group will be elaborated on, focusing on diverse food traditions and eating behaviour.

7.1 DISPARITIES IN NEIGHBOURHOODS

The focus of this project lies on secondary school students attending preparatory secondary vocational education (*In Dutch: Voorbereidend middelbaar beroepsonderwijs* (VMBO)) in low SES neighbourhoods Feijenoord and Charlois in Rotterdam South.

This choice was made because there are notable differences between high and low SES neighbourhoods in terms of food availability and health outcomes. According to Mölenberg et al. (2021), there is a significant increase in the presence of fast food locations, particularly in low SES neighbourhoods. In addition, schools in these areas tend to have a higher number of food providers within a 5-minute radius (Locatus, 2019).

Furthermore, overweight and obesity are health risks that particularly arise among individuals with lower education levels and/or migration backgrounds (Ocké et al., 2018), as the data of Feijenoord and Charlois shows in Figure 15.

The socioeconomic health disparities are expected to increase due to financial constraints and rising healthy food prices leading to cheaper but less nutritious food choices (Ocké et al., 2018; City Deal Voedsel op de stedelijke agenda, 2021.) These constraints also contribute to high stress, which puts individuals at higher risks for unhealthy behaviour (Woodward et al., 2018).

Additionally, Azizi Fard et al. (2021) observed that higher educated people tend to have a greater awareness of the importance of a balanced diet, resulting in a more diverse intake of healthy nutrients and a smaller caloric footprint. Conversely, lower educated people consume more carbohydrates, fat and sweets, relying more on ready-made and ultra-processed foods.

PREPARATORY SECONDARY VOCATIONAL EDUCATION

A lower education level for secondary school students in the Netherlands offering theoretical and practical courses (Ministerie van Onderwijs, Cultuur en Wetenschap, 2017).

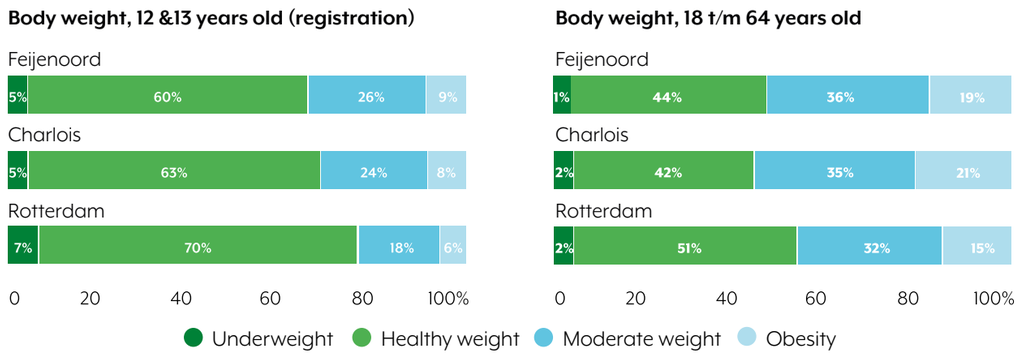


Figure 15. Weight rates of Feijenoord and Charlois compared to Rotterdam (Gemeente Rotterdam-Rijnmond, 2019).

7.2 THE MULTI-ETHNIC DNA OF ROTTERDAM

Multiple institutes recommend a national or global adoption of a standard diet that meets a healthy and sustainable lifestyle, like the planetary health diet (Eat-lancet) and the Eat-well guide (Voedingscentrum). However, sustainable and healthy eating patterns should also be culturally acceptable, taking into account the diverse norms and values of different cultural groups (FAO, 2010; Brons et al., 2020). Especially now that 'majority-minority cities', of which Rotterdam is one, are on the rise, where cultural minorities make up the majority of urban populations, each with their unique dietary practices (Crul, 2016). Figure 16 show the distribution of migration backgrounds in Feijenoord and Charlois, with significant Moroccan and Turkish populations.

Cultural influence

Turkish and Moroccan communities in the Netherlands have a different diet compared to the Dutch. These cultures stick more to religious guidelines and often consume dishes of cultural origin, emphasising halal foods, avoidance of pork, and abstaining from alcoholic beverages within the Islam. The research by De Boer et al. (2015) reveals that Turkish and Moroccan people consume significantly less alcohol compared to the Dutch. However, they consume more fruit juices and soft drinks, fruits, nuts and grain products compared to the Dutch. Moreover, meat consumption is more prevalent in Turkish and Moroccan culture, especially beef, lamb and poultry.

Apart from differences in the type of foods consumed, food carries cultural importance within Turkish and Moroccan communities. Both cultures are known for their strong tradition of hospitality, in which food holds a central position. When guests visit, serving food is customary. Leaving food untouched is considered impolite as it can be perceived as an insult to the cooking skills (Nicolaou et al., 2009). Additionally, cooking extra food is a common practice to show hospitality and have leftovers for the next day (Voedingscentrum, n.d.-d).

Research shows that people with a non-western migration background, including Turkish and Moroccan communities, have a higher risk of being overweight or obese (De Boer et al., 2015). In these communities, a large part sees overweight children as healthy and views a slightly chubby appearance as a sign of good health (Adviesraad Diversiteit en Integratie, 2013).

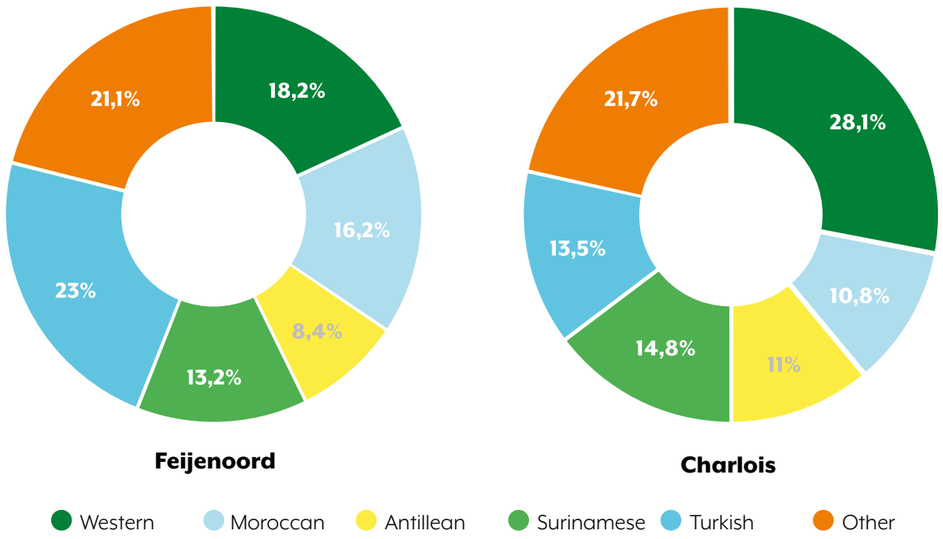


Figure 16. Migration background Feijenoord (Allecijfers, 2022a)

CHAPTER CONCLUSION

The scope of the project is narrowed down to secondary school students enrolled in preparatory secondary vocational education (VMBO). This choice is made because there are notable health disparities between people from low and high SES neighbourhoods. In addition, these low SES neighbourhoods in Rotterdam have a multi-ethnic DNA. The culture and religion of people with migrant backgrounds need to be taken into account in the project, as they have a major influence on eating patterns and the function of food.

08. FIELD RESEARCH

This chapter presents the methodology used for the field research, followed by the main takeaways that emerged. Firstly, a deep dive into the lives of VMBO students is made through observations, street encounters and in-depth interviews, offering insights into their living environment and food behaviour. After that, interviews are conducted with other actors in the food system to gain an understanding of the system and its impact on VMBO students.

8.1 UNDERSTANDING VMBO STUDENTS

Through interaction with the target group, it is possible to learn more about the behaviour, habits, values and needs of VMBO students concerning food. Engagement with VMBO students will give a clear picture of the current situation and possible bottlenecks and opportunities for change in the system.

Method

Through observations, street encounters and in-depth interviews with students from both preparatory secondary vocational education (VMBO) and higher educational levels, a better picture of the target group is formed.

Observations

Number of observations: 7
Locations: Dirk van den Broek supermarket, Albert Heijn supermarket, Zuidplein shopping mall, Crooswijkseweg, VMBO schools
Documentation: pictures and direct digital note-taking

Observations of the target group ensure that the researcher can fully engage in the world of the target group and can gather useful insights (Kouprie & Sleeswijk Visser, 2009). During the observations, attention was mainly paid to the who, what, where, and when. They were done in the purchasing context, including supermarkets and other food providers near schools and inside schools. The students were unaware of the observations to ensure they would show their normal behaviour. Pictures of the observations can be seen in Figure 18 - 20.

Street conversations

Number of conversations: 10
Locations: Dirk van den Broek supermarket, Zuidplein shopping mall, Crooswijkseweg, VMBO school, Coloured Mindplein, Bospolderplein and Zwart-Janstraat
Duration: 15 to 20 minutes
Documentation: afterward digital note-taking

Street conversations took place at similar locations as the observations and at popular youth hangouts like sports fields, play squares and the city. The districts of Charlois and Feijenoord were selected as research areas. However, some conversations were spontaneous in other districts of Rotterdam. Nonetheless, the participants were all VMBO students. During these encounters, questions were asked to dive deeper into their food behaviour, needs and preferences.

In-depth interviews

Number of interviews: 6 VMBO students, 3 higher educated students
Locations: 1 VMBO school, at home and online
Setting: face-to-face and online
Duration: 30 to 50 minutes per participant or group of participants
Documentation: audio recording and direct digital note-taking

To gather an in-depth understanding of the underlying needs and values of the target group, interviews were held with secondary school students aged 12-17, from grades two to six. The first three interviews involved higher educated students. Insights gathered on the differences between low and high educational levels in these interviews also led to the specification of the target group to VMBO students. An additional set of six interviews was conducted with the specified target group, including three one-on-one sessions and three small group sessions. Consent was obtained from the participants verbally. For individuals below the age of 16, parental consent was sought through a permission letter or a phone call (see Appendix B).

The first four interviews followed a semi-structured contextual approach including an interview guide and worksheet (Figure 17). A contextual interview gives insights into relationships with other people, emotions throughout the day and objects and services the participant interacts with (Jones & Van Ael, 2022). This approach structured the interviews and gave freedom to explore interesting topics (Patton, 2002). In addition, probing questions were used to dive deeper into the underlying needs and preferences of the participants. During the first interviews, it became clear that the worksheet did not contribute to the conversation. Therefore, the worksheets were excluded from the other interviews and the focus was put on the interview guide, fostering a more fluid and natural conversation. The interview guide can be viewed in Appendix C.

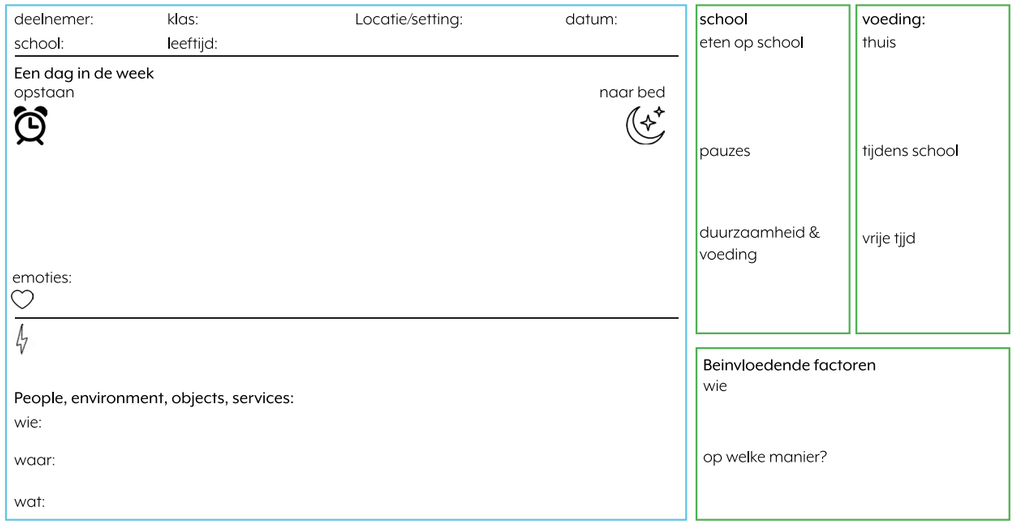


Figure 17. Contextual interview worksheet

Figure 18. Observation at Zuidplein shopping mall

Figure 19. Observation of school canteen

Figure 20. Observation of students during lunch break

Data analysis

The data of the field research includes pictures, notes, three contextual maps and nine audio recordings. To gather as many insights as possible from this data, all recordings were transcribed using Office 365 and checked manually after transcribing. Thereafter, codes were generated both using descriptive codes and In Vivo codes (Saldaña, 2013). All codes and other information were mapped out on post-its in Miro. Afterward, the information was clustered several times in an iterative way to get to themes and important takeaways.

