

SAILORS IN MOTION

A persuasive game to stimulate physical exercise among
employees with low socioeconomic status



MASTER THESIS
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Design for Interaction

SAILORS IN MOTION

Master thesis - Design for Interaction

Faculty of Industrial Design Engineering
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Sailors in motion: A persuasive game to stimulate physical exercise among employees with low socioeconomic status.

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PREFACE

In front of you is the end result of my graduation project for the master Design for Interaction at Delft University of Technology. This master thesis presents my project about encouraging employees with low socio-economic status in doing physical activity. The project is done in corporation with DZB Leiden. This is a re-integration company of the municipality of Leiden and the product of this project is designed for the employees of DZB. The health intervention that is created during this project is intended to elicit behaviour change within the employees where they incorporate physical exercise in their daily routine.

I find human behaviour a fascinating topic and I strongly believe that design can play a big role in supporting people during behaviour change, to help them lead a healthy and happy life. By following a human-centered design process, the needs of the target group can be discovered and translated to useful elements for design. This human-centered approach leads to products and services that are tailored to the target group, which gives the products more chance to have a successful outcome. I believe a human-centered approach is essential in each design project. Therefore, I like to get in touch with my user group early on in the design process. By involving myself in the target group I give myself the opportunity to discover surprising elements about the users.

Furthermore, I like to create products and services that leaves the user with a positive and comfortable feeling. I focus on the positive elements and try to apply and enlarge these in my design concepts. Having a playful attitude myself and having positive interactions with the users will create a comfortable atmosphere where these interesting elements can be discovered.

When I encountered this project where my interests all came together, I got very excited and I tried to grasp the project with both hands. I am thankful for the opportunity to apply gamification in a social context and being able to work so closely together with my target group. This project shows how I applied what I learned during my studies but also which new things I learned during the project. This project was an exciting one to conclude my masters with and I had a great time working and designing at DZB. The process of this graduation project can be read in this thesis.

Enjoy reading.

Suzanne Moens,

Oktober 2020



EXECUTIVE SUMMARY

The aim of this graduation project is to increase physical exercise of employees with low socio economic status (SES) by engaging them in a health intervention. Individuals with low SES often negatively influence their health by having an unhealthy lifestyle. This lifestyle causes the individual problems and non-communicable diseases (NCD), which causes a shorter life expectancy and being ill makes it harder to participate in work activity.

The client for this project is DZB Leiden, a re-integration company of the municipality of Leiden. DZB is there for everyone who wants to work but has difficulty keeping up with the current work practice. The people turning to DZB often experience a work disability and have a low socio-economic status. DZB also recognizes an unhealthy lifestyle among their employees. A healthier life will contribute to the well-being of the employee and will decrease employee absenteeism. Thus, not only looking from an employment perspective, but considering improvement of quality of life of their employees, DZB is determined to give a contribution to their employees' health.

To increase the physical activity of the employees, a persuasive game was designed to be played at DZB. Persuasive game design is a tool to motivate people to perform certain behaviours in a game experienced world, which can be beneficial to them in the real world. The physical activity experienced during the game can motivate people to perform the desired behaviour in the real life.

In order to design a game based health intervention that will be accepted by the employees, an extensive field study was conducted. By taking a human-centered approach and co-designing with the employees a deeper understanding of the target group was created, including their view on health, motivations, barriers and needs.

The findings from the field study were translated to 10 points of attention to be considered for creating the health intervention. Also, a framework

for design was developed, including three motivational elements: humour, fellowship and discovery. By applying the 10 attention points and design framework, the final game 'Sailors in Motion' was developed.

Sailors in Motion is a game where boats are hidden and searched for throughout the building of DZB in a scavenger hunt with treasure maps. Making and following these maps stimulates the player to walk around at DZB. The game is all about discovering new places in the building, which is done together with colleagues. Additionally, the game includes joyful elements. During the journey, health messages can be found, meant to educate the player about the benefits of physical activity.

Finally the game was evaluated with the employees. The aim of this evaluation was to figure out whether the game stimulated to walk and triggered to increase physical activity in the employees' daily life.

The evaluation showed that the game does put people in motion and creates a immersive experience for the player. However, since the game was evaluated in a short time, the effect of the game on someone's health awareness was difficult to measure. It is recommended to play the game more often and spread the activities over multiple weeks to provoke behaviour change. Also, the game could be part of a larger health program where employees set goals and get support to reach them. The game serves as a starting point where people can easily engage in to experience the benefits of physical activity on their mood and body. This experience can motivate them with setting personal health goals and eventually changing their behaviour.

The deliverable of this project is not only the tangible game, but also a variety of insights about the employees of DZB. The company could use the framework for design as well as the 10 point of attention during future development of health related initiatives at DZB.

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01

INTRODUCTION

This introduction chapter describes the context of DZB Leiden, the place where this project is conducted. DZB Leiden is a re-integration company connected to the municipality of Leiden. Additionally, the problem of this project is explained. Finally, in this introduction is described what approach is taken during this project and what questions will be answered.

- 1.1 Context
- 1.2 Problem statement
- 1.3 Project setup

1.1 CONTEXT

DZB Leiden

The re-integration company DZB Leiden is there for everyone who wants to work, but has trouble keeping up with the current work practice. These people have a so called ‘distance to the labour market’. This distance can be caused by illness, disability or just a setback in life. DZB Leiden supports job seekers towards suitable employment by building connections between employees and employers. Thereby, DZB tries to find these people a suitable job with an external company or provides them a job within their own company. A job where they feel at ease and are able to grow.

When someone is provided a job within DZB, there are multiple workshops in the companies’ building where they can do their work. DZB provides different work activities, such as working in their chocolate factory, creating wallets, sorting components for airplanes, gardening, cleaning or working in catering. They have collaborations with different external companies that offer work to them. Because of the diversity of job offers there is most likely a match for every employee. Some work places are in a silent room or a space with minimal social contacts, if this is what the employee needs in order to do his or her job.

The mission of DZB Leiden is: ‘Working together on a world in which everyone participates’ (figure 2) (DZB, 2018). Within the company the development of each individual person is central. Accordingly, employees are trained to gain confidence to be better prepared for the labour market. Consequently, it will be easier for the employees to find a regular job at an external company, or working at DZB will become more comfortable for them. The supervisors of the workplaces are in close contact with the employees to make sure everything is going well, also in the employees’ private life.

DZB itself hosts about 600 employees and guides employability of around 1200 people in total. The people that turn to DZB are people that fall under

the Participation Act. This law is meant for anyone who can work but cannot make it on the labour market without support. The law must ensure that more people in the Netherlands find work, including people with a labour disability.



Participation act

On January 1st 2015, the Participation Act (Participatiewet) has come into force in the Netherlands. The Participation Act replaces the law ‘Wet Werken Bijstand (WWB), the ‘Wet sociale werkvoorziening’ (Wsw) and a large part of the ‘Wet werk en arbeidsondersteuning jongehandicapten’ (Wajong). The aim of the Participation Act is to have as many people as possible, with or without a labour limitation, to participate in the labour market (SZW, 2019). Everyone who is able to work, but needs assistance to get there, falls under this law. The purpose of this law is that everyone participates in society according to their own ability and provides for themselves as much as possible. In this case everyone is provided with an income consisting of the minimum wage. To provide everyone with work, the government made a jobs agreement to make more jobs available for people with a labour disability. In the next two paragraphs is explained how this is this is getting accomplished.

Jobs agreement and guarantee jobs

The government aims to get most people with a labour disability a job with a regular employer. A guarantee job (garantiebaan) is a regular function at a regular company. Hence, the cabinet has set

a target that in 2025, 125.000 jobs are realised for people with a labour disability. This target is referred to as the jobs agreement (banenafspraak). According to the jobs agreement, 100.000 jobs should be created by the private sector and 25.000 jobs should be created by the government (SZW, 2018). The responsibility to create these jobs lies with the municipalities and they receive the means from the government to perform this task. For instance, if a regular company offers a guarantee job, the employer can ask for different regulations such as subsidies to create adapted workplaces, wage compensation or a trial placement (Arnoldus, 2016).

Sheltered/social workshop

The sheltered workshop is a place to work for people with a disability and for people that are long-term unemployed. This workshop is a place for people who are not able to find a job within a regular company (SZW, 2019). DZB provides these sheltered jobs within their company, where the employees are able to earn minimum income (figure 1). The employees are supported to execute their job and they can work at their own pace. These sheltered workplaces provide a working opportunity for people that have personal, mental or physical limitations. However, the goal of the government is to minimise these sheltered workshops and create positions within a regular company.



Figure 1: Sheltered workshop at DZB.



Figure 2: Mission statement of DZB (DZB, 2018).

Employees with low Socioeconomic status (SES)

The majority of the employees at DZB have a low socioeconomic status (SES). SES refers to the position people have on the social ladder. This position is defined by educational attainment (primary education, LO, VMBO, Mavo), height of income and occupation. In the Netherlands, around 30% of the population has a low SES (De Hollander, Hoogendoorn & Beck, 2019). These employees often lack literacy skills, have a physical or mental disability or suffer from an illness, which prevents them from working at a regular company. Hence, they found their place at DZB.

Work and health with low SES

Individuals with low SES are more likely to be unemployed than those with a higher SES (Schuring, Robroek, Otten, Arts & Budorf, 2013). Working is not only important for a salary, it also helps you in getting social contacts, makes you feel involved in society and the appreciation you get as an employee helps with gaining self-esteem and a certain status in life. Working ensures for structure in your life, since it gives a daily occupation. Furthermore, working is beneficial for personal development and is also good for you mental and physical state. Engaging in work activities is important for the low SES group, since

1.2 PROBLEM STATEMENT

these people have a higher risk of experiencing mental health problems (Reiss, 2013). Overall it can be said that working contributes to well-being. People who used to get governmental benefits and re-integrate often experience health benefits as well as improvements in socio-economic status (Waddell & Buton, 2006).

Although having a job has a positive effect on the mental and physical health of individuals with low SES, they often negatively influence their health themselves by having an unhealthy lifestyle. Meaning that many of these people from the low SES group smoke, eat unhealthy food or do not have much physical exercise during the day (Bukman et al., 2014). This causes a big health difference between people with high and low SES. People who smoke, have high blood pressure or are overweight have a shorter life expectancy of 6 years in comparison with those who do not have these 3 risk factors (Licher et al., 2019; CBS, 2017).

This early mortality of 6 years also holds for people with lower education (Pharos, 2019; CBS, 2017). Additionally, people who do not smoke, do not have a high blood pressure or are not overweight have a delay of 9 years for non-communicable diseases (NCD) occurring (Licher et al., 2019). Research shows that low educated or unemployed persons smoke more, exercise less and have a higher BMI than those who have had a longer education or are employed (Pampel, Krueger & Denney, 2010). This health difference is thus not only caused by their education or occupation, but also for a large part caused by their lifestyle and environment (Farhud, 2015). They often smoke, eat less fruits and vegetables and live in neighbourhoods with less green and safety to enjoy the outdoors. Furthermore, practicing an unhealthy lifestyle can cause illness and thereby have influence on the ability to participate in education or work. This can be the reason someone obtains a lower socioeconomic status over time.

DZB Leiden also recognises the unhealthy lifestyle of their employees. There are many people working with a higher BMI or poor health condition. Most employees prefer to eat fried snacks in the canteen during lunch, while there is also healthy food available. Also, they take the scooter or taxi to work, while a postcode analysis showed that 80% of the employees live in a radius of 7,5 km from the company (figure 3). You could assume it is possible for the employees to walk or take the bike to work.

This unhealthy lifestyle is considered as a problem. Not only is it affecting the employees physical and mental well-being. Also, pursuing an unhealthy lifestyle makes you more prone for illnesses and problems during work (Kamphuis et al., 2007). Being sick can cause an employee to be absent at work (figure 4). Having a lot of absenteeism makes an employee less attractive to hire since absenteeism cause companies to make less profit (Cooper & Dewe, 2008). Introducing a health program in organisations has shown to be effective in reducing employee absenteeism (Aldana & Pronk, 2001; Aldaba et al., 2005; Blair et al., 1986)

A healthier life will contribute to the well-being of the employee and working would be more comfortable for them. Not only looking from an employment perspective, but considering improvement of quality of life of their employees, DZB is determined to give a contribution to the health of the employees and therefore this project is introduced.

As mentioned before, an unhealthy lifestyle can among others be caused by an unhealthy diet, limited physical activity, stress, smoking, alcohol or too little/restless sleeping. For this project the focus lies on increasing physical activity of employees from DZB with a low SES. The choice for physical activity was made early on in the process to give focus to the project. Therefore, the literature and user research is mainly focused on benefits of physical activity and barriers or motivations to participate in physical exercise. Due to COVID-19 there was not much room to do first observations. Therefore the choice for physical activity is made because of the following arguments; At the start of this project, which was also the beginning of the pandemic, not many employees were working and the DZB canteen was closed. Therefore it was not useful to focus

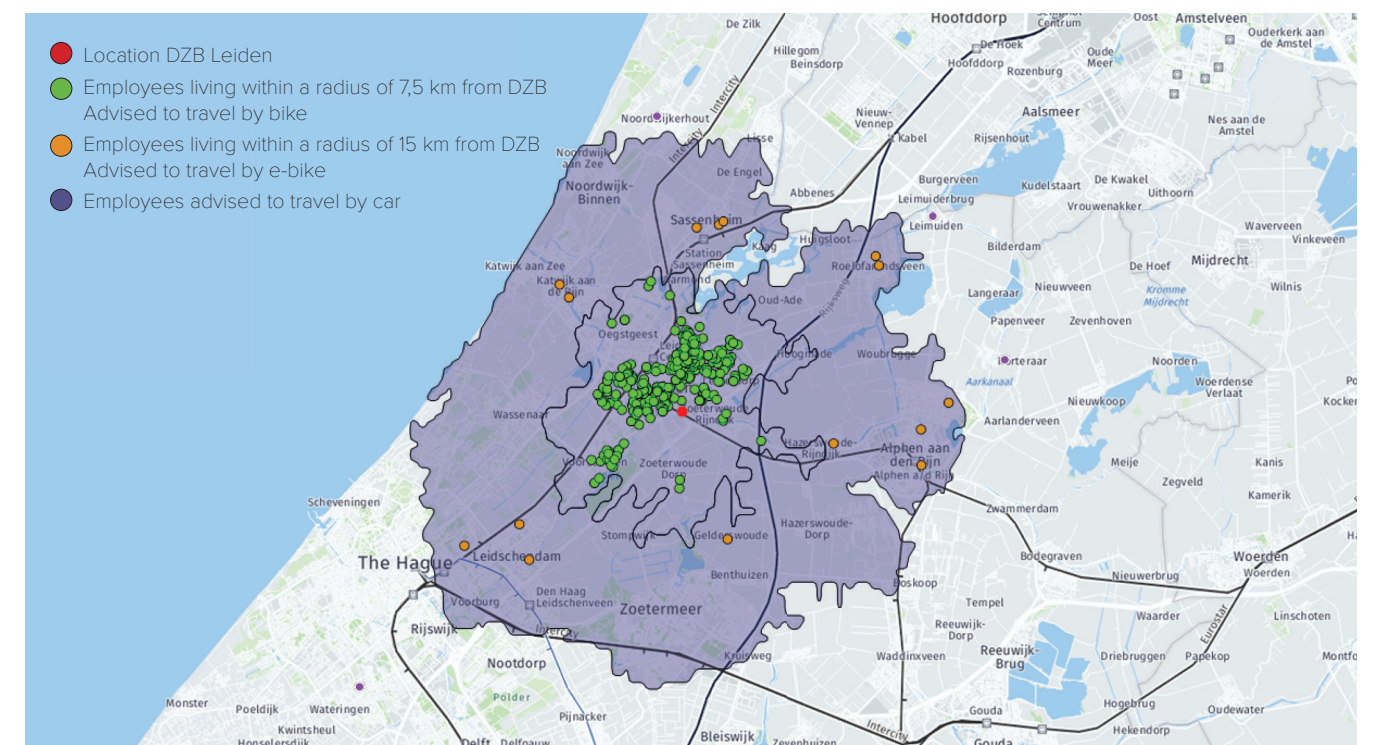


Figure 3: Postcode analysis DZB employees (DZB, 2020).



Figure 4: Cause and effect scheme of unhealthy lifestyle

on the food in the canteen. Smoking and alcohol are addictions where already many interventions are designed for. I considered this a challenge that does not inspire me, since it involves someone stopping a habit and not necessary creating one. Regarding sleeping, this would ask for research at people's homes, and I wanted to design something for and inside the company to reach a large group of people. Focussing on physical exercise not only seemed most feasible to perform with taking COVID-19 regulations into account, it also interests me personally and consider it a very important aspect of healthy living.

The aim of this research is to develop a proof of concept for a game based health intervention that motivates DZB employees to increase physical activity. Persuasive game design is a tool to motivate people to do certain activities while being in the game world, which can be beneficial to them in the real world (Visch, 2013).

There are different ways to provoke someone to live healthy. Think about advertisement or programs you can follow. However, lifestyle interventions often fail to successfully reach individuals with low SES (Teuscher et al., 2015). These current interventions do not always trigger the low SES group because they do not match their way of thinking and doing, since limited research was done about the target group's perspectives

(Teuscher et al., 2015). The interventions are missing a holistic approach, where all influencing factors from a person's life, such as home situation, culture, education or unemployment are taken into account (RIVM, 2010). It is important to know these factors of the target group in order to tailor a health intervention to personal needs in a way that someone can feel connected to it. Changing the lifestyle of the employees with low SES is considered a great challenge. It is characteristic for them to think short-term and they do not notice the long-term benefits of a healthy lifestyle. Often, they are not motivated to change their diet, start exercising or stop smoking, since they do not see the consequences of their current behaviour. Therefore they see no reason to change their ways (Heutink, van Diemen, Elzenga & Kooiker, 2010)

With the use of gamification an immersive experience can be created for the employees. The game world they will get immersed in, can trigger them to change their current behaviour. In order to design an intervention that catches on with the employees, extensive user research will be done. Thereby, the opinion of the employees will be taken into account while developing the health intervention. Hence, this thesis addresses the needs and motivations of DZB employees, as well as a way of motivating them towards increased physical activity with the designed intervention.