Main takeaways

Following my friends

High school students attach great importance to their friends, as they spend considerable time with them both at school and during their free time. They often mirror the behaviour of their friends. For example, joining them for trips to the supermarket or adopting similar fashion choices.

"We always go together, never alone"
- VMBO student

I do not know it, so I do not want it

High school students attach great importance to their friends, as they spend considerable time with them both at school and during their free time. They often mirror the behaviour of their friends. For example, joining them for trips to the supermarket or adopting similar fashion choices.

At home vs. out of home

There is a notable difference in food choices consumed at home or out of home. At home, stricter rules regarding food are in place, with students having less say in it. Conversely, outside the home, there is greater freedom of choice, and secondary school students are more likely to go for unhealthy foods.

Easy and convenient

Secondary school students regularly buy products that are easy and quick to grab and share. They prefer snacks that require minimal effort and simple preparations. If a snack is too complicated, they are likely to switch to an alternative option.

Comfort food

Food serves multiple purposes for young people. Besides the nutritious value of food, they view eating as an activity that gives them mental satisfaction and comfort. This aspect often arises with unhealthy eating choices because it can evoke good memories.

We cannot go without meat

When asked about their consumption of vegetarian or meat substitute options, the initial response is that they do not even consider it. Meat is seen as an integral part of their meals, the idea of removing or replacing it is seen as incomplete and weird. This stance is rooted in the belief that meals have traditionally always been that way.

"If you do not eat chicken or meat, they will look funny at you"
- VMBO student

"Well if she becomes a vegetarian or something, I will slap her haha"
- VMBO student

Sustainability, what is that?

What emerged strongly among VMBO students was their lack of knowledge about sustainability (*In Dutch: duurzaamheid*). They often thought of expensive (*In Dutch: duur*) food rather than the environment. When familiar with the concept of sustainability, they often associate it with non-food-related activities, such as managing plastic waste or adopting green energy practices.

"Sustainability, what is that?"
- VMBO student

Social media

Secondary school students spend a lot of time on their phones and social media platforms like TikTok and Instagram, even during school breaks and class. They perform this behaviour as a pastime and to explore educational content, such as topics related to religion and fashion.

Powerful cultures

Secondary school students often feel a strong sense of connection to their culture, religion and community. Religious and cultural practices shape students' lifestyles and interactions, including their dietary preferences.

"I am Muslim, so only halal food is eaten at home of course"
- VMBO student

8.2 UNDERSTANDING THE ENVIRONMENT

As described in Chapter 4.2 *Actor mapping*, the food system of Rotterdam has multiple actors influencing the food environment and secondary school students. Interviews were conducted with caterers, school employees and parents, to gain insights into developments in the field of nutrition, health, and sustainability within schools and at home.

Method

The interaction with system actors included two telephone interviews with caterers affiliated with multiple schools in Rotterdam, one interview with a canteen lady, one interview with an education coordinator and two telephone interviews with parents of secondary school students. All these conversations were semi-structured with specific questions for each actor, as can be seen in Appendix D. Documentation was done through audio recording and direct note-taking.

Data analysis

During the telephone interviews, notes were written down to collect most information shared. The other interviews were recorded and transcribed using Office 365. Using both descriptive and In Vivo codes, the transcripts were processed (Saldaña, 2013). All information was written down on post-its and clustered in Miro. In this process of identifying themes, the main takeaways emerged.

Main takeaways

Me, myself and I

VMBO students are focused on their individual concerns and exhibit behaviour that mainly contributes to their own well-being. Occasionally, they take into account the collective interests of their friends, but their considerations generally do not extend much beyond that.

Rather lazy than tired

The general behaviour of VMBO students was mainly described as passive. It takes time and effort to get this group to work or enthuse them. Only a minority of students will proactively take action on their own.

"They offer a free activity program every week, but hardly anyone comes"
- Education coordinator

My kids need to be healthy

Parents make sure their children are healthy by including vegetables into every meal and ensuring there is fruit available at home. Additionally, children are encouraged to engage in physical exercise, although its effectiveness may vary.

"I do try to get her to go to the gym with me too, but she does not always want to"
- Mother of a VMBO student

Cheap and easy

Sustainability is not a significant concern among families in low SES neighbourhoods. Limited financial resources and a lack of knowledge lead to a preference for affordable products with a favourable quality-price ratio. Convenience plays a significant role in decision-making as well.

"I have a weekly budget and I try to stick to it as best I can"
- Mother of VMBO student

A balanced diet

Parents, schools and canteen staff emphasise the importance of maintaining a balance between healthy and unhealthy food options. Both at home and at school, there is a balanced offer of snacks and meals. Secondary school students are no longer tempted by the gastronomy industry or supermarkets and will stay at the school's property when unhealthy products are offered at school as well.

"If we do not offer it, they will go and get it somewhere else, at Zuidplein for example"
- Canteen lady

CHAPTER CONCLUSION

The field research proved to be super valuable. Through engaging in the daily lives of the target group, it became clear that secondary school students, in the midst of their development, place great importance on their friendships, cultural influences, and social media. They strive to be cool and are often preoccupied with self-image. Actors in the system emphasised that this target group has a passive attitude. Furthermore, VMBO students tend to buy unhealthy food because it is tasty, easy and they do not get it at home. While they acknowledge that unhealthy choices are not ideal for their health, they often lack knowledge about the broader environmental impact or long-term effects of unhealthy food. Both parents and schools emphasise the importance of healthy eating for children but also recognize the value of allowing indulgence sometimes. It can be concluded from the field research that it is important to make healthy and sustainable eating cool and with low effort to motivate students to make a different choice.

09. FROM RESEARCH TO DESIGN

This chapter bridges the insights obtained during the initial research phase 'discover' to the second phase 'define' of the double diamond. The Social Implication Design method is used to create the VMBO student's worldview and complementing persona. Subsequently, barriers and opportunities will be identified that led, together with the insights from the research phase, to redefining the research question. After that, the design statement and five design criteria will be presented.

9.1 WORLDVIEW

After identifying and grouping the key factors and insights on Miro, the SID method was used to establish a contextual framework around the challenge, referred to as the worldview (Figure 21)(Tromp & Hekkert, 2014). The worldview describes the development of the personal identity of VMBO students and their attitude and preferences, in combination with the function of food.

VMBO students are in the midst of their identity development, strongly influenced by their friends, cultural background, and social media. They aspire to be cool and unique, yet they fear being excluded from their social group. While they desire autonomy in decision-making, they recognize that their choices impact their social status, leading them to conform to the norm. They tend to develop their identity passively, primarily focusing on themselves. This can be attributed to their "Me, Myself, and I" mindset, which prioritises personal concerns over societal or long-term ones, conflicting with the need to focus on collective concerns to solve large societal problems like climate change and the unhealthy society.

Furthermore, food serves multiple roles in the lives of students and it is crucial to acknowledge that its function goes beyond nutrition. Food brings enjoyment and serves as a means of stimulating social connections by bringing people together. This role of food is also established throughout cultural and religious traditions. Additionally, food can be comforting and evoke a good mood.

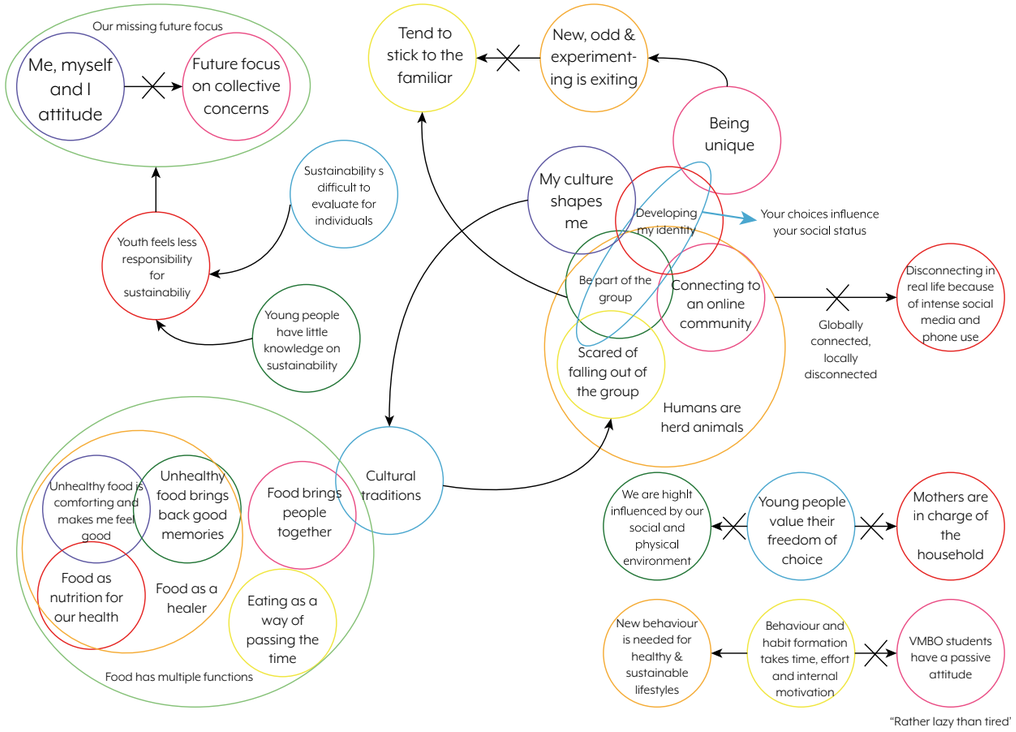
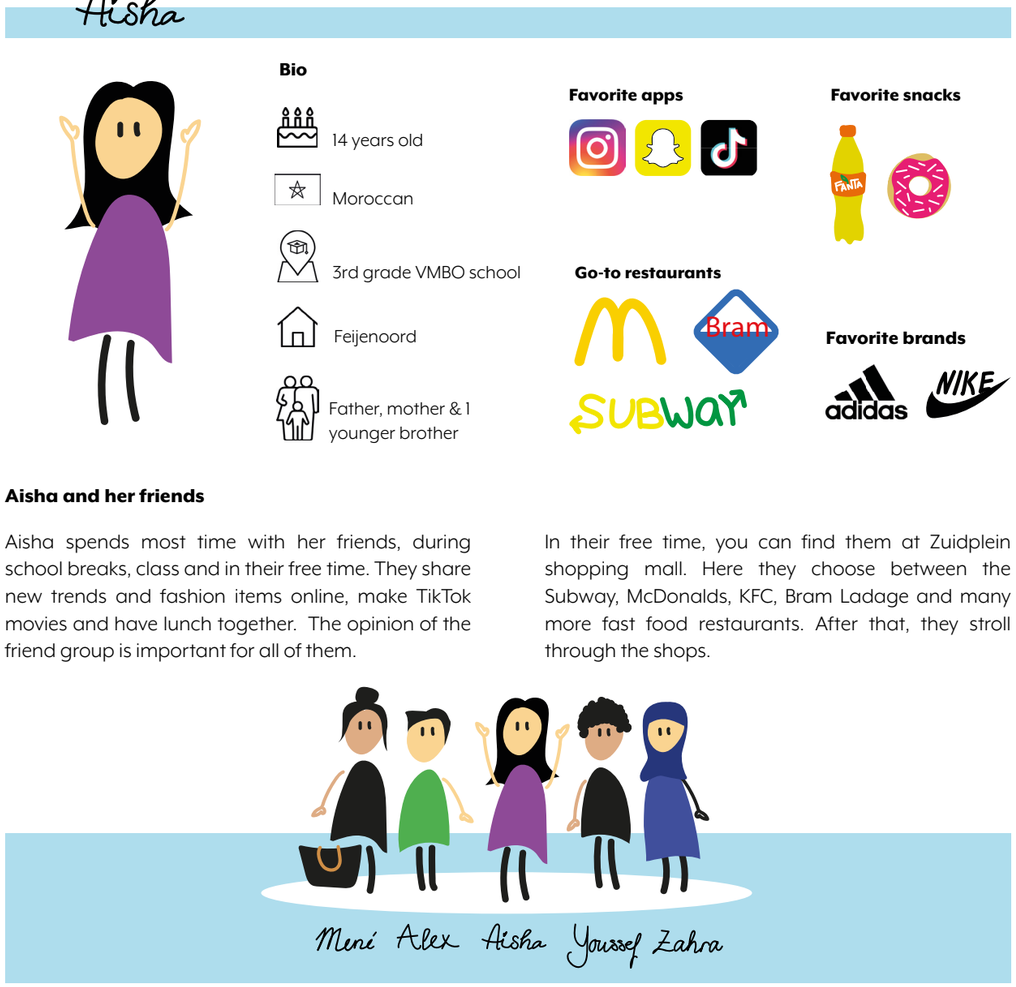


Figure 21. Worldview of the food environment of VMBO students

Persona

A matching persona of the target group is created, as can be seen in Figure 22. Personas are a visual representation of an individual matching the target group, including behaviour, values and needs. Utilising a persona makes it easier to include the target group and their lifestyle in the next design phase (Van Boeijen et al., 2013). This persona highlights the demographics, preferences and behaviour of the VMBO student.



Aisha and her friends

Aisha spends most time with her friends, during school breaks, class and in their free time. They share new trends and fashion items online, make TikTok movies and have lunch together. The opinion of the friend group is important for all of them.

In their free time, you can find them at Zuidplein shopping mall. Here they choose between the Subway, McDonalds, KFC, Bram Ladage and many more fast food restaurants. After that, they stroll through the shops.

Figure 22. Persona of the target group

9.2 BARRIERS & OPPORTUNITIES

To find areas for change, barriers and opportunities are explored.

Barriers

Obesogenic environment

In Rotterdam, the majority of the offer of food is unhealthy. This obesogenic environment fosters a culture of excessive eating and minimal physical activity leading to overweight. VMBO students are tempted by this unhealthy food environment, leading to unhealthy dietary choices.

It is not cool

Another significant obstacle for VMBO students to adopt a healthier and more sustainable diet is the perception associated with it. Currently, being a vegetarian, consuming vegetables or limited amounts of meat is viewed as different from the norm. This contradiction conflicts with the target group's desire for social status and recognition.

Distrusting the unknown

VMBO students typically prefer convenience and familiarity when it comes to their food choices. When presented with something new, they are sceptical and less willing to enjoy it. Additionally, they hold a disapproving attitude towards meat substitutes due to a sense of uncertainty regarding the ingredients and taste. This perception also prevents caterers and school canteens from offering meat substitutes, as there is an expectation that they will not sell well.

Lack of knowledge

There is a lack of knowledge regarding sustainability and the long-term effects of unhealthy food among young people. A clear difference exists between students of varying education levels, with many VMBO students being unfamiliar with the concept of sustainability.

Financial resources

In Feijenoord and Charlois, people have limited financial resources and are often constrained by a fixed budget. Consequently, their priorities revolve around factors like convenience and affordability. Although there is a desire to prioritise healthy eating, sustainability aspects are not given significant consideration.

Opportunities

Food experience

Unhealthy food is often perceived more favourably than healthy options as it is associated with moments of relaxation, enjoyment, and indulgence. By giving healthy foods a similar perception, young people may be more inclined to choose sustainable or healthy alternatives.

Culture & traditions

Secondary school students in Rotterdam South often have a deep-rooted connection to their culture and traditions, which also influences their eating habits. There lies an opportunity to reshape eating patterns in a healthier direction by leveraging these strong cultures and traditions.

Changing the offer

There is a significant opportunity to transform the food offer and environment. Supermarkets, the gastronomy industry and schools can make a difference here by changing their offer or presenting them differently. The potential lies in promoting healthy food options instead of unhealthy ones and demonstrating to retailers that they can make profit with nutritious alternatives.

Friends as motivators

Group opinions, choices and activities influence an individual's behaviour. There lies potential in popularising healthier and more sustainable dietary choices among peers and thereby fostering a sense of motivation among VMBO students to adopt such behaviours.

Enhancing the societal impact

VMBO students often prioritise their personal well-being and make choices that benefit themselves. However, they also hold a sense of loyalty and connection to their friends, peers and culture. By emphasising how their actions can positively influence the important people in their lives, VMBO students could be encouraged to engage in behaviours that are beneficial for themselves and for society.

9.3 DESIGN FOCUS

The project started with the research question:

"How can the municipality of Rotterdam stimulate secondary school students toward adopting a more sustainable and healthier diet?"

As discussed in Chapter 7, *Target group,* the decision was made to focus on VMBO students. Furthermore, through literature and field research, it became clear that sustainability is a theme about which the target group has little knowledge. Actors from the system indicated that it is important to first improve the health of people from low SES neighbourhoods before this group focuses on the aspect of sustainability. These findings lead to reformulating the research question:

"How can the municipality of Rotterdam stimulate VMBO students toward adopting a healthier and more sustainable diet?"

Context selection

In the 'discover' phase, it became evident that there are two contexts that influence the food choices of VMBO students. The first context concerns the external environment, outside of the home, in which students enjoy relatively greater freedom to make their own eating decisions. They have the autonomy to purchase food items of their choice, whenever and wherever they desire. The other context revolves around the in-home environment. In this context, parents play a leading role in shaping the dietary choices of their children. Typically, the mothers make food-related decisions, having a significant influence on the food consumed. Considering the greater independence and freedom of choice that VMBO students have outside their homes along with the temptation, the primary focus of the project will be on the out-of-home environment.

Furthermore, the decision was made to design for VMBO students themselves and to leave out the gastronomy industry and food providers after discussion with colleagues at the municipality of Rotterdam, because less designable impact can be made at that level of the system during this project.

Design statement

With use of the SID method, a design statement is formulated. This covers the behaviour the design will support, the meaning the behaviour has for the individual and how the corresponding feeling will be evoked.

"To ensure VMBO students will make healthy dietary choices, I want them to feel cool among their friends by making healthy choices tempting."

The behaviour to support

The desired behaviour is the adoption of healthier dietary choices among VMBO students, which includes sustainability without being explicitly emphasised in this particular statement. The decision was made to prioritise the health of people rather than the climate impact because there lies a greater need for improvement.

The individual benefit

By emphasising the individual benefits of the intervention in relation to their friends' perception and enhancing the social status of the target group, there is a higher likelihood the intervention will be adopted by the VMBO students.

The mechanism

The individual benefit, expressed as a feeling, is achieved by making the food choices tempting. Consequently, VMBO students keep their freedom of choice, the choice will be appreciated among friends and it contributes to the student's social status.

Design criteria

To ensure the alignment of the intervention with the target group, specific design criteria have been established. These criteria have been derived primarily from discussions with VMBO students and actors in their food environment and are supported by findings from literature.

Healthy & sustainable

The project's primary objective is to enhance the health of VMBO students in Rotterdam, while also emphasising the importance of sustainability as a secondary goal. The ultimate goal is to create an intervention that effectively showcases and supports both aspects convincingly.

Cool & fun

Their social status is very important for VMBO students. Currently, healthy and sustainable food behaviour is unappealing and unexciting. To achieve success among the target group, the intervention must be perceived as cool and fun by them and their friends.

Low effort

Considering the passive attitude and distrust of the target group, it is expected that they will make limited effort to change. Therefore, designing the intervention with minimal actions required from them is more likely to yield successful results.

Motivating

In addition to being low effort and cool & fun, the intervention should effectively inspire and motivate the target group to make healthy choices. This motivation is crucial to establish the new choices as the norm and prevent students from falling back into old patterns.

Culturally acceptable

It is important to ensure that the final design respects cultural and religious practices and does not conflict with guidelines. By acknowledging the cultural and religious considerations of VMBO students, the intervention can effectively engage and support the target group in making healthier choices.

Municipality's wish

In addition to the design criteria, the municipality has expressed a desire for the intervention. To facilitate the implementation of the final design, it is preferable for the municipality to primarily undertake a guiding role because the municipality of Rotterdam is already engaged in various ongoing programs. By delegating the leading role to another party or working with partnerships, the municipality can speed up the implementation of the intervention. The specific party to take on this responsibility will depend on the nature of the intervention and the involvement of various actors.

CHAPTER CONCLUSION

The worldview reflects the needs and preferences of the target group, emphasising the importance of their social world, both online and offline. They spend a lot of time with their friends, driven by a strong desire to belong to the group, a characteristic that also influences their behaviour and food choices. Moreover, VMBO students prove to be challenging to engage, primarily due to their passive attitude. From the worldview and prior research, areas of opportunity were identified. Consequently, a project focus is placed on improving the health of VMBO students in the out-of-house context. In addition, the design statement was formed: "To ensure VMBO students will make healthy dietary choices, I want them to feel cool among their friends by making healthy choices tempting". Any intervention should be designed to elevate their social status, to motivate the target group by expecting low effort from them and to be culturally acceptable while being healthy & sustainable.

10. IDEATION

In this chapter, the creative process of ideation will be shared, in which the idea generation and concept development process are discussed. Many ideas are generated in individual sessions, a brainstorm session with peers and a co-creation session with the target group. After that, concept directions are chosen and further developed, which leads to a final concept selection.

10.1 IDEA GENERATION

Through two individual idea generation sessions, a brainstorming session with peers and a co-creation session with VMBO students in Rotterdam South, various ideas were developed.

Individual idea generation

Through the how-to method and design drawing to develop, over 50 ideas were created individually. These ideas were then gathered and documented on Miro for the next stages of idea selection.

Peer brainstorm

Participants: 2 SPD Master students (year 1 & 2), 1 DFI Master student (year 2), 1 IDE Bachelor student (year 2)
Setting: Meeting room B-1-420, table with chairs and whiteboard
Duration: 1 hour 15 minutes
Aim of the brainstorm session: start of idea generation, outside perspective on the project, creative out-of-the-box ideas.

A brainstorming session with peers was organised to spark the idea generation. Students with different IDE backgrounds were invited to contribute to the project. Following the treehouse method, created by Veenhoff & Pater (2022), a set-up was established (see Appendix E). First, the purpose of the session was shared, a brief introduction was given and participants were introduced to each other. In addition, the design statement was shared and reflected on. Subsequently, three topics were explored using the 'how to' method.

- Make something cool
- Enthuse people
- Get a message across

The 'how to' exercises provided inspiration for the idea generation session, in which participants were encouraged to generate as many ideas as possible within two rounds of five minutes. Afterward, the ideas were gathered and organised into clusters using the Rapid Map technique (see Figure 24) (Veenhoff & Pater, 2022), which facilitated a short discussion on the most promising ideas. With the Rapid Map technique, participants' two best ideas are collected and clustered right away. Other ideas are added to the Rapid Map afterward. The session ended with a brief advice from each participant regarding possible next steps.

Figure 23. Impression of brainstorm session with peers

Figure 24. Rapid Map peer session

Co-creation VMBO students

Participants: four VMBO students, female, between the age of 13-16
Setting: Classroom, multiple small groups of tables and chairs and a whiteboard (see Figure 25)
Aim of the co-creation session: developing ideas that fit the target group and their needs and preferences. Additionally, get a better understanding of what will motivate them to make healthy food choices.
Duration: 1 hour 15 minutes

By facilitating a co-creation session with VMBO students, ideas that fit their specific needs and preferences are developed. For this session, VMBO students who previously participated were contacted. The session started with four students, the youngest of whom clearly had no interest and showed disruptive behaviour. Eventually, the session continued with three girls. Parental permission was sought through a Whatsapp message, as the brainstorming session was organised at short notice.

To create an appropriate set-up, a meeting was held with Mathieu Gielen (expert in co-creation with children). A fitting set-up is important because this target group has no experience with design. The session set-up, a tailored version of the treehouse method (Veenhoff & Pater, 2022), can be seen in Appendix F.

The session started with a brief introduction, highlighting the session's topic, purpose, and the planned activities. To introduce all participants and create a comfortable atmosphere, an icebreaker activity was used where everyone shared their choice of snack from a range of options and explained their choice. After this, the topic of (un)healthy food was explored, leading to the creation of a Mind Map (see Appendix G.1). To familiarise participants with the concept of designing, another Mind Map was generated, focusing on communication (see Appendix G.2).

With the participants warmed up and actively engaged in thinking about healthy eating, the next step was the idea generation. This was done in two seven-minute rounds, using the Picture brainstorm and Word associations tools, as illustrated in Figure 26. The first is a tool to visually inspire participants during the idea generation, while the latter inspires children who are more language-oriented thinkers. Both tools stimulate different idea directions, causing a large variety of ideas from different perspectives (Your Turn, n.d.). Again, the ideas generated were gathered in a Rapid Map (see Figure 27). Subsequently, the ideas were discussed and the session concluded with an evaluation of the ideas generated during the peer brainstorming session.

Figure 25. Classroom set-up

Figure 26. Picture Brainstorm and Word Associations

Figure 27. Rapid Map co-creation session

10.2 FROM IDEAS TO CONCEPT DIRECTIONS

After the idea generation sessions, all ideas were gathered and clustered in Miro with several iterations. Additionally, the ideas were visually arranged in a C-box (Van Boeijen et al., 2013). In this method, ideas are plotted along two axes: the x-axis represents the feasibility of the ideas, while the y-axis represents the newness. To fit the C-box with the design statement and target group, a change on the y-axis to coolness was made (see Figure 28).