1.3 PROJECT SETUP

Design approach

The design process is based on the 5 stage iterative Design Thinking process that was first educated in 2003 by the Hasso Plattner Institute of Design (figure 5). To match the solution with the current capacity, skills and knowledge of the employees, focus lies on the 'empathise' phase. The employees will be closely involved throughout the whole process, so that a suiting intervention could be designed that helps the employees in improving their lifestyle.

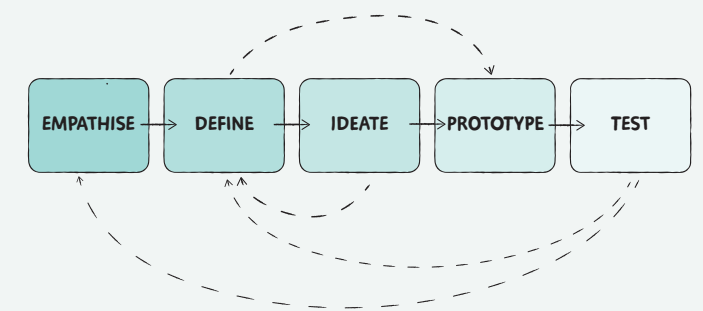


Figure 5: Design thinking process

Research questions

The main question of this graduation project is

WHAT GAMIFICATION BASED INTERVENTION MOTIVATES INDIVIDUALS WITH LOW SES TO INCREASE THEIR PHYSICAL ACTIVITY WHILE BEING AT WORK?

In order to find out what kind of intervention will be effective in increasing physical activity of DZB employees, and thereby achieve behavioural change, a few sub questions formulated:

- **RQ1:** What is the current view and knowledge of the employees about a healthy lifestyle?
- **RQ2:** What are the main motivations, habits and needs of the employees?
- **RQ3:** At what level are the employees prepared to change their current habits?
- **RQ4:** How do the employees believe they can be supported in pursuing a healthy lifestyle?
- **RQ5:** Which game elements match with the characteristics and motivations of the employees?
- **RQ6:** How can the designed intervention stimulate increased physical activity of the employees?

Report structure

This report describes the research and design activities conducted in order to answer the research questions. To answer these questions and design a successful health intervention, several research and design activities are performed and described in this thesis. An overview of these activities is displayed in figure 6. Firstly, a literature study was conducted in order to understand the attitude individuals with low SES have towards a healthy lifestyle. Also, literature research has been done about behavioural change and persuasive game

design. Secondly, to understand the employees of DZB and create a successful intervention that matches their needs, a human-centered approach is taken by doing an extensive contextmapping study. Lastly, several iterations are designed and evaluated with the target group consisting of DZB employees. These activities lead to the creation of a game that reaches the goal of this project to increase physical activity of employees with low socioeconomic status by engaging them in an health intervention placed in DZB.

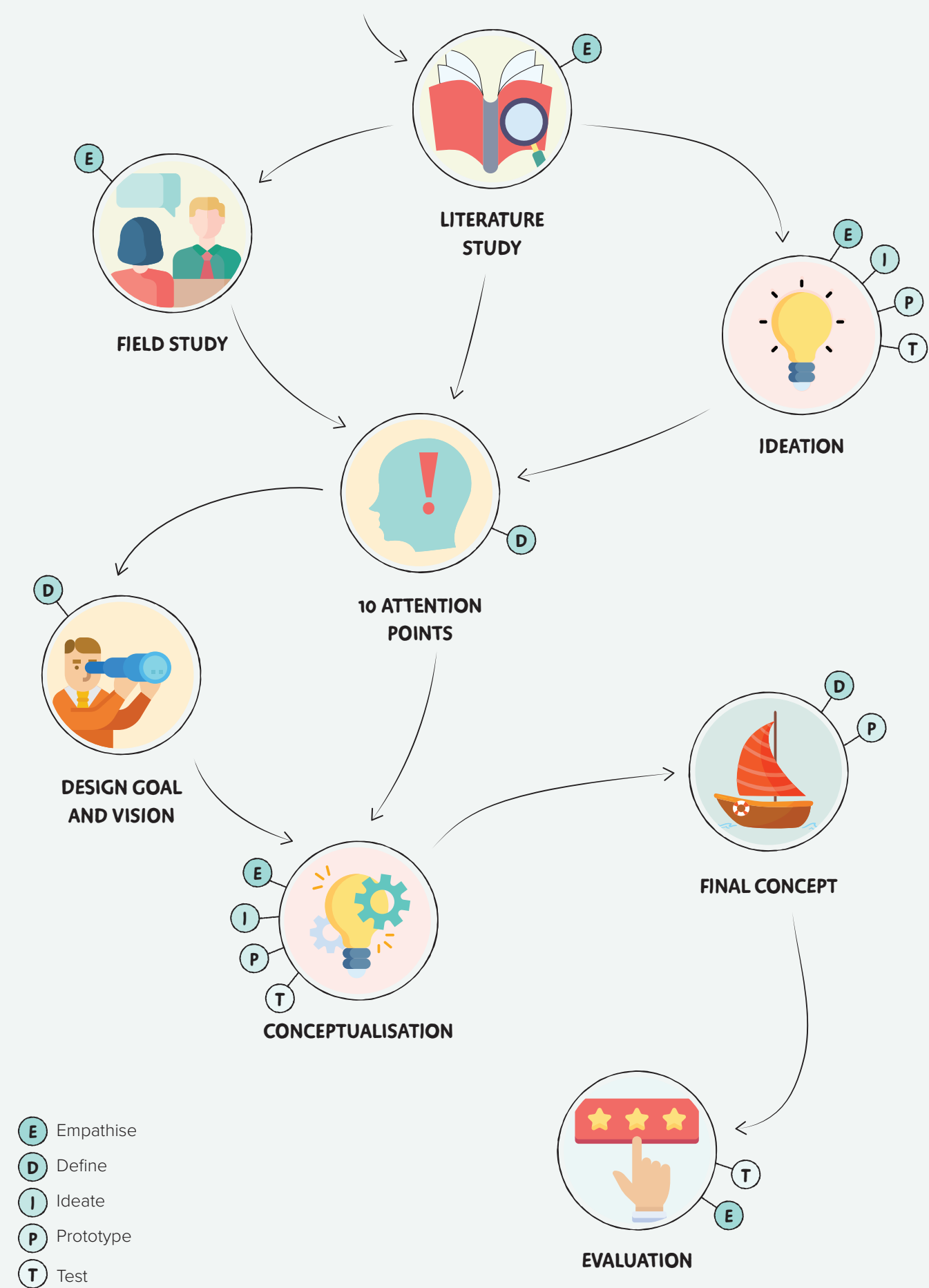


Figure 6: Design process



02

LITERATURE STUDY

People with low SES often live an unhealthy lifestyle. Meaning that they have a habit of smoking, having an unhealthy diet or doing no to limited physical activity. This chapter explains the consequences of pursuing this lifestyle as well as the reasoning for most of these people to have these unhealthy habits. Additionally, research is conducted about behaviour change and also about persuasive game design as a opportunity to evoke behaviour change within an individual.

2.1 Lifestyle

2.2 Behaviour change

2.3 Gamification to support action

2.4 Conclusion

2.1 LIFESTYLE

Lifestyle can be described as the way a person lives their life. Lifestyle factors are a set of adjustable habits and choices that a person has to remain a feeling of security in their life (Jensen, 2007). These habits can influence the overall health and well-being of a person (Sharma, Biedenharn, Fedor & Agarwal, 2013). Health is defined by WHO in 1948 as ‘a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity’. Health is thus not only defined by diet, amount of physical exercise and not having illness, but also by social life, mental state, quality of life and how meaningful the life is for the individual (Flinterman et al., 2019). Lifestyle factors such as smoking, limited physical activity, being overweight, unhealthy diet, stress, and drinking alcohol can negatively influence someone’s health and thereby cause early mortality (van Dam, Spiegelman, Franco & Hu, 2008).

As mentioned in the introduction, people who have low SES often have unhealthy habits. The following topics describe the consequences of lifestyle choices as well as the reasoning for people with low SES to have these unhealthy habits.

Negative consequences of unhealthy lifestyle

An unhealthy lifestyle can have major consequences. Not only for someone’s position in the job market, but also for their health and thereby their quality of life. Smoking, drinking alcohol, stress, being overweight and a lack of physical activity can cause non-communicable diseases such as diabetes, cancer, high blood pressure or cardiovascular diseases. Of which all can cause early mortality (Kamphuis et al., 2007; van Dam et al., 2008). Of all disease burden in the Netherlands, 3.5% can be accounted to limited physical activity (RIVM, 2016). Additionally, inadequate physical exercise can make the body feel less flexible, which can make working and moving around less comfortable.

Positive effect of physical exercise

Regular physical activity contributes to a better quality of life and health. Inactive adults and those with limitations due to illness will have added health benefits when they become more active. For adults aged between 18 and 64, at least 150 minutes of moderate-intensity aerobic physical activity throughout the week is recommended. Increased time or more intensified physical activity will add to health benefits (WHO, 2011).

Low SES groups are often less represented during sports activities. Around 15-24% of the low SES group has a membership at sport club, while for the regular Dutch population this is 31% (RIVM, 2016).