The placement of an idea on the axes was based on insights from the field research and discussions held during the co-creation session with the target group.

Three promising concept directions were ultimately identified:

- Using role models and social media
- Creative use of public spaces
- School events

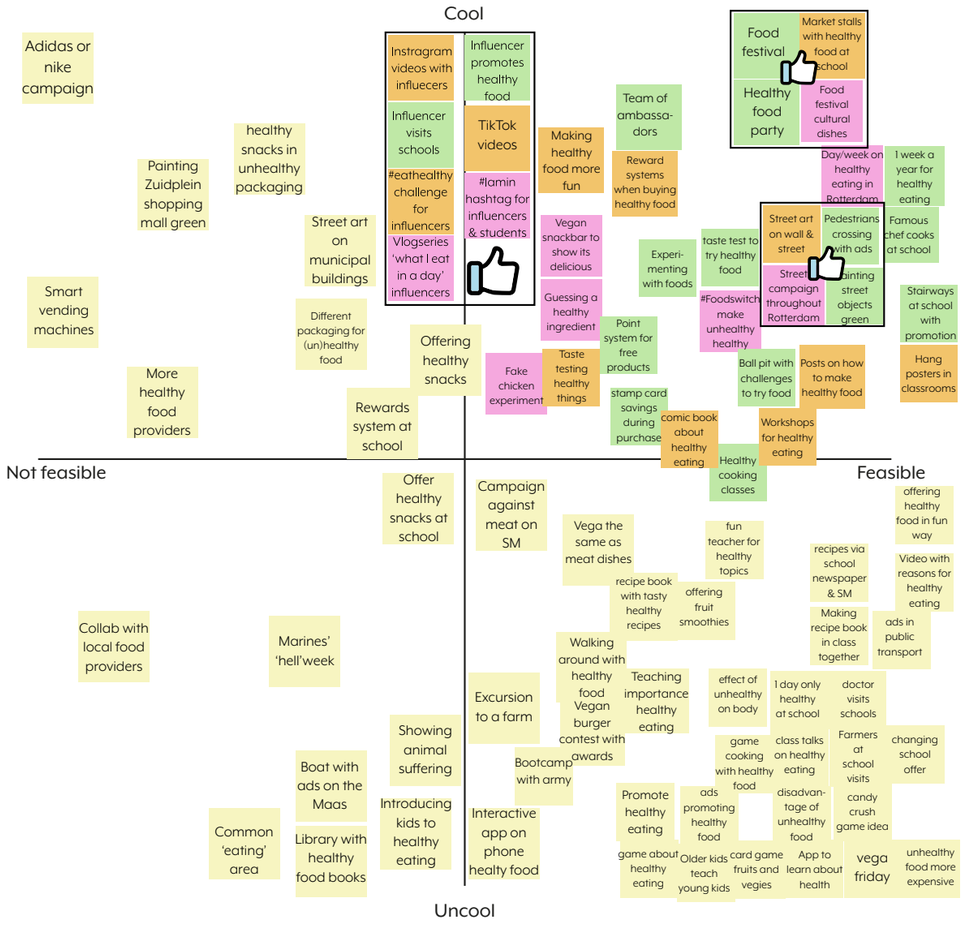


Figure 28. C-box method

Using role models

Concept direction 1 focuses on leveraging the power of role models through social media. By demonstrating to the target group that influencers make healthy choices, a sense of coolness is evoked among the students. Additionally, making use of popular social media channels will reach a broader audience.

Figure 29. Concept direction 1: Use of role models

Creative campaign in the public space

Concept direction 2 puts focus on public spaces. By promoting healthy food choices through art in public spaces, students are influenced during everyday activities and walks through their neighbourhoods.

Figure 30. Concept direction 2: creative campaign in the public space

School event

Concept direction 3 covers a food festival at school. During the festival, market stalls are set up where students can taste healthy and sustainable food. By actively engaging the students in the preparation and tasting of food, they will gain knowledge on how to prepare healthy food and experience the fun and tasty side of it. It also emerged from the co-creation session with the students, that tasting makes them curious and willing to try new things, especially when fellow students lead in this behaviour.

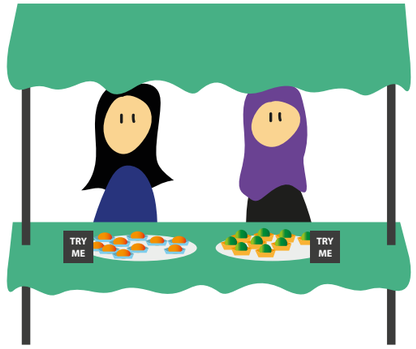


Figure 31. Concept direction 3: Food festival at school

10.3 MERGING CONCEPTS

After evaluating the concept directions with the municipality of Rotterdam, the directions were merged into two concepts. In the 'discover' and 'define' phases of the project, it became clear that the use of role models will have a positive effect on the interest and behaviour of the VMBO students. Therefore, concept direction 1 is merged with both directions 2 and 3 into concept A: 'Eat smart, play hard' and B: 'Eat to your Beat'.

Eat smart, play hard

In this concept, a combination of online and offline marketing channels is used to motivate the VMBO student to make healthy dietary choices. In the offline world, the student will be attracted through art that will bring across the message of eating healthy in a fun and cool way. The murals show healthy food products displayed colourfully and temptingly. The art piece is made interactive by adding a QR code and space for taking photos. Students will be triggered to take a picture with the art piece and share it online. Through the QR code, they have the opportunity to learn more about the art piece, the message behind it and the supporting campaign. The street art is created by street artists in collaboration with VMBO students from schools in Rotterdam South and is located close to schools, shopping centres and public transport locations. By making use of public spaces, people passing by will also be influenced by the mural.

The online channel is used for a social media campaign promoting the same message as the offline channel does. The campaign is made cool and fun by partnering with an influencer. It is important to collaborate with an influencer who is popular among the target group and who is internally motivated to contribute to the promotion of healthy food for the content to be trustworthy.

The on- and offline channels are brought together through a challenge. Paintings of golden healthy food products are incorporated in murals. When students find one of the objects, they can take a picture of it, post it on their Instagram or TikTok and tag the campaign account and influencer. By posting the picture, the VMBO student has a chance of winning a meet & greet with the influencer, a voucher for a free healthy lunch or a recipe book with healthy dishes. This challenge can be repeated with different healthy products to make the challenge last longer. Through this challenge, the message spreads quickly and more children will be introduced to the concept.

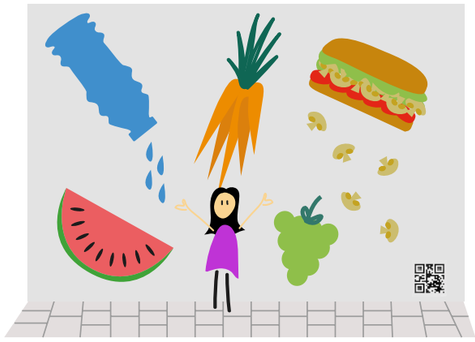


Figure 32. Concept A: interactive mural & Online challenge of finding the golden object

Eat to your Beat

The second concept puts focus on the experience of healthy foods. ‘Eat to your Beat’ is a food festival organised at schools where VMBO students experience healthy foods in a fun and interactive way. At the event, market stalls are placed in the school canteen, where students can taste healthy sustainable food while enjoying music and chilling with friends.

To make healthy food tempting to the target group, a part will be prepared by a well-known Rotterdam chef. The other part of the food is prepared by the students themselves. With the combination of catered food and self-prepared food, the students will experience and try new unknown dishes and gain skills and knowledge in preparing healthy foods. As stated in Chapter 9.3 *Design focus,* design interventions should be culturally acceptable. Therefore, the students will be encouraged to cook healthy and plant-based dishes related to their cultural background and religion.

A cooking contest will be held to attract more students to attend the festival. In the days before the event, the students will be guided by teachers in their cooking classes to prepare healthy and sustainable dishes. During the food festival, the food will be tasted and judged on healthiness, originality and presentation by a jury consisting of the chef, the teacher and an influencer. The partnership with an influencer will increase the popularity of the event among school students. Social media accounts and school channels are used to announce the event and to get students excited about the food festival.

To make sure healthy choices are made over a longer period, ‘Eat to your Beat’ will be the start of the ‘Eat healthy-week’ at school. School canteens and caterers will be motivated to offer only healthy food to nudge the students into making healthier choices.

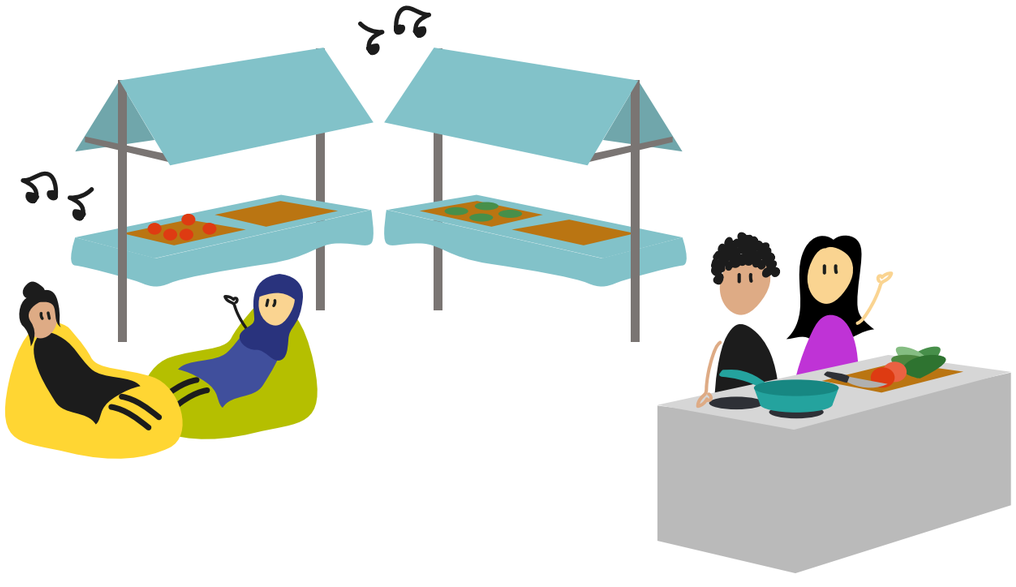


Figure 33. Concept B: food festival at school and cooking competition

10.4 CONCEPT SELECTION

A list of criteria has been drawn up to ensure that both concepts are developed at the same level. After that, the criteria are used as the basis for the Harris profiles to make a concept selection between the concepts, which can be seen in Figure 34. Harris profiles are a visual representation of the strengths and weaknesses of design concepts and are used to evaluate and select concepts. It is an easy way to quickly view and compare all concepts (Van Boeijen et al., 2013).

The Harris profiles indicate a similar scoring for both concepts. Through discussions with various stakeholders it has been revealed that actively involving the VMBO students through concept B ‘Eat to your Beat’ will have a greater impact on long-term behaviour change and increase skills and knowledge about healthy food more compared to concept A. However, the stimuli created in concept A will last longer and recur more frequently in the daily lives of the VMBO students, unlike the food festival does. Another strength of concept A is the power of changing the streetscape and making healthy food visible for entire neighbourhoods. Considering these factors and after discussion with the municipality of Rotterdam, the decision is made to combine both concepts into one implementation roadmap.

Criteria	Concept A: Eat smart, play hard				Concept B: Eat to your Beat			
	− −	−	+	+ +	− −	−	+	+ +
Cool & Fun (design criteria H.9)			■	■			■	■
Motivating (design criteria H.9)		■					■	■
Low Effort (design criteria H.9)			■			■		
Healthy & Sustainable (design criteria H.9)			■				■	
Culturally acceptable (design criteria H.9)			■				■	
Added value to coolness of the individual (fit with design statement)			■	■			■	
Healthy choices are tempting (fit with design statement)		■					■	
Intervention works over long period of time			■	■		■		
Intervention causes behavior change for a long period of time		■					■	
Possible costs of intervention are low	■	■				■		
Reach in lives of secondary school students			■	■		■		
Municipality takes on a guiding role (Client's wish)			■				■	

miro

Figure 34. Harris profiles

CHAPTER CONCLUSION

During the ideation process, multiple sessions were conducted including a co-creation session with the target group. This brought new ideas and valuable knowledge on motivations of the target group. Through the C-box method, three concept directions emerged, which were combined into two concepts. Concept A ‘Eat smart, Play hard’ focuses on the creative campaign through both online and offline channels to provide continuous stimuli in the daily lives of VMBO students and alter the streetscape with street art. Concept B ‘Eat to your Beat’ involves the active engagement of the target group in the preparation and tasting of healthy foods during a food festival at school. Both concepts leverage the power of role models. After discussion with the municipality and scoring the concepts in Harris profiles, both concepts are further developed into one final concept with a roadmap, which is presented in the next chapter.

11. FINAL CONCEPT

This chapter provides an in-depth exploration of the final concept. At first, a storyboard will be used to illustrate the functional elements and interactions from a user perspective. Subsequently, the roadmap for the implementation of the concept will be presented, followed by an elaboration on the stakeholders and their roles, the actions required for the municipality, and the value exchange map. The chapter concludes with an evaluation of the concept at the individual, social, physical and macro levels of the food environment.

In the final concept, the strengths of both concept elements ‘Eat smart, play hard’ and ‘Eat to your beat’ are bundled together. The focus of the concept lies on the active engagement of VMBO students in both the offline and online world.

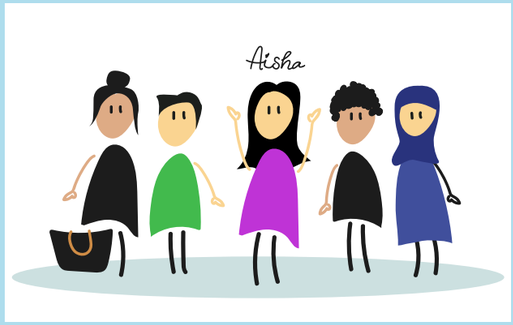
In the offline world the target group is inspired and activated during a food festival at school and all activities connected to that day such as the cooking classes before to the event and the ‘Eat healthy-week’ afterward. Furthermore, street art is created in collaboration between artists and students throughout Rotterdam South to inspire the VMBO students. The street art influences the students during their everyday lives and changes the streetscape from unhealthy to healthy temptation.

In the online world the students are motivated through a social media campaign and challenge. The social media campaign is created in partnership with an influencer and runs through Instagram and TikTok. The aim of the challenge is to find golden food objects incorporated into the street art to win items. This challenge will spread the message further online and introduce more children to the concept.

Figure 35. Final concept: ‘Eat to you Beat’ and ‘Eat smart, play hard’

11.1 STORYBOARD

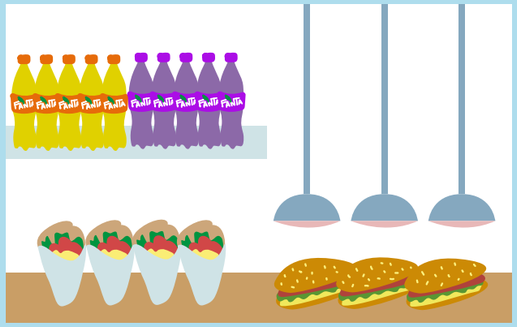
The concept is explained in a narrative style using the storyboard on the following pages, highlighting the roles of various stakeholders. In addition, it points how the concept resonates with the target group. The story revolves around a VMBO student, her friends and a teacher, adding a personal dimension to the narrative.



Meet Aisha, a 14-year-old girl who lives with her family in Feijenoord, a neighbourhood in Rotterdam South. Her parents came to the Netherlands from Morocco 20 years ago. Aisha is in the 3rd grade of a VMBO school, just like her friends. From dawn till dusk, Aisha spends a lot of time with them, whether at school or in their free time.

Everyday, Aisha walks to school. It is a short 15 minute walk through her neighbourhood. On her walk, she passes Zuidplein, a big shopping mall with fashion stores and many fast food restaurants. Many of Aisha’s friends walk to school or go by public transport, with Zuidplein as the main stop.

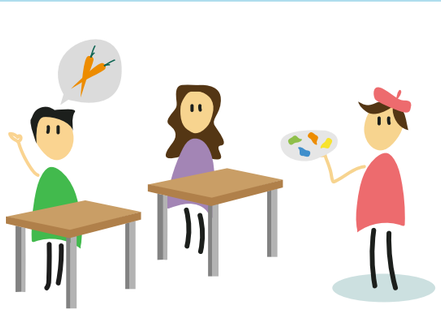
Aisha consistently attends her classes, but the subjects do not always interest her. She is often distracted by her friends, stuff in the classroom or things happening outside. She spends a lot of time on her phone, scrolling through Instagram and TikTok. She follows many fashion brands, influencers and food accounts on social media.



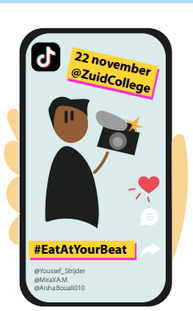
After the first classes, it is time for lunch. At School, it is normal to buy lunch from the canteen. Only a few students bring food from home. Aisha‘s favourite is the chicken burger and a bottle of fanta. Other best-sellers in the school canteen are the Turkish pizza, shoarma sandwich or chocolate bars. All children love soft drinks as well. Water is not so exciting and the healthy sandwiches are presented less tempting in the canteen.

The best part of the day is mentor hour. During this class, news is shared and this time Aisha's teacher announces something really fun. In 3 weeks, the 'Eat to your Beat' food festival will take place at school. It's a day dedicated to healthy and delicious food. There will be food to taste, music and a famous influencer. To prepare the students for the cooking competition, healthy food will be the topic of the coming cooking classes prior to the event.

Aisha and her friend Youssef talk about the food festival. They heard from their mentor that a cool chef and one of their favourite influencers from Rotterdam will be at the event. If they participate in the cooking competition and win, they will get a meet & greet with them! This gets them excited and ideas start rolling for different dishes and snacks. Aisha & Youssef decide to sign up for the competition together.



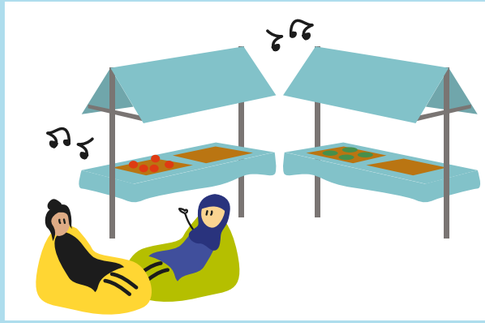
The last class of the day is art class, and today is exciting because the students are working together with a street artist on a project. The theme for the day revolves around healthy food. In co-creation with the artist, the kids will create artworks of healthy foods, which shows the students that healthy food can be tasty and fun. Eventually, the artist will transform these artworks into a real mural, and the students will get the chance to help painting!



At night, while laying in bed, Aisha scrolls through her TikTok feed and sees a post of her favourite influencer. The post is about the 'Eat to your Beat' food festival taking place at her school soon. She immediately likes and shares the post with her friends. More and more of her classmates are talking about the festival, everyone is excited!

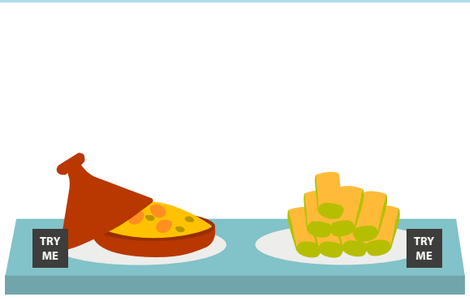
The next day, the teacher is preparing the food festival. As schools have little time for extra activities, the municipality of Rotterdam takes on a leading role. Schools can easily rent the festival package through the 'Eat to your Beat'-landing page, linked to the Lekker Fit! initiative. They only need to provide the date, location and number of visitors. The municipality takes care of the rest! By offering the total package, more schools can organise 'Eat to your Beat'.

During the next few weeks in cooking class, Aisha and Youssef start preparing their dishes. The cooking classes provide great practice for the food festival. Together with her friend and with their teacher's help, Aisha explores this new field of tasty, healthy and sustainable food. She gains knowledge and skills in how to prepare the food, which she can use for the cooking competition but also at home!



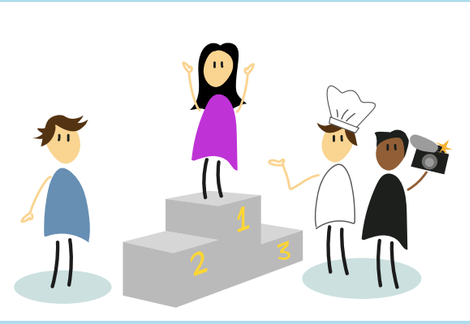
It's the day of the food festival! Aisha's school is hosting 'Eat to your Beat' and the auditorium is buzzing with excitement. There are a bunch of market stalls where you can try out food. There is a chill-out area where you can relax and enjoy some music or strike poses in front of the photobooth, while others are chilling on bean bags. It's a day filled with good food, good vibes, and great company.

In addition to the students' own creations, there is also plenty of fancy and unfamiliar food to try. This is prepared by a well-known chef from Rotterdam. He is a true Rotterdam fan with a passion for food. At 'Eat to your Beat' he introduces the kids to healthy and plant-based food in a fun and cool way.

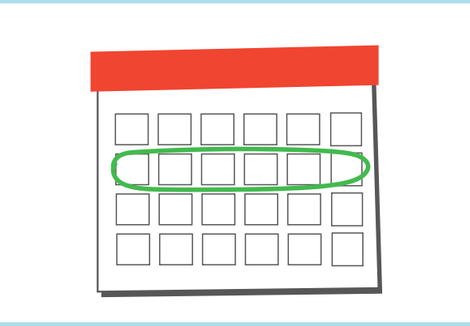


Aisha has a Moroccan background, as do many of her fellow students. Rotterdam South is home to a large mix of cultures. To make everyone feel at home at the food festival, the students are encouraged to prepare a dish that is commonly eaten in their culture. Aisha has prepared a tajine, while Mohed brought a healthy version of baklava.

The food festival is packed with students and family & friends. This is definitely due to the arrival of the fun influencer! Every student wants to meet and take a picture with him. The influencer has a powerful role towards the school students, since they often copy his behaviour. With him at ‘Eat to your Beat’, healthy food just got a lot cooler!



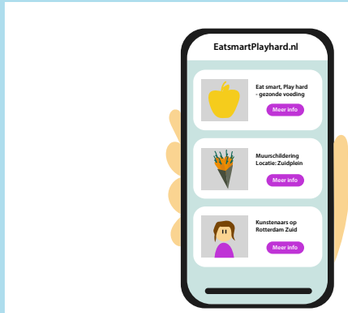
At the end of the afternoon, the snacks and meals prepared by the students, are tasted and judged by the jury. The judges are the cooking teacher, the chef and the fun influencer. Aisha takes the win with her Moroccan tajine! Super cool, because next week her dish will be sold in the school canteen for everyone to try.



The food festival has come to an end. The day was a great success, where the children gained knowledge and skills on healthy eating. There was a lot to do and taste. To keep the healthy choices going, ‘Eat to your Beat’ kicks off a ‘Eat healthy-week’ at school. The coming week, only healthy food will be offered in the school canteen. Organisations like Voedingscentrum and Lekker Fit! will offer the schools guidance for this week.

After the festive day, Aisha is chilling on the couch at home. She scrolls through Instagram and TikTok when she sees a post from the influencer she met today. He is posing smiling in front of a colourful mural. In the picture, there is a shiny golden apple with the hashtag #EatsmartPlayhard. Aisha’s attention has been caught and she is curious about the post and the mural.

A few days later, Aisha and her friends pass the same mural as the influencer posted about. She recognises some of the drawings her classmates made during art class! Delicious fruits and veggies are painted all over the wall. There is a spot in between the food to strike a pose. Super fun, now she can share this on her TikTok feed!



With her phone, Aisha scans the QR code at the bottom of the mural and is directed to a website. There, Aisha finds information on the mural, its meaning and who created it; her classmates! There is also information on a social media campaign with one of her favourite influencers

Scrolling further, she reads some information on the golden objects she kept seeing online as well. It turns out it is an online challenge where students can win cool things! Aisha joins the challenge by posting a picture with the golden apple with the hashtag #EatsmartPlayhard on her Instagram story!

11.2 ROADMAP

To have an overview of all elements and activities connected to the design interventions and to capture the timespan in which the implementation can take place, a roadmap is created for the municipality of Rotterdam (see Figure 36). A roadmap is a visual representation of design innovation elements along a timeline. It helps to put the implementation of new products and services into context to reach an organisation's future vision (Simonse, 2017). A detailed version is included in Appendix H.

The horizons

The roadmap is divided into three horizons, each representing one year. Every horizon contains a part of the concept, activities for the municipality and necessary resources. The concept grows across the horizons, delivering impact and value to the vision of the municipality of Rotterdam of creating a vital city and improving the health of its citizens.