Next to the health effects, physical activity can have a positive influence on social level, occupation and well-being. This is not only true for low SES groups, but for all groups in society (RIVM, 2016). To conclude, being active gives a person more energy over the day. Physical exercise is key in achieving an energy balance and it will contribute positively to the mental state of the person (Weyerer & Kupfer, 1994). By motivating the low SES group to exercise more, their physical and mental health could be greatly improved.

Barriers to pursue a healthy lifestyle

Although physical activity is proven to have a positive influence on health, few people with low socioeconomic status participate sufficiently in physical activity. This is because they face several barriers in pursuing a healthy lifestyle. These barriers are described below.

Living conditions

Firstly, people with low SES do not have the material and financial means to practice a healthy lifestyle. Fruits and vegetables are expensive, as is a sport membership. Additionally, people with low SES often live in unsafe or unpleasant neighbourhoods, which might prevent them from going out for a nice walk in the evening (Bukman et al., 2014).



BARRIERS



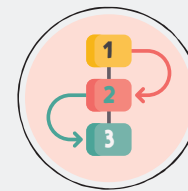
LIVING CONDITIONS



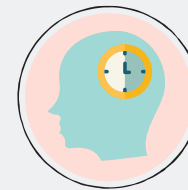
UPBRINGING



SOCIAL INFLUENCES



DIFFERENT PRIORITIES



SHORT-TERM THINKING



DEPENDENT ON OTHERS

Upbringing

Another reason is that these people are not raised with playing sports or they did not feel like they were talented in their youth. These factors might have given them a negative association with physical exercise. Also, they might have been raised with an unhealthy diet, so they might not know better than what they are currently eating (Bukman et al., 2014).

Social influences

People are often influenced by their social surroundings. Meaning that they are expected to eat the food at parties, otherwise you are antisocial. The same goes for drinking alcohol to join the others (Bukman et al., 2014). Social connections can be perceived as a barrier. Also, since social activity also enhances the well-being of a person, someone is often in a dilemma to choose between physical activity and spending time with friends (Teuscher et al., 2015). Social norms often influence behaviour for eating and physical activity (Ball, Jefferey, Abbot, McNaughton & Crawford, 2010). Thus, this issue is not only valid for the low SES group, but for all people when they are making lifestyle choices.

Different priorities

Next, people with low SES often have a lot on their mind to manage their life. They might experience several financial or social problems or health problems of family members. Due to an accumulation of personal problems, they simply do not have the time or energy to prioritise their own health. Nor do they have the time or motivation to participate in physical exercise (Bukman et al., 2014). For example, when someone has many kids, who need time and attention, has a financial issue that costs time and mental energy and has a ill family member that they have to visit in the hospital, not much time is left to incorporate physical exercise in their daily routine. Nor does it feel as a priority to these people, since they have to spend their time on their personal problems (Teuscher, 2015; Ballering, Schreurs, Renders, Kooiker & van Ameijden, 2013).

Short-term thinking

Furthermore, this group is known for being short-term thinkers. They might not realise the potential long-term harm of their unhealthy behaviour, nor do they see the benefits of changing their current habits. (Heutink et al., 2010; Pampel, Krueger & Denney, 2010). This mindset makes it harder to elicit intention to change within these people. Also, it is hard for them to see long-term benefits of changing their habits towards healthy ones. For instance, when a person feel stress at this moment, smoking a cigarette can be the solution to release this stress now, the long-term harm of this cigarette is not considered as important at that moment (Heutink et al., 2014). All people, including those with low SES want to experience a pleasant and stress free life. When they are dealing with current problems, they find a way to solve them quick and easily, to return to a pleasant state, and do not consider the long term health effects of this behaviour (Heutink et al., 2014).

Dependent on others

Additionally, people with a physical or mental disability often depend on others for exercise or transportation to an activity, which might discourage them to participate in physical activities. (De Hollander, van den Berg, Duijf & Hoogendoorn, 2019)

Low health literacy

Having low SES often goes hand in hand with having a low health literacy (Coupe, Cotterill & Peters, 2018). Health literacy can be defined as: 'The skills of individuals to obtain, understand, process and apply information about health, needed in order to take appropriate health care decisions in daily life. (Heijmans, Barbers & Rademakers, 2018; Sørensen, 2015). Someone with a sufficient level of health literacy has the ability to take responsibility for their health, as well as for family or community health (Sørensen, 2012). In the Netherlands, 2,5 million people have low literacy skills, meaning that they have trouble with writing and/or reading and mathematics. From the Dutch population, 36% has low health literacy (Heijmans et al., 2018). There are clear relations

between low health literacy, poor health status and health outcomes. People with low health literacy are also more likely to have a low SES (Stewart, 2014). Non-communicable diseases and psychological problems occur more frequently with people with low health literacy (Rademakers, 2014). These people have a shorter lifespan on average, compared to people with adequate health literacy (Bostock & Steptoe, 2012).

Due to low (health) literacy, it is hard for some people to absorb and understand messages from health interventions and put the explanations into action. Also, they often do not understand the importance of a healthy lifestyle (Coupe et al., 2018). Low educated people might have limited knowledge on unhealthy behaviour and are therefore less motivated to apply healthy habits. Since they might not understand health messages, current interventions are less likely trigger them to change their habits.



LOW HEALTH LITERACY



EDUCATION



PATRONISING INTERVENTIONS

Education

Furthermore, schooling increases efficacy, problem-solving skills and the ability to process information. People with low SES, and thus low education, encounter trouble with setting personal goals, (re)-organising life and self-management. These aspects can influence someone's ability and willingness to change their behaviour (Pampel, Krueger & Denney, 2010).

Patronising interventions

Finally, current lifestyle interventions are often designed in a way that they come across as: 'much must, little is allowed' (Heutink et al., 2010). This might be quite discouraging and makes the behavioural change harder for the individual. This was also the case at DZB, where they only provide one sort of fried snack a day in the canteen. This feels as patronising for the employees and is taking away their freedom to make their own choices.

Motivations to pursue healthy lifestyle

Since current health interventions might not evoke behavioural change within the individual with low SES, it is important to understand what drives this group of people in order to match the intervention to their motivations and needs.

Social support

Although social life can be a barrier to pursue a healthy lifestyle, it can also serve as a great motivator to participate in physical activity or other health related activities. During focus studies, low SES groups addressed that working with others and getting support from significant others works as a great motivator to pursue a healthy lifestyle. Also, it is important that the social surrounding of the individual is aware of health benefits and that they are supportive towards the initiative of the individual to change. Social control works as a great tool to keep someone on track with their habit change and to get someone stimulated by shared ideas and experiences. (Heutink et al., 2010; Bukman et al., 2014). However, when working together towards behavioural change, it is important to work with peers, for instance, people

of the same age, abilities or interests (Teusher et al., 2015). Additionally, physical activity is often perceived as more enjoyable when performed with others. When performing physical activity in a group, someone would be more motivated because the group expects the person to show up



MOTIVATIONS



SOCIAL SUPPORT



BODILY FEEDBACK



TAILORED INFORMATION



RAISED CONFIDENCE

2.2 BEHAVIOUR CHANGE

and participate. Health behaviour, when combined with something pleasant, like social engagement, is perceived as less demanding (Teuscher et al., 2015).

Bodily feedback

In most cases, people with low SES find the motivations to change their lifestyle when they get a sign from their body. This sign can be high blood pressure, heart disease or having bodily pain (Bukman et al., 2014). They do not always understand that a healthy lifestyle can prevent these kind of diseases or improve their health when they already have the disease. However, having a health setback in life can serve as a great motivator to turn the current lifestyle around.

Tailored information

Furthermore, when participating in a program, for instance to lose weight or change current

habits, a personalised message creates a more serious atmosphere, causing people to feel more motivated to change (Bukman et al., 2014). As an example, this can be the use of someone's name in a health message, but also showing knowledge about the participants personal situation, physical condition or age (Teuscher et al., 2015).

Raised confidence

People in low SES groups, mainly those with a disability, have often been passed over by others and had to adjust themselves a lot in their lives. Therefore, they do not have much trust in their own skills and might have lower self-esteem (Twenge & Cambell, 2002). Giving these people a confidence boost (e.g. providing compliments) can be a great motivator for people with low SES.

The aim of the project is to motivate people to exercise more and incorporate this activity in their daily routine. To achieve this, it is desired to evoke a behavioural change within the individual. Habits are the key driver in behaviour, 45% of peoples everyday actions consist of habits and routines (Neal, Wood & Quinn, 2006). Performing a habit does not require a lot of cognitive effort. That is why habits are preferred over new behaviours. Furthermore, health related behaviours are often guided by daily routines, social norms and values and not by the constant effort to be healthy (Teuscher et al., 2015). In order for a habit to be formed, the desired behaviour should be performed multiple times and eventually be included in someone's routine. The intention to perform in health related behaviours can be done by educating about benefits, or helping people with setting goals. However, another way to approach behaviour change is by supporting the action. By getting people to actually perform the behaviour, they can experience the positive outcomes of this behaviour, which can increase their intention and motivation to make a habit of this behaviour. One way to activate people and elicit desired behaviours is by persuasive game design. Persuasive game design is a tool to shape people values and beliefs about a subject and persuade them in doing certain actions. (Siriaraya, Visch, Vermeeren & Bas, 2018). This approach is suiting the target group and this project, and is therefore chosen as key to evoke behaviour change within the employees of DZB. However, in order to apply the right game elements to the lifestyle intervention and motivate the employees to change their behaviour, it is first important to understand what behavioural change, motivation and persuasive game design entails. This is described in the following topics.