Horizon 1 focuses on laying the foundations of the concept. Within the municipality, Lekker Fit! will be appointed as the team to pull the project. In addition, the partnerships with valuable stakeholders are laid and the logistical actions are carried out. At the end of the first horizon, the first mural is realised and two food festivals are held. The target group in this horizon includes VMBO students living or attending schools near Zuidplein shopping mall.

In **horizon 2**, the concept is further expanded. The online channels go live and the online campaign is launched in collaboration with the influencer. It also marks the start of the first online challenge. In addition, improvements are made to optimise the upcoming events based on the outcomes of those held in the first year. The target group is broadened to VMBO students living or attending schools in Rotterdam South.

Horizon 3 is the year for optimal execution of the project. Because all components have now been executed at least once, new partnerships can be established in horizon 3 and the challenge can be repeated. Furthermore, the target group is expanded to VMBO students living or attending schools in the whole of Rotterdam, which not only broadens the target group, but also the possibilities with it, like the collaboration with design schools.

Stakeholders & their benefits

The concept involves partnerships with multiple stakeholders that differ in their contribution to the concept. The stakeholders are divided into three categories:

- **Main stakeholders:** crucial for implementing the concept
- **Secondary stakeholders:** essential in the concept with a small role in setting up and implementation
- **Optional stakeholders:** improvement of the concept, but not necessary for execution

Main stakeholders

VMBO students

The target group of the project is VMBO students. They will be introduced to the topic of healthy eating in a way that takes little effort for them. Through various activities related to the food festival, street art and online challenge, VMBO students are inspired to adopt healthier eating patterns in a cool and fun way. Additionally, they will gain skills and knowledge about healthy food and consequently improve their health.

Municipality of Rotterdam

The municipality takes the lead in executing the concept. They arrange the logistics and partnerships with and between other actors involved, leading to valuable connections. The municipality can offer multiple schools the opportunity to introduce their students to healthy food, minimising the burden of organisation. On top of that, the municipality provides the necessary funding. In return, VMBO students will make healthier dietary choices and the streetscape of Rotterdam will inspire many people to choose healthy in an appealing way, and thereby improving the health of Rotterdam's citizens.

Lekker Fit!

Lekker Fit! will lead the project within the municipality and support the project in various ways. First of all, the valuable network of Lekker Fit! provides access to schools, Feyenoord and welfare organisations WMO radar and SOL (Samen Ondernemend Leren). Additionally, Lekker Fit! offers expertise to schools for a healthier environment, hosts rental and information pages on their website, and brings in a bigger budget at the municipality. The main motivation for Lekker Fit! to join is the improved well-being of young people in Rotterdam.

JOGG

JOGG will take partial ownership of the concept together with Lekker Fit!, with the possibility of expanding the concept to additional municipalities. Subsequently, the organisation can bring in expertise to help schools in their journey toward becoming a healthy school. The partnership will substantially increase the support and exposure of the concept, resulting in a healthier young generation.

Schools

Schools are key stakeholders in the concept, since the food festival 'Eat to your Beat' is hosted at different schools in Rotterdam. To relieve schools from the burden of organisation, the municipality will handle logistics and partnerships. Schools promote the festival to the students and organise the event during the day itself. In addition, teachers will integrate healthy eating into their cooking and art classes, inspiring the students. This approach improves schools' skills and knowledge in providing healthier food and it improves students' well-being.

Street artists

Partnerships with multiple street artists will be established throughout the horizons for creating the street art. The concept is a way for artists to express their creativity and brighten up gloomy buildings. Moreover, they can guide the collaboration with students through co-creation sessions.

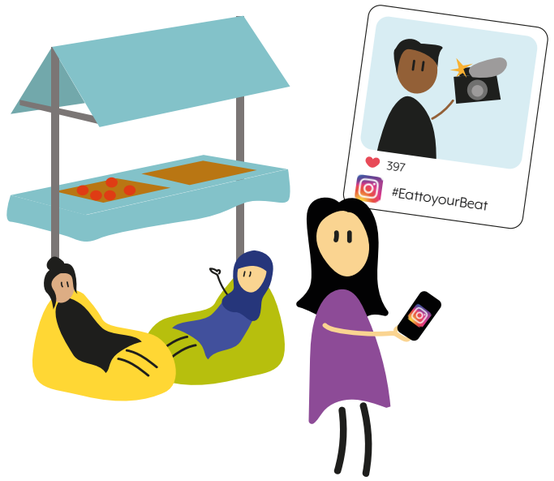
ROADMAP	2024	2025	2026
	Laying the foundation	Growing the concept	Optimising the performance
Target goup	VMBO students going to school and living nearby Zuidplein	VMBO students in Rotterdam South	VMBO students in Rotterdam
Design intervention			
Activities: Eat to your Beat	Partnerships stakeholders; Developing landing page; Renting food festival packages	Connect more schools; +2 schools connected; 4 food festivals	Connect more schools; Property permission; 6 food festivals
Activities: Online channels	Developing landing page; Partnership influencer; Social media accounts & preparation	Launch social media; First online challenge; Post on social media	Partnership 2nd influencer; 2nd online challenge
Activities: Eat smart Play hard	Partnerships schools & artists; Property permission; First mural	Partnerships schools & artists; Property permission; 2nd mural	Partnerships design schools & artists; +2 schools connected; 3rd mural
Resources: Partnerships	VMBO schools; Chef; Voedingscentrum; Influencer; NPRZ; JOGG; Street artist; ACOR & CBK; Property owner	VMBO schools; Influencer; Street artist; Property owner	VMBO schools; Street artist; Design schools; Property owner
Resources: External companies	Bureau voor de Boeg / Cipix; Content creator; Photo & videographer; Light & sound company	Content creator; Photo & videographer	Content creator
Resources: Internal people	Lekker Fit!; Marketing & campaign expert; Content creator	Content creator	Content creator

Figure 36. Roadmap for implementation

Secondary stakeholders

Creative students

A collaboration will be formed between street artists and students to create the street art, fostering a sense of ownership among the target group and introducing them to healthy food early in the concept journey. In the first horizon, the focus lies on VMBO students in Rotterdam South near Zuidplein, making it possible to collaborate with schools in that specific area. In horizon two, schools further north in Rotterdam South can participate. In the third horizon, as the concept expands city-wide, collaboration with VMBO schools like Rotterdam Designcollege and Grafisch Lyceum Rotterdam becomes possible.

Influencers

In this concept, influencers have a powerful role. They will promote and attend parts of the concept, boosting its popularity. In return, they receive better exposure, resulting in more followers and likes on social media. To maintain credibility, it is important that the message of promoting healthy dietary choices aligns with the influencer's lifestyle. There are two categories to consider. The first includes social media stars, followed by many young people. However, the promoted message in the concept is less in line with their current motivation and posts, and they are relatively expensive. The second category are famous athletes, known for their sports performances and who use social media to gain popularity. The message of eating healthy fits well with their lifestyles, although they are less popular among the target group.

Chef

The chef plays a role as a stakeholder in this concept, offering inspiration to the target group. In a creative and fun way, the chef exposes the target group to new and nutritious food.

Property owners

Permission needs to be obtained from property owners, since not all buildings suitable for the concept are owned by the municipality. In return, the property is given a boost with the street art.

ACOR & CBK

There are rules for placing art in public spaces in Rotterdam. Within the municipality, the Advisory Committee Public Spaces (In Dutch: Adviescommissie Openbare Ruimte (ACOR)) advices on art in public spaces. Additionally, the Visual Arts Centre (In Dutch: Centrum Beeldende Kunst (CBK)) decides on new projects and their locations.

Light & sound company

To create an exciting atmosphere at the 'Eat to your Beat'-festival, a light & sound company will arrange the necessary hardware.

Market stall company

Just like the light & sound company, market stalls need to be bought or rented for all events.

Optional stakeholders

Voedingscentrum

Voedingscentrum is the ideal partner for providing knowledge to schools and students on achieving better health, through expertise and recipes. Voedingscentrum includes the Eat-well guide and offers advice that embraces diverse cultures. This partnership enhances the support and exposure of the concept, ultimately contributing to improved well-being among individuals and a better food environment.

National Programme Rotterdam South

The municipality of Rotterdam collaborates with the government, businesses, and various organisations in the National Programme Rotterdam South (In Dutch Nationaal Programma Rotterdam Zuid (NPRZ)) to improve the prospects and well-being of citizens in Rotterdam South. The program focuses on education and culture among other things, which aligns well with the concept. Collaborating with the NPRZ will increase the support and exposure of the concept.

Family of VMBO students

Family of VMBO students and other citizens of Rotterdam can be targeted through the off- and online channels to further broaden the target group. By inviting families to the 'Eat to your Beat'-festival, the promotion of healthy food choices can extend from the outside the home to the in-home environment. Furthermore, the street art will capture the attention of pedestrians, promoting healthier dietary choices among more individuals.

School canteen or caterer

Through the food festival, school canteens or caterers can be involved. As a result, the entire school canteen is encouraged to provide healthier options. This will be of value in the 'Eat healthy-week' after the food festival.

Municipality's action

The activities to implement the concept are divided into three categories for the municipality of Rotterdam. One person from Lekker Fit! should be appointed to start with the project, cover the first activities and delegate actions to others.

- Partnerships
- Online channel: activities regarding social media, landing page and online challenge
- Logistics

Partnerships

The concept largely builds on partnerships with various stakeholders, which is important for both the online and offline components. The municipality of Rotterdam can set up these partnerships through contacts established during this project and through already existing programs.

Online channel

To complete the online elements, external software developers, content creators, and photographers are essential. An internal marketing expert should be selected as well, ideally with prior experience in Gezond010 or Lekker Fit!. In addition, an employee should be appointed to maintain the social media accounts and online challenge.

Logistics

Logistics for both the street art and the food festival need to be arranged. The municipality should research the best locations and permission for the murals in collaboration with the street artists. Furthermore, agreements should be made with companies for light & sound and market stalls and necessities such as beanbags and decorations should be bought.

11.3 VALUE EXCHANGE MAP

An important part of the implementation, which shows part of the viability of the concept, is the value exchange map, visible in Figure 37. In this map, monetary and more tangible values are presented together with non-measurable values. The three categories of stakeholders are illustrated in different colours in the value exchange map.

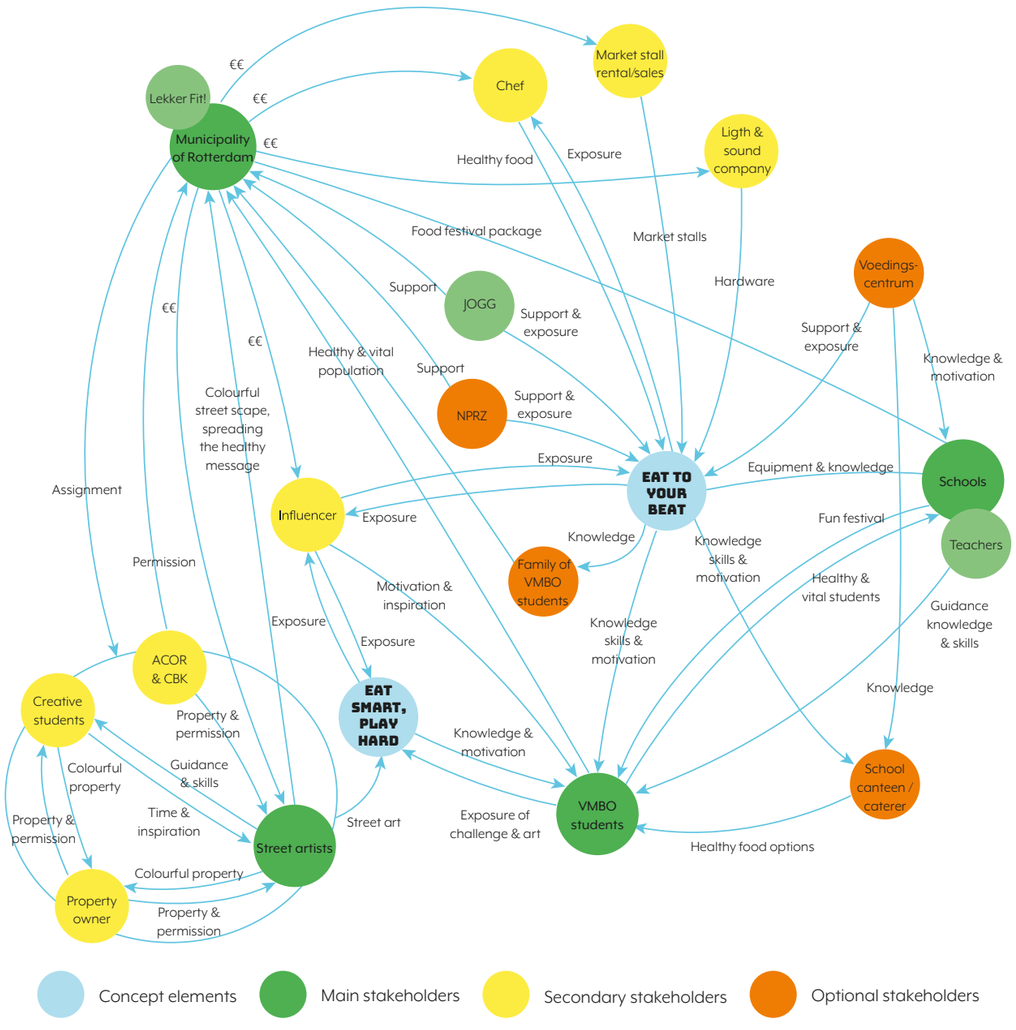


Figure 37. Value exchange map

11.4 IMPACT PER SYSTEM LEVEL

To determine the impact of the concept, all four levels of the food environment are evaluated, as can be seen in Figure 38. This is done with the Ecological Framework of Story et al. (2008) as described in Chapter 5.2 *Three levels of behavioural influence*.