Motivation

Motivation is the driver behind our actions. It can be described as the processes that give behaviour its energy and direction (Reeve, 2016). It is a reason for behaving a certain way and wanting to achieve our goals. People can be intrinsically

and extrinsically motivated (Deci & Ryan, 2000). Intrinsic motivation is doing an activity for its inherent satisfactions rather than for some separable consequence. It can be seen as the inner drive to seek challenges and possibilities. On the other hand, external motivation comes from external sources. This is doing an activity because it leads to a separable outcome. These separable outcome can for example be a reward. On the one hand, it is important to note that when the intrinsic motivation is already accomplished, an extrinsic motivation can appear to be controlling. Meaning that giving a reward for a task that is in itself intrinsically satisfying, can decrease the intrinsic motivation. This phenomenon is also known as the justification effect (Tang & Hall, 1995). On the other hand, note that in performance context often intrinsic motivation and incentives (such as wage, bonuses and rewards) coexist with each other and the incentives can enhance the intrinsic motivation (Cerasoli, Nicklin & Ford, 2014). So external motivators, such as rewards can influence intrinsic motivation positively as well as negatively, it depends on the situation the individual is in. Intrinsic motivators have more effect on quality of performance while incentives have effect on quantity of performance (Cerasoli, Nicklin & Ford, 2014).

Self-determination theory

Both intrinsic and extrinsic motivation drive us daily to meet 3 universal psychological needs that are described in the self-determination theory (figure 7) (Deci & Ryan, 2012). Self-determination theory refers to a person's ability to make choices and manage their own life. The 3 needs of this theory are *autonomy*, *competence* and *social relatedness*. People are motivated to grow and change by these 3 needs. If these needs are satisfied, it allows for optimal function and growth within a person. (Deci & Ryan, 2012).

Autonomy means that people feel in control of their own behaviour. They can make their own choices and set their own goals.

Competence refers to the skills you have learned or are learning. When you feel that you have right skills for a task, you are more likely to achieve your goals.

Social relatedness is all about having a sense of belonging to others and caring for others.

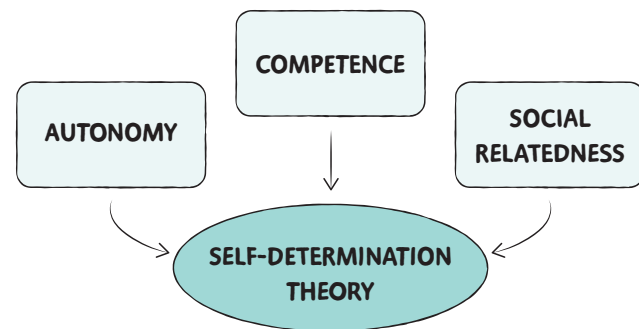


Figure 7: Self-determination theory (Deci & Ryan, 2012).

Designing for psychological needs

Within design, **autonomy** can be achieved by providing freedom of choice. This will allow for a sense of autonomy, which can serve as a motivator to perform this behaviour. Especially in the low SES group, where a call for action can be perceived as a negative stimulus, providing autonomy is an important aspect. Observations showed and the supervisor mentioned that this call for action is a negative approach. Telling an employee to do a task right now and saying this imperative tone can make the employee feel uncomfortable and the situation provides them stress. Some people need time to process information and consider the benefits or barriers of the activity. Not giving them the time to consider their choice pressures the individual and makes him/her wanting to leave and say no.

Competence can be tackled in design, for instance, by providing unexpected positive feedback on skills. Since the low SES group is often misunderstood or passed over by others, providing compliments can enhance their feeling of competence. This feeling can serve as a motivation and confidence booster to achieve their goals. However, these compliments need to

be tailored to the target group, so the compliments do not backfire by putting people off in engaging in the in the designed intervention.

Finally, **social relatedness** is very important for the low SES group. They like to help others and be together with others. Social relatedness can be a promising input for the design of the intervention. Seeking social relatedness can be their drive, while the intervention at the same time allows for increased physical exercise. As described in the previous chapter, working together and having support from others are important factors in health behavioural change for the individuals with low SES.



Behavioural change models

Theories about behavioural change are attempts to explain how behaviours work and why we do, or do not, change our behaviour. There are several models that have overlap with each other, but also include different elements that explain behavioural change. They help to understand certain behaviours of the target group. However, these models are not leading for this research, since the models include many different elements that can be interpreted in several ways. In this project these theories mainly serve as an inspiration and input for the health intervention. The models that served as inspirational input for the health intervention are described on the next two pages.

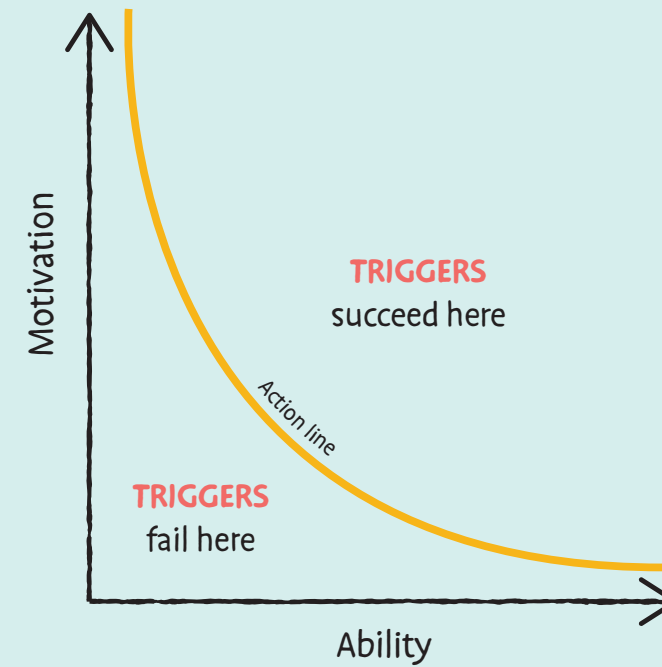


Figure 8: Fogg's behaviour model (Fogg, 2009).

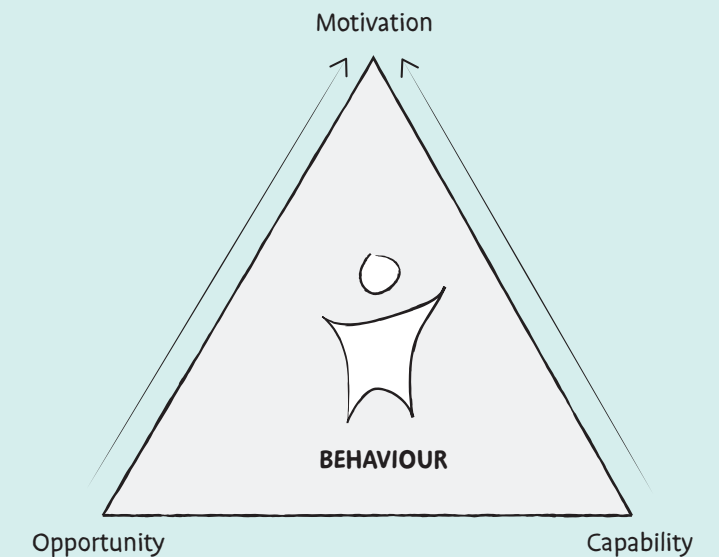


Figure 9: Interpretation of COM-B model

Fogg's behaviour model

In order for desired behaviour to occur the 3 elements of Fogg's Behaviour Model should converge at the same moment. These 3 elements are Motivation, Ability and a Trigger (figure 8). If one of those is missing, desired behaviour will most likely not occur (Fogg, 2009). Motivation refers to *'if people want to do a certain action'*. Ability means *'if people are able to perform the behaviour'* and the trigger is a *stimulus* that prompts the behaviour. For instance, a trigger can be a notification on the phone to do physical exercise.

It is assumed that the low SES group is not highly motivated to increase their physical activity, since they do not see the benefits of it. When motivation is low, the ability should be high. It is therefore important for the intervention to be easy to engage in. The intervention should not take too much time, money or effort. Additionally, when an activity is incorporated in a daily routine, the sense of ability will be high, since non-routine task can feel like more effort. Important to note is that the trigger for behaviour should be a positive stimulus, otherwise the desired effect can backfire.

COM-B Model

Not only motivation and ability/capability are drivers for certain behaviours, but also all outside factors influence willingness to perform in a certain behaviour (figure 9). The COM-B model describes these outside factor as 'opportunity'. The opportunity component shows that behaviour can only be understood in relation to its context (Michie, van Stralen & West, 2011).

The COM-B model shows that behaviour is part of an interacting system with different components. When designing intervention, one or more of these components should be changed in a way that they support the behavioural change and minimise the risk of failing. (Michie, van Stralen & West, 2011). Looking at the approach of this project, the context will first extensively be explored, such that all influencing factors are known and can be taken into account while designing the intervention.

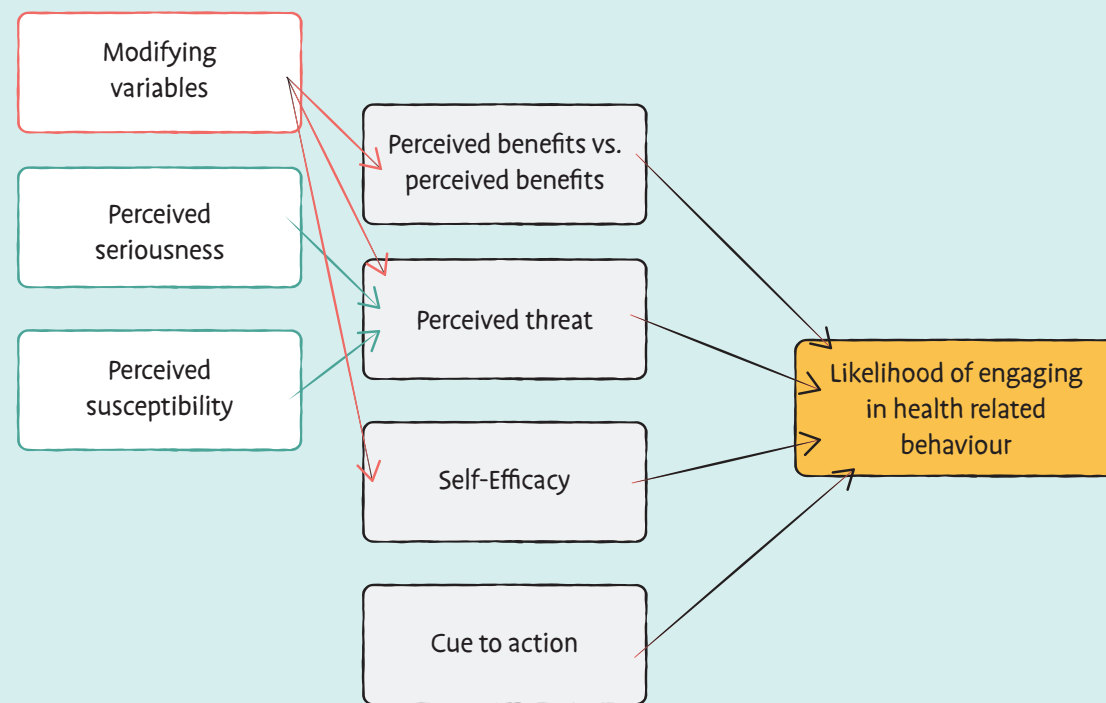


Figure 10: Health belief model (Strecher & Rosenstock, 1997)

Health belief model (HBM)

The health belief model is developed to explain and predict health related behaviours. This model shows that behavioural intention is influenced by the perception of threats and the perceived benefits and barriers of engaging in the behaviour. (figure 10) (Strecher & Rosenstock, 1997). Also influencing the behaviour is self-efficacy and a cue to action (trigger). The first 3 elements of the model are always influenced by different variables. Think about someone's age, gender cultural beliefs or their values.

The health belief model shows that people will not change their behaviour unless they see the benefit and realise the risk they are at. However, the low SES group are short-term thinkers and might not see these benefits or risks. Furthermore, they might see more barriers than benefits for engaging in health related behaviour. Also, as described before, the values and beliefs about health might contradict with the desired health behaviour. Therefore, it is important that the intervention educates the users about the benefits of physical activity.

Self-efficacy

Self-efficacy is defined as an individual's belief in his/her capacity to execute behaviours to achieve a specific task (Bandura, 1997). Self-efficacy thus refers to the confidence in one's ability to exert control over their own motivation, behaviour and social environment.

While engaging in behavioural change, self-efficacy can be a key component in succeeding in the desired behaviour. Literature shows that individuals with low SES report a lower level of self-efficacy (Boardman & Robert., 2000; Tong & Song, 2004). While self-efficacy is increased by the intervention, it will be more likely that the individual will keep engaging in the health related behaviour.

2.3 GAMIFICATION TO SUPPORT ACTION

Take-aways behaviour change models

These behaviour change models served as input and inspiration for designing the health intervention. Not one model is used as guideline, but most inspiring elements of all models are highlighted and later on included in the conceptualisation phase of this project. Firstly, the intervention should have a *low threshold to engage in*. Assumed that the motivation of people is low, the intervention should have a high accessibility so people can easily participate. Secondly, all *context factors of the situation will be researched*, so all influencing factors of the target group can be discovered and taken into account while designing the intervention. So that it is a tailored intervention for the employees with low SES, which will most likely be successful in grabbing the attention of the target group. Thirdly, the intervention will *enhance the growth of self-efficacy*, so that the individual will generate a higher belief in his/her ability to perform the desired behaviour.

The different behavioural change models show a pathway towards behavioural intention. However, still a lot can happen between having the intention and actually performing the behaviour. Many external influences can change one's motivation or beliefs about the behaviour. This problem is also referred to as the intention-behaviour gap (Sniehotta, Scholz, & Schwarzer, 2005).

The low SES group often does not feel the need consider the importance of healthy behaviour, since they do not see the long term benefits of this behaviour. Hence, they have limited to no intention to engage in healthy behaviours. This intention can be created by educating them about the benefits, or help them setting goals. In this way their motivation and capability can be increased, thereby their intention might grow. Another way to approach behavioural change is by supporting the action. By getting the people to actually perform the desired behaviour, they can experience the positive outcomes of this behaviour, which again increases their motivation and capability to maintain this behaviour in the future. This is the approach taken in this project. By making employees of DZB experience the pleasure of physical activity, they might be more motivated to do more physical activity themselves and include it in their daily routine. When experiencing the benefits of physical activity, their intention to perform in health related behaviours might grow.

A way to engage users in an activity is by games. Often, in a game world, a person is motivated to perform certain behaviours he would not have done in another setting. When people are immersed in a game world, they can easier be persuaded to change their beliefs about a certain action or behaviour. That is why persuasive game design can be a great tool to support action and achieve behavioural change. For example the 'Active Cues Tovertafel' where animations are

projected on a table to motivate elderly in nursing homes to increase physical activity. Results of this research showed significant improvement in peoples' physical activity as well as increased social interaction and happiness (Anderiesen, 2017). Within the game world, no prior knowledge and skills are needed. An aspect that suits the target group, since they are often lacking knowledge about health or do not understand health related information. The next topics describe how people can be persuaded and what persuasive game design entails.

Persuasion

Persuasion is the attempt to influence an individual's beliefs, attitudes, motivations or behaviours. Persuasion works best when collective concerns are in line with personal concerns. The goal of the intervention should be easy to relate to and quickly accepted by individuals. However, when the long-term implications of the intervention conflict with an individual's short-term concern, the intervention has a chance to fail (Tromp & Hekkert, 2011). For instance, when the intervention has a long-term goal of getting people to exercise and increase their well-being, the pain and effort the individual has to go through now, might not be worth it. This is an aspect to take into account while designing gamified interventions, especially with the short term thinking low SES group. Applying persuasion in an intervention is most successful when people participate in it voluntarily (Tromp & Hekkert, 2011). The persuasive influence should be apparent for the target group, however it is a weak influence, since they are free of choice to participate in this designed persuasion.

Persuasive game design

Persuasive game design is a method that aims to create an user experienced game world (GW) to change users behaviour in the real world (RW) (Visch et al., 2013.) The aim of persuasive game design is to persuade people to change their

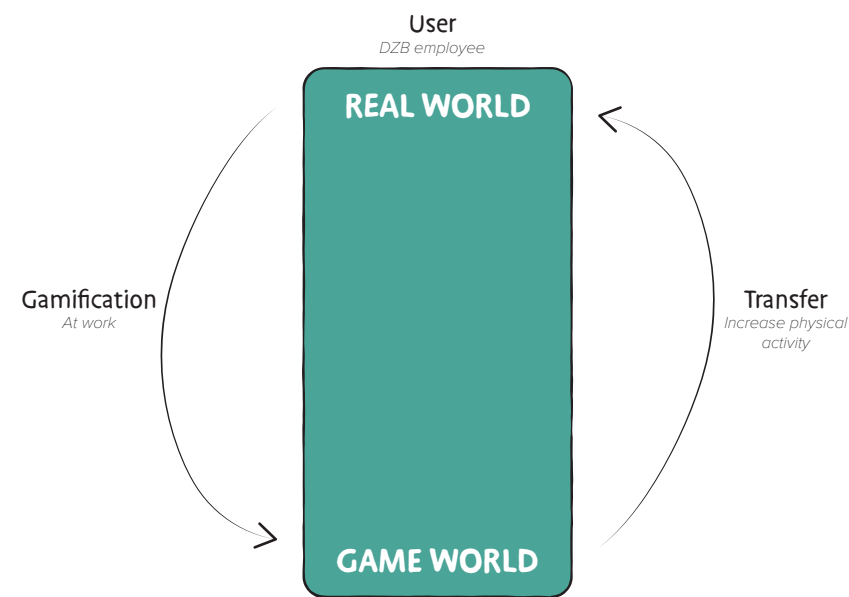


Figure 11: Persuasive game design model (Visch et al., 2013).

beliefs and views to influence their behaviour. Game worlds are designed to fulfill user's needs. A game world can be considered as a safe zone, where actions do not have major consequences, like they might have in the real world.