Individual factors

The design interventions have an impact on various individual factors of the VMBO student. Engaging in cooking classes and participating in the food festival equips students with the knowledge and skills to identify and prepare healthy food, thereby increasing their self-efficacy and belief in their abilities. Furthermore, their attitude towards healthy eating will improve due to the fun and engaging experiences offered by the food festival and street art.

Social environment

As explained earlier, including a social aspect in the concept is of important value, especially for this target group. By engaging role models, the social norm can be changed, which will lead to the adoption of the desired behaviour among the target group. Additionally, the concept is interactive and highlights the social aspect of experimenting with others. This evokes an extra stimulus from within the desired social group.

Physical environment

In this level of the framework, subtler stimuli are presented to inspire and nudge the target group towards healthier choices. Street art creatively presents healthy foods in a tempting way. In addition, the food at the food festival and in the school canteen during the 'Eat healthy-week' will steer VMBO students to choose healthy foods. Lastly, the target group is influenced in their online world, an overlap of their social and physical environment since they spend a lot of time online, through the challenge and campaign.

Macro-level environment

At the macro level, the concept's impact is limited. Nevertheless, establishing connections between the municipality and key stakeholders is of significant value. Engaging organisations on a higher level, like JOGG, Voedingscentrum and NPRZ, improves the concept by leveraging on their expertise and support, creating a stronger collective effort for disease prevention, aligning with the overarching goal of City Deals to connect influential stakeholders within the urban network (AgendaStad, 2019). Additionally, the concept contributes to a healthy society, which supports the municipality of Rotterdam's responsibility to formulate measures for reducing health risks and improving the vitality of its citizens. Furthermore, the design interventions and roadmap can be shared with other municipalities in the City Deal 'Healthy and sustainable food environment', to stimulate more secondary school students in other cities.

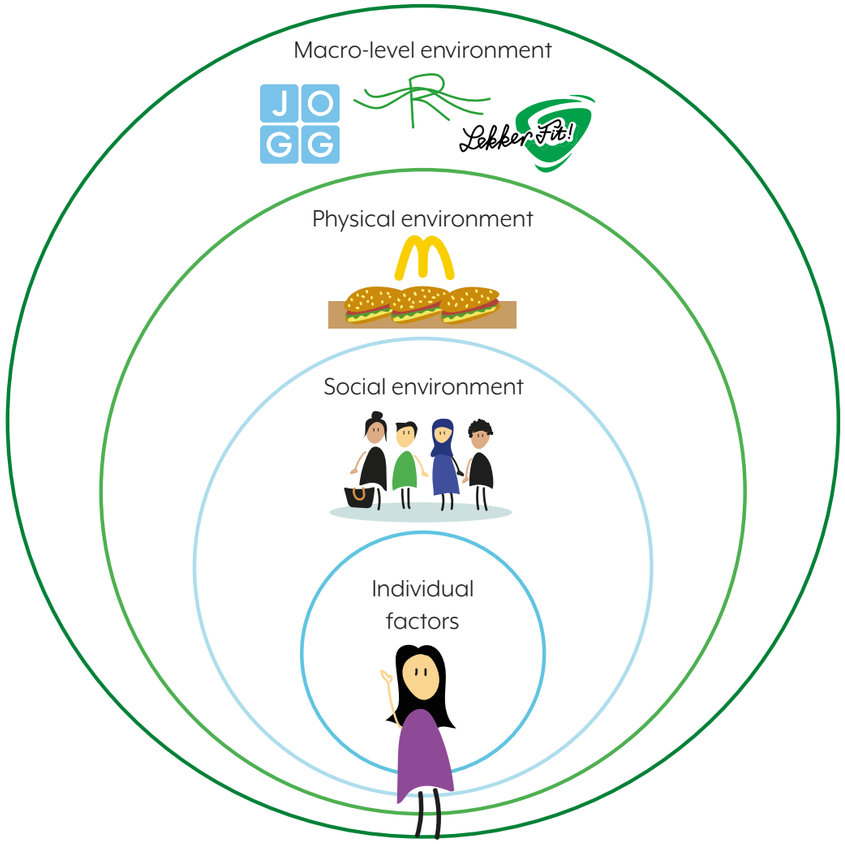


Figure 38. Ecological framework of a VMBO student in Rotterdam South

CHAPTER CONCLUSION

The concept includes multiple elements that are creatively and playfully designed to introduce VMBO students to healthy eating in an easy and engaging way. Through the online campaign, challenge and street art, VMBO students are inspired and motivated. Ultimately, the concept has an effect at individual, social, physical and macro levels of the food system, in which the change in self-efficacy and social norms are of great value. For the municipality of Rotterdam, the tactical roadmap presents a detailed overview of the concept for implementation. This roadmap provides a concrete start of the concept with valuable connections with other organisations.

12. VALIDATION

This chapter documents the results of the validation sessions with multiple stakeholders. In 9 interviews, the final concept and its elements ‘Eat to your Beat’ and ‘Eat smart, Play hard’ are evaluated, leading to the identification of challenges and opportunities for improvement.

12.1 APPROACH

The validation involved interviews with stakeholders in the food environment of VMBO students. The aim was to evaluate the concept on its feasibility, desirability, viability and alignment with the design statement. During the interviews, challenges and areas of improvement were identified and discussed, providing rich qualitative data within a short period of time. The interview guides are documented in Appendix I. Apart from the interview guides, A3 foam boards with concept visuals were used to support the concept explanation, as can be seen in Figure 39.

The following individuals or groups participated in the validation sessions:

- VMBO students
  - A group of three girls
  - A group of three boys
  - A mixed group of five students
  - One boy
  - One girl
- Two school employees at VMBO schools
- Experts from Lekker Fit! and Voedingscentrum

Figure 39. A3 foam boards for validation sessions

12.2 RESULTS

Attitudes

Enthusiastic stakeholders

After explaining the concept elements, participants' responses were very positive. The participants all expressed their interest in the various components and the engagement with healthy food. The experts expressed their enthusiasm by highlighting the concept's potential as a reward or motivation for schools to change. The enthusiasm among the participants was primarily driven by the playful aspects, including the festive event and creative art. Additionally, VMBO students expressed a desire for their schools to host the concept, stressing that they would attend it and post about it on their social media.

"I think this is quite cool! It's really nice and I think everyone will think so"
- VMBO student, boy

"Nice, it looks well thought through! I think it also appeals to teachers, in addition to VMBO school students"
- Teacher

Eat to your Beat vs. Eat smart, Play hard

While the interviews did cover questions related to all elements of the concept, participants shifted towards the food festival in their responses. One reason for this focus could be that VMBO students expected it to steer them more toward healthier choices compared to other concept elements. Secondly, a stronger partnership is created for the experts and school employees in 'Eat to your Beat' in comparison to 'Eat smart, Play hard'.

Variety in concept elements

All participants highlighted the diverse range of concept elements, which ensures that there is something fun and appealing for everyone. The school employees emphasised that more teachers will get involved in the concept at school due to the variety of activities and subjects. The variation also creates appeal among girls and boys. Additionally, the involvement of influencers guarantees increased participation from more students, including girls and boys.

"This is a good start for schools to start [healthy eating] with and you can do a lot with it"
- Education coordinator

"Feyenoord players are also quite cool, definitely boys will find that interesting"
- VMBO student, girl

Opportunities

Lekker Fit! in charge

During the validation with Lekker Fit! experts, the role of the organisation was discussed. The experts agreed that Lekker Fit! is the right organisation within the municipality to lead the implementation, given their existing network and expertise with schools and children. However, there was uncertainty regarding which schools to engage from their side. Some schools already working on the topic of healthy food could be rewarded with the concept elements, while other schools in need of change could use the elements as a booster.

Learning while doing

Through the various activities, VMBO students are actively involved in preparing and tasting food. Experts from Lekker Fit! and Voedingscentrum have expressed that it is a refreshing approach to educating children

about healthy eating, which is more fun than traditional classes. In addition, one of the school employees suggested involving other subjects, such as biology, to educate students about healthy foods at different levels.

"It's learning in a completely different way, children will probably find it more fun."
- Expert from Voedingscentrum

More than food

Voedingscentrum and Lekker Fit! highlighted the possibility of integrating the concept into school activities focusing on healthy lifestyles, such as the proposed 'Eat healthy-week' or a 'Lekker Fit!-week'. This integration increases the chances of schools including the activities in their curriculum for repetition. Additionally, the school coordinator said that linking the food festival to sports days improves the organisation and provides students with a mix of activities, appealing to a larger target group.

"If it becomes part of a larger or longer activity such as a 'Lekker Fit!-week' or a healthy month at schools, it is likely to have a larger long-term impact"
- Expert from Lekker Fit!

During school hours

School employees confirmed that schools with the right equipment and opportunity in their curriculum can include the cooking classes and co-creation with street artists into current classes, which will lower the burden of organisation. Additionally, including the classes in the current curriculum is more appealing to the students as they do not have to spend extra hours at school, which was confirmed by the students as well.

Wider audience

School employees saw an opportunity to include family besides VMBO students during the food festival to further spread the message of healthy eating. Furthermore, they emphasised the power of street art and the online campaign for a wider reach, which was highlighted by the municipality earlier in the project as well.

Challenges

Long-term behaviour change

The participants shared their opinion on the long-term effects on food behaviour in the interviews. VMBO students were likely to change their behaviour shortly after engagement in the concept. However, they expected to fall back into old patterns and start buying unhealthy food again after being not exposed to stimuli for a longer time. The fall-back was also predicted by other actors. To overcome this challenge, repetition of the concept elements is important to create new habits as discussed in the Transtheoretical Model of Change in Chapter 5.3 *Habits*.

"I would leave a biscuit for one time, but eat it again the time after"
- VMBO student, boy

Different equipment at schools

VMBO schools do not uniformly offer the same set of courses to their students. The availability of classes depends on the different educational packages provided by each school, their equipment and available teachers. These differences create challenges in implementing both the cooking classes and co-creation with street artists. Consequently, the concept should be tailored to align with the possibilities at schools.

Keeping schools involved

One risk that was highlighted by the experts from both Lekker Fit! and Voedingscentrum, was the one-off execution of the food festival at participating schools. The concept will have an increased impact in behaviour change when it is covered in schools' vision and repeated at least yearly, otherwise, the concept's impact will be limited and costs will be relatively high.

"We do need to make sure that this is salvaged by schools and it is not a one-off event"
- Expert from Voedingscentrum

Shortage of time and money

The school employees underscored the scarcity of time and money, due to busy school schedules and limited hours of teachers. Therefore, they stressed that a leading role from the municipality is a must, mainly for providing the food festival packages. In addition, the municipal budget is limited. Consequently, the concept elements could be rolled out over a longer period of time than proposed in the current roadmap to overcome the challenges of shortage of time and money.

CHAPTER CONCLUSION

Participants' responses were mainly positive. Experts viewed the collaboration with Voedingscentrum and Lekker Fit! as valuable and feasible. Furthermore, all participants acknowledged the complementary value of each concept element and the VMBO students expressed a strong desire for implementation. Among the participants, the food festival gathered the highest level of interest, although the street art and online campaign generated positive responses as well. Schools considered the leading role of the municipality as necessary and the integrating of the elements into the current curriculum was seen as a good idea. The greatest challenges lie in achieving long-term behaviour change. According to the experts, the concept elements work well as boosters or rewards for healthy change, but need to be integrated and linked to other school activities to create lasting impact. Additionally, differences in equipment and space at schools present a challenge. To address this challenge, different-sized food festival packages, such as small, medium and large, could be a solution. The final challenge experts expect is to keep schools engaged for repeated execution.