These worlds are displayed in the persuasive game design model (PGD) (figure 11) (Visch et al., 2013). PGD makes a distinction between the game world (GW) and real world (RW). Going from the real world to the game world is called 'gamification' and moving back from the game world to the real world is called 'transfer'. By designing game elements and applying them on real world situations, a user experienced game world can be created. Transfer is the effect of this user experience in the game world on forming, altering or reinforcing behaviour in the real world.

In this project, the gamification will be applied in the context of DZB and the transfer goal is to increase physical activity. Meaning that the physical activity performed in the game world will change someone's attitude towards physical activity. The player will see the benefits and will continue participating in physical activity in the real world, and hopefully incorporate it in their daily routine.

Gamification

Gamification is the use of game mechanics and techniques in non-game contexts. In this situation, the non-game context is the employees in their work environment (DZB building and its surroundings). These game elements are meant to motivate employees to pursue a healthy lifestyle and eventually achieve behavioural change. Game elements contain among others of feedback, goal setting, rewards, rules, narrative and challenges. Gamification is a great tool to achieve behavioural change since it is a way to engage people in an activity, and keep them involved in performing this activity.

Nudging

One way to guide people towards a desired behaviour is by nudging. Gamification elements are sometimes nudges. Nudges are small interventions that stimulate the subconscious mindset. A nudge attempts to influence behaviour in a predictable way by making use of cognitive

patterns of thoughts. Within gamification there can be made use of a nudge. For instance the piano stairs that guide people towards taking the stairs (Figure 12). Important to note is that a nudge preserves freedom of choice and should not limit peoples choices. Also, a nudge does not include changing current processes, for example including a fine or reward.

In order to have ethical considerate nudges, they should be transparent and not misleading. It should be easy to not perform in a nudge guided behaviour and the desired behaviour of the nudge should be in best interest of the person.



Figure 12: Piano stairs nudge - The Fun Theory. Retrieved from: <https://goodvertising.site/the-fun-theory/>

2.4 CONCLUSION

A lack of physical activity can have severe consequences in the form of non-communicable diseases (NCD). However, participating regularly in physical activity of at least 150 minutes a week can prevent these kind of diseases and improves energy balance. While this seems manageable, individuals with low SES often encounter several barriers in participating in physical activity, such as having no financial means, not having the right information or unsupportive social relations. However, this group also has several motivations to do physical activity, such as having social support or getting a ‘sign’ from their body to get active.

This chapter described several behaviour change models where elements will be used while designing in order to elicit behaviour change with the target group. Gamification is a promising method in activating people and creating an experience that will help people to incorporate physical activity in their daily routine.

Some of the research questions that are described earlier could be partly answered by the literature research. The literature shows typical examples of how people with low SES manage their health and what their view and knowledge is about healthy living. While this research gives an interesting overview, it is not specified on the employees of DZB. These people often have a physical or mental disability causing their low socio economic status. In order to empathise with this target group an extensive field research is needed to get a more elaborated answer on the several research questions.

The literature study helped to get a better understanding of the target group and their motives for their current behavioural aspects. The insights are important to consider while developing the intervention for the target group. When incorporating the elements of behavioural change, the intervention can have more chance to succeed in its goal to increase physical activity of the employees with low SES.

► **RQ1:** What is the current view and knowledge of the employees about a healthy lifestyle?

People with low SES often have a low health literacy. This means that is hard to understand health related information or put health related messages into action. Due to this low health literacy people might not have the knowledge about the importance of a healthy lifestyle and therefore have low motivation to apply healthy habits in their life.

Furthermore, people with low SES see many several barriers in pursuing a healthy lifestyle. These are described below.



BARRIERS

- No financial or material means
- Negative associations with sport
- Unsupportive social connections
- Too much going on in their lives
- Short-term thinking about health
- Relying on others because of disability
- Low health literacy
- No/low self-regulation
- Current interventions are patronising

► **RQ2:** What are the main motivations, habits and needs of the employees?

While people experience barriers. There are also motivations that they have for doing healthy activities.

This part of the research was mainly focussed on the motivations regarding physical activity. During field work the goal is to also discover general motivations and needs of the target group. In order to incorporate them in the intervention.



MOTIVATIONS

- Sign/feedback from body to work on health
- Positive social support
- Personalised messages in interventions
- Compliments for confidence/competence boost

► **RQ3:** At what level are the employees prepared to change their current habits?

Although the literature research did not necessary learned us how prepared people with low SES are to change. The exploration about behaviour change shows how intention to change can be increased. The aspects below are the main insights that should be taken into account while designing the health intervention.



BEHAVIOUR CHANGE

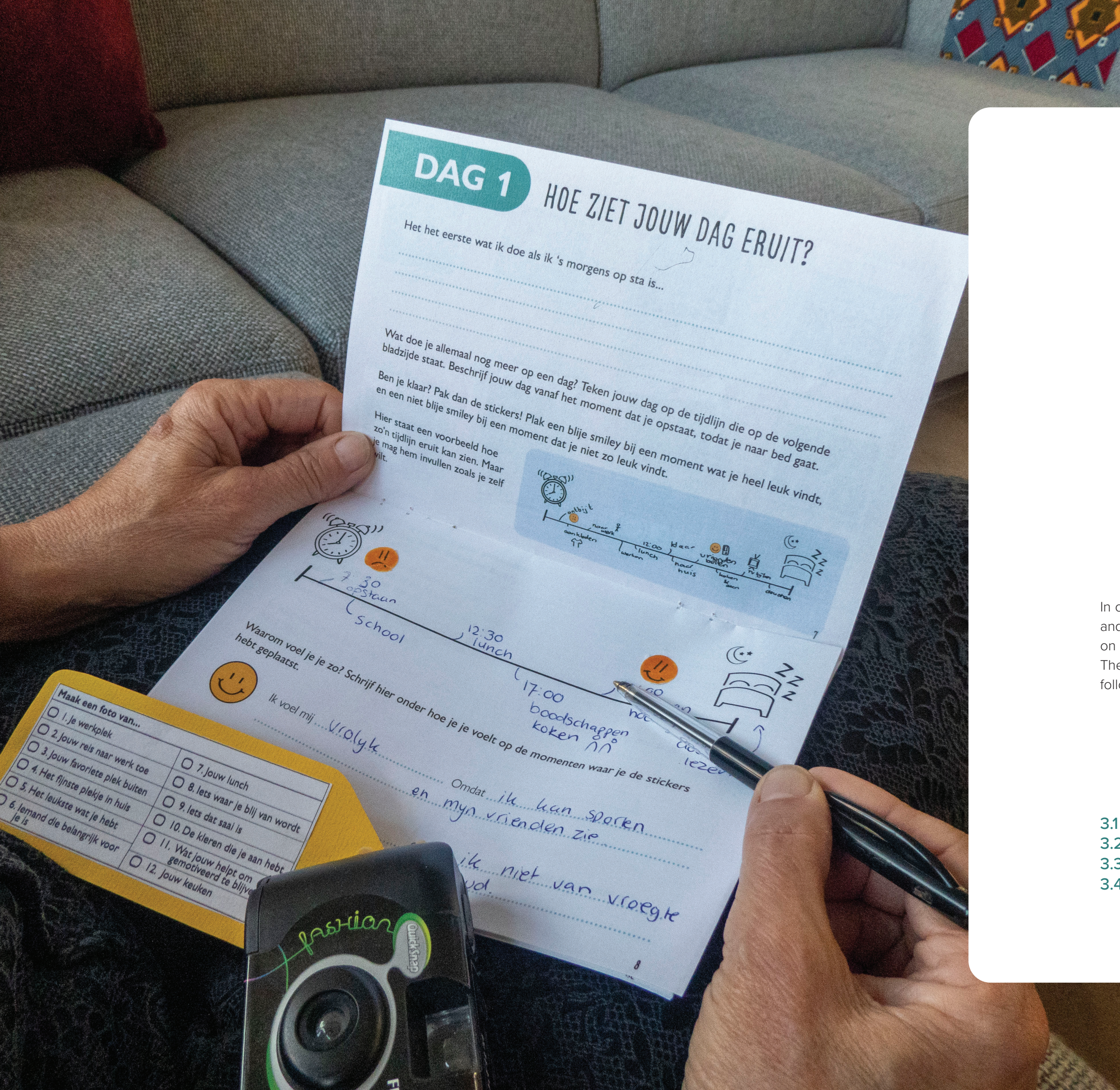
- Provide autonomy
- Support their skills
- Enhance social relatedness
- Create a high ability, since motivation is low
- Support the action of behaviour
- Increase Self-efficacy
- Educate about benefits and risks

03

FIELD STUDY

In order to empathise with the employees of DZB and find out their daily motivations and their view on health, a contextmapping study is conducted. The approach of this study and the results that followed are described in this chapter.

- 3.1 Contextmapping
- 3.2 Data analysis
- 3.3 Results
- 3.4 Conclusion



3.1 CONTEXTMAPPING

During the literature research not all research questions were answered or fully answered. In order to get a good view of the target group, it is important to understand what the attitude of the target group is about their behaviour and lifestyle. This understanding helps to optimise components of the health intervention which makes the intervention more relevant to the target group (Teuscher et al., 2014). In order to get to know and understand the employees of DZB and create an intervention that provokes behavioural change, a human-centered design approach is essential. This approach involves empathising with the user of the future product and taking the users perspective as a start of designing.