13. CONCLUDING THE PROJECT

In this final chapter, the limitations of the final concept and research will be discussed, followed by recommendations for further research and concept improvement. Subsequently, the process of the project will be reflected on. The report ends with a conclusion and a personal reflection on the project.

13.1 LIMITATIONS & RECOMMENDATIONS

Limitations

Selection of participants

The first limitation of the research is participant selection. Difficulties were encountered in seeking parental consent and lifestyle disparities between the researcher and target group, leading to the majority of participants being female students. As a result, the final concept may reflect female needs and preferences more than males. To address this shortcoming, the validation included both genders. However, including male students earlier in the research would have been preferable.

Effect of the interventions

Secondly, a thorough evaluation of the interventions' effectiveness was unfeasible to include in the project. Although validation showed positive reactions, it remains uncertain whether the target group will participate in the cooking competition or online challenge, given their passive attitude and the fact that these activities are not included in the school curriculum.

Long-term behaviour change

In addition, the design interventions are limited in achieving long-term behaviour change. They are great rewards or boosters to initiate change and students would consider healthy food more often than they currently do. However, in terms of truly changing eating patterns, these interventions fall short. Less conscious designs might have better results in changing behaviour as explained in Chapter 5.4 *Healthy & sustainable behaviour.*

Concept costs

Lastly, a limitation of this concept is the high costs of implementation when partnering with influencers. Influencers charge high prices and there are additional costs for content creation and marketing. However, the collaboration will have a positive impact on the popularity of the design interventions and the behaviour of VMBO students.

Recommendations

Pilot

The first recommendation is to initiate a pilot, because the design interventions have not been tested yet and implementing them could involve high costs. This pilot would enable measurements of participant engagement, identification of potential barriers, and the creation of a strong foundation. Subsequently, an improved version of the concept can be rolled out.

Higher in the system

The second recommendation is to further research how impact can be made at a higher level in the system, since major changes need to happen in the physical environment, because citizens are currently seduced by unhealthy foods. This requires greater governmental influence at the macro-level of the food system.

Target group expansion

Another recommendation is to expand research into secondary school students' lifestyles across other education levels to extend the concept's impact to a wider target group, fostering more significant change.

In-home environment

This project was focused on the out-of-home environment of VMBO students. To create a bigger impact, further research is recommended in the in-home environment where parents are in charge of food-related decisions to foster healthy dietary choices among parents and families.

Incremental implementation

Finally, it is recommended to use the tactical roadmap for incremental implementation if challenges are faced due to time and budget constraints from multiple stakeholders. The tactical roadmap creates the possibility to roll out the concept elements gradually over a longer period of time instead of all simultaneously.

Implementation in other municipalities

The opportunity to extend the concept to additional municipalities exists through the City Deal 'Healthy and sustainable food environment' and strengthening partnerships with JOGG and Voedingscentrum. By involving JOGG as co-owner of the concept, the concept can also be introduced to young people in other cities.

13.2 PROCESS REFLECTION

In this research, the role of the municipality of Rotterdam in stimulating secondary school students towards healthy food choices was examined from a design perspective. To establish a solid foundation, the double diamond and the first steps of the Design Journey for Complex Systems were used. This process reflection assesses the project on strengths and weaknesses in each project phase of the double diamond.

1. Discover

In the first phase, insights were gathered through literature and field research, providing a broad understanding of various aspects of Rotterdam's food system. It also gave the opportunity as a researcher to fully immerse in the target group's environment, which led to unexpected insights that were valuable for later steps in the project. Additionally, the decision was made to concentrate on VMBO students in Rotterdam South, which refined the project focus.

2. Define

The second phase started with organising all the information. It was challenging to filter the information obtained because of the absence of an appropriate tool. Eventually, the Social Implication Design (SID) method was used to structure this phase. This method created a hierarchy in the insights, resulting in a clear worldview of the VMBO student without losing important aspects. The 'define' phase concluded with the design statement and five design criteria, which were used to evaluate decisions in the subsequent project phases.

3. Develop

The third stage covered the idea generation, which included a peer brainstorming session and co-creation with the target group. Involving VMBO students presented some challenges, however, the session was very valuable because of insights into underlying motivations of the target group. For both groups, the tailored treehouse method proved to be a useful method for structuring the sessions. All ideas created in this phase formed the foundation for the 'deliver' phase.

4. Deliver

The fourth project phase was split into concepting and validating, placing greater emphasis on the latter than usual in the double diamond model to include specific Strategic Product Design skills. The 'concepting' part began with the C-box method, which resulted in the identification of three concept directions in line with the design statement, which were then merged into the final concept. Subsequently, a tactical roadmap was created for the municipality of Rotterdam, detailing the implementation steps for the concept and making the next steps tangible for the client. In addition, a review of the four levels of the food system was conducted, serving as a valuable literature reference. The phase concluded with the concept validation with system actors, resulting in limitations and recommendations for improvement of the concept.

13.3 CONCLUSION

This project explored the challenges and opportunities associated with stimulating secondary school students to adopt a healthier diet. It involved research into the current food system and its effects on people and planet together with theories on food behaviour. The decision was made to narrow the focus to VMBO students. Additionally, field research was conducted to gain a deep understanding of the target groups' needs and preferences. The first diamond of the project was concluded with the design statement:

"To ensure VMBO students will make healthy dietary choices, I want them to feel cool among their friends by making healthy choices tempting."

Throughout the project, this statement guided developments and choices. The final concept consists of design interventions to promote healthier dietary choices among VMBO students. The first intervention is the 'Eat to your Beat' food festival at school. Through cooking classes, a cooking competition and food prepared by a Rotterdam chef, the students will gain knowledge and skills on healthy eating. The presence of an influencer at the festival aims to increase its popularity. After the event, the 'Eat healthy-week' will take place at school. This first intervention aims to actively engage students to experience that healthy food can be tasty and fun. The second intervention, 'Eat smart, Play hard', uses street art to draw the attention of VMBO students and other pedestrians to healthy food choices. During art class at school, students co-create the art with street artists. The art is linked to an online challenge complemented by a social media campaign in collaboration with the influencer. This intervention aims to creatively showcase healthy food seductively and engage with the target group in their online world.

The concept elements align with the design statement, by promoting healthy food in a festive way, presenting healthy foods seductively, and partnering with influencers on social media. The concept focuses more on making healthy food cool rather than tempting. However, the inclusion of playful elements and art seduces students more to healthy food than they currently are. More focus could have been put on the coolness of the concept related to the social status among friends. Nonetheless, the concept was positively received by VMBO students and system actors, who expressed their desire for implementation. Some challenges emerged during the interviews related to long-term impact and school specifics.

To address the research question: "How can the municipality of Rotterdam stimulate VMBO students toward adopting a healthier and more sustainable diet?", the municipality of Rotterdam should delegate the concept to Lekker Fit! who will be responsible for implementation, establishing the stakeholder network and allocate funding.

To conclude, the project effectively contributes to its goal of creating a strategy for the municipality to stimulate VMBO students towards adopting a healthier diet. Additionally, it contributes to the second strategic pathway of the City Deal by diving into the motivations and lifestyle of a specific target group. While challenges persist, the project aims to motivate the municipality, and all other parties involved, to take action and improve the health of VMBO students in Rotterdam South, and possibly nationwide, by making healthy food cool!

PERSONAL REFLECTION

After six months of hard work, blood, sweat and tears, I am writing my closing words. This graduation project has been one of the most challenging things I have done and I am proud to say that I have struggled, learned and grown throughout this project.

During the search for my graduation project, I knew for sure that I wanted to do something with sustainable food. At that time, I was consciously working on my own sustainable behaviour and food was a great starting point for me. I soon met Anna at the TU Delft and together with her, I found my project at the municipality of Rotterdam, a municipality with a heart for the city and its citizens.

At the start, I found myself in a vast sea of literature to explore. Unraveling theories and models turned out to suit me and I enjoyed reading many pages about the food system, its impact, actors involved and the municipality of Rotterdam. Eventually, using the Design Journey for Complex Systems, I gained a deep understanding of the system and its influential actors.

All the information I gathered gave me an infinity of possibilities. As a result, I ran into one of my bigger pitfalls: making decisions. It often felt like I was rushing into things without careful thought, but as a design student, I have learned to balance knowledge with intuition leading to valid choices.

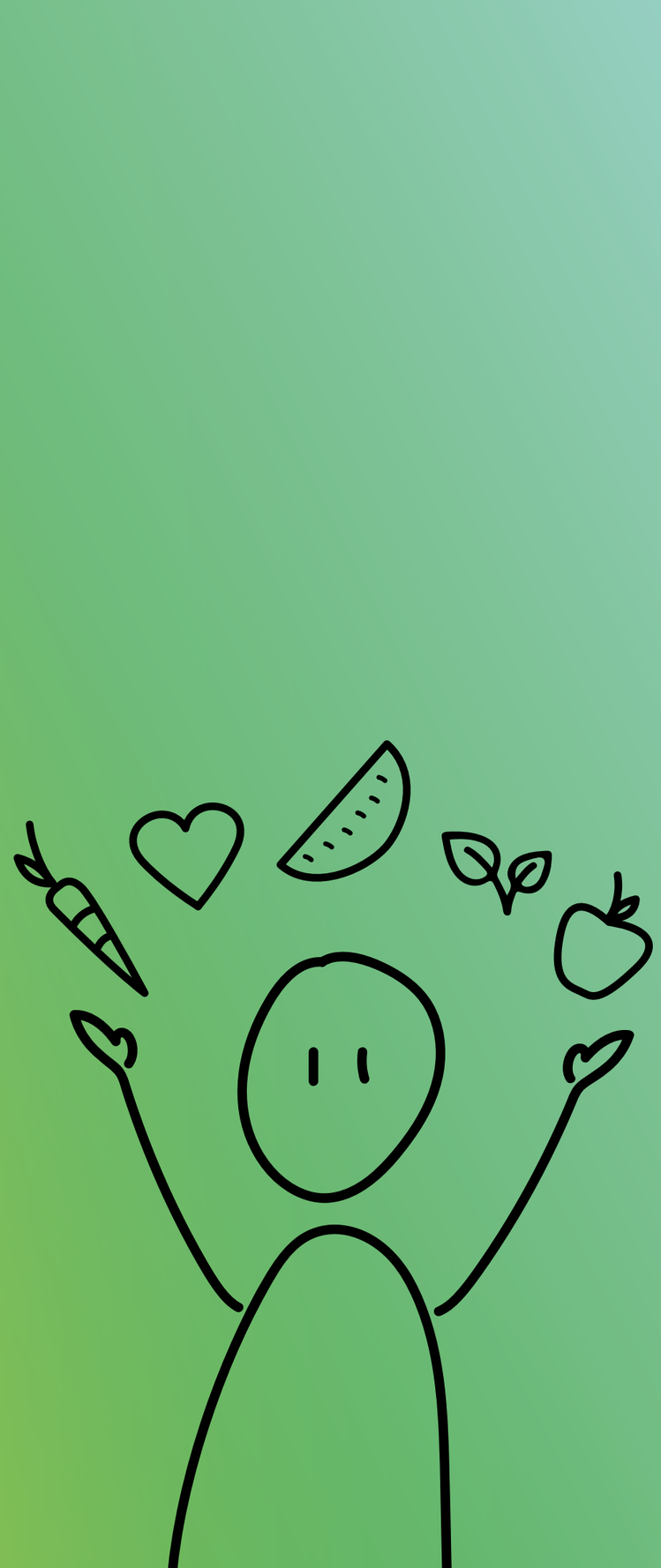
The decision was made to focus on VMBO students from low SES neighbourhoods in Rotterdam South, which marked the start of a challenging but incredibly educational phase in my project. As I engaged with these students in their social environment, I realised that the sustainability bubble that I had stepped into in recent years was very small, and for many people, sustainability is not a top priority (yet). The target group had little to no knowledge of this topic and that sometimes discouraged me. Nevertheless, through this experience, a more urgent issue came to light: the importance of health and well-being.

The project allowed me to connect with various actors in the system and to exchange personal interests and motivation regarding the topic. It proves to be a tricky subject and opinions on what is possible and permissible vary widely. I hope my conversations with teachers, caterers and other stakeholders have inspired them to go the extra mile to create a healthier food environment for the younger generation.

Concerning project managing: it is something you learn along the way. My communication and planning skills improved significantly. Over the past few months, I have learned to stick to a schedule and to be flexible when necessary. I worked hard when I had to, but also took my time when I could.

Overall, this project has made me a resilient and courageous person with internal motivation to make a positive impact on society. It also taught me that we live in a connected system where collaboration is crucial for achieving major transformations which are necessary to keep people and planet healthy. Additionally, it showed me that there is still so much to discover and an open mind can take you far.

With this open mind, I now close off this project and face my future with a big smile!



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