One way to empathise with the user is by contextmapping (Visser, Stappers, Van der Lugt, & Sanders, 2005). As the name suggests, the context of a subject is mapped by using different research techniques. It is a way to get to know the underlying motivations of people and discover about their everyday lives. The context are all factors that influence the experience of a product. Contextmapping research is not yet focussed on one product or idea, it is an open qualitative research that is aimed to collect a lot of rich and broad information that is later on analysed (Visser, Stappers, Van der Lugt, & Sanders, 2005). This contextmapping research consists of a sensitizing period and an interview with generative tools, of which the information will be used as input for design.

During a regular interview or observations can be discovered what people say and do. However, by doing generative research, dreams, underlying needs and latent knowledge can be discovered (figure 13) (Sanders & Stappers, 2012). In order to find this latent information, there must be dived deep, which happens during this contextmapping study.

By being involved in this type of research the target group already starts thinking about what a healthy lifestyle means for them. This helps them to come into a reflective state and makes them think about their behaviour. When interviewing them after the sensitizing period, the participants will likely feel comfortable and more fruitful answers and insights will appear than there would have with a regular interview. The answers are more fruitful since deeper knowledge will be unveiled. You do not just discover what people do, but why they do it and what their values, culture and beliefs are.

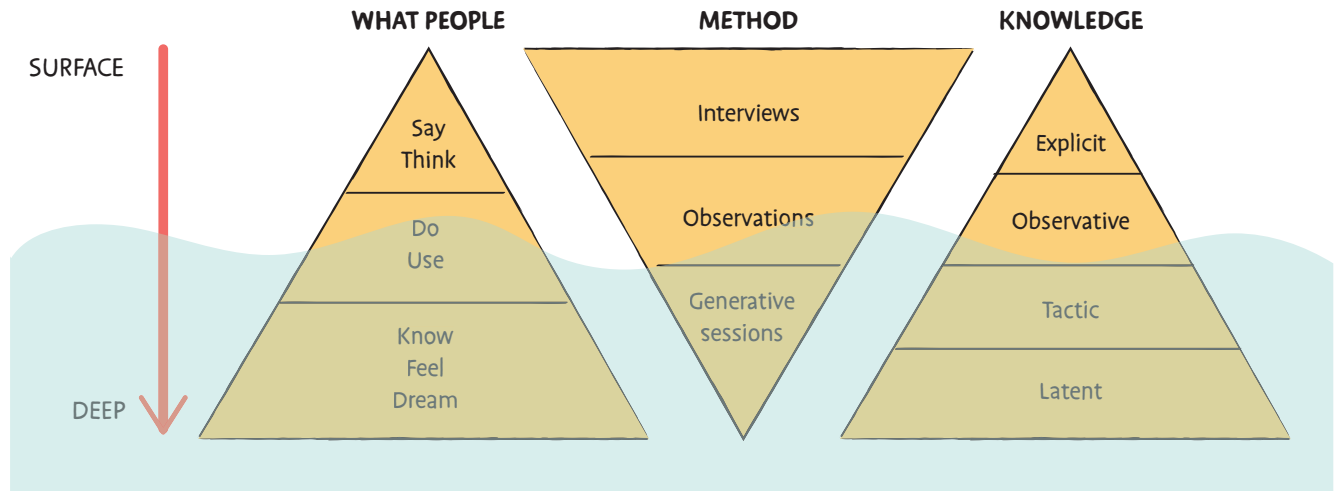


Figure 13: Research techniques to explore peoples experiences(Sanders & Stappers, 2012)

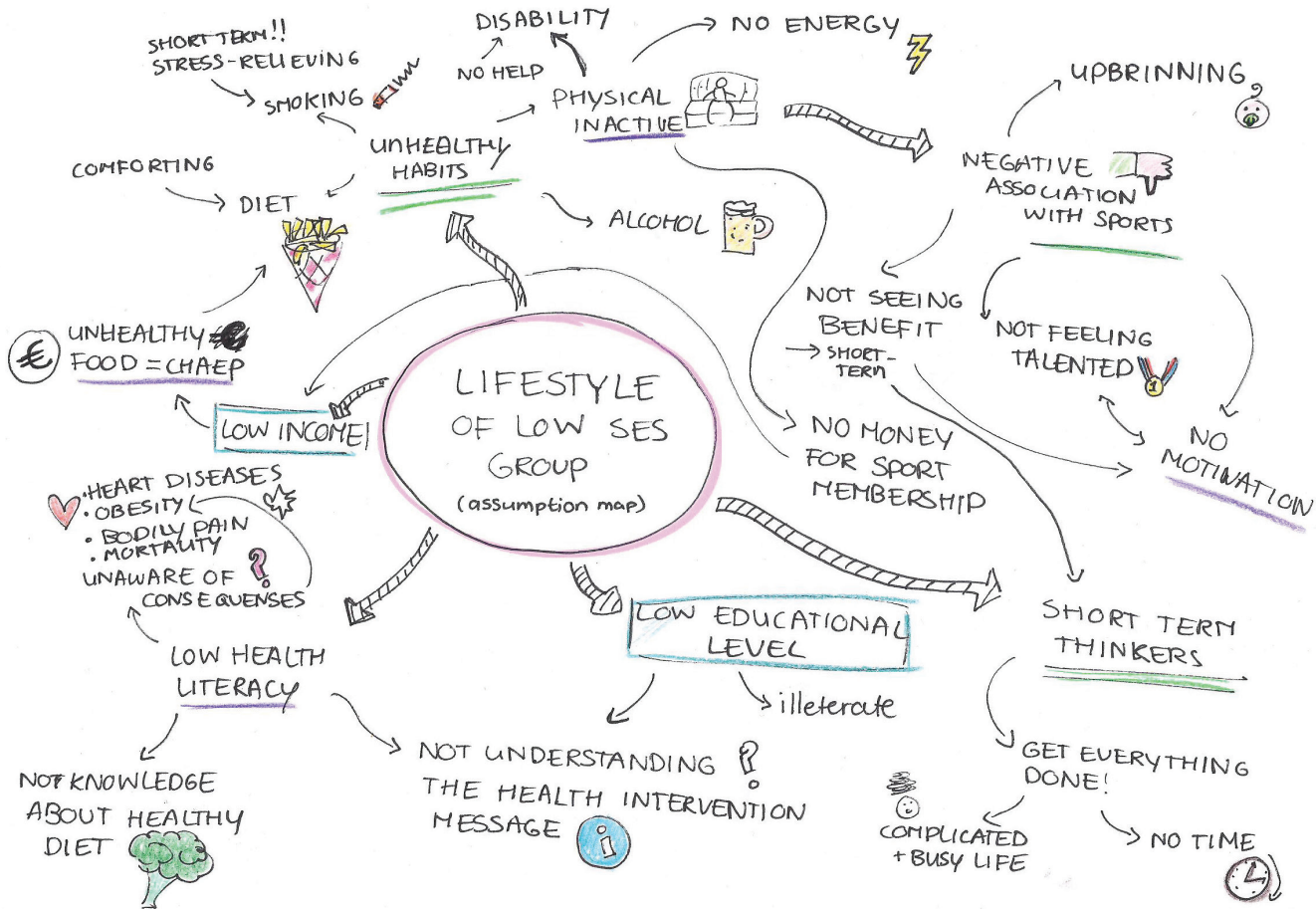


Figure 14: Assumption map lifestyle of low SES group

Preparation

After the literature study on health and lifestyle within low SES groups, an assumption map was created (figure 14). The assumption map describes that it is assumed that people with low SES often have a negative association with sports, which might prevent them from participating in physical exercise. Also, it is assumed that people with low SES have an unhealthy lifestyle including being physically inactive, smoking and drinking. This lifestyle can be caused by having a low income, which makes it harder to afford healthy foods or a sport membership.

The assumption map shows insights from literature. From the assumption map, it was discovered that a few things about the DZB employees were still unknown. Namely:

- **RQ1:** What is the current view and knowledge of the employees about a healthy lifestyle?
- **RQ2:** What are the main motivations, habits and needs of the employees?
- **RQ3:** At what level are the employees prepared to change their current habits?
- **RQ4:** How do the employees believe they can be supported in pursuing a healthy lifestyle?

These are some of the research questions that are focussed on the people of DZB. By doing an extensive contextmapping study, these questions can get answered. So that important elements can be incorporated in the intervention. Additionally, the employees should express their needs regarding the health intervention. Therefore the last two research question are addressed in the interview by a session with game elements and a co-constructing stories session.

- **RQ5:** Which game elements match with the characteristics and motivations of the employees?
- **RQ6:** How can the designed intervention stimulate increased physical activity of the employees?

All research questions served as inspiration for the content of the sensitizing materials and interview. Questions 1 and 2 are mainly addressed in the workbook and all 6 questions are discussed in the interview.

Sensitizing package

The assumption map also shows the insights from the literature study that are taken into account while designing the sensitizing materials. This sensitizing package consists of a workbook with several exercises, a disposable camera and a few pens (figure 15).

The questions are formulated in such a way that they do not judge the amount of physical exercise someone does or does not do. Also, as seen in literature, many people have low literacy skills. The assignments are formulated as clear as possible and with a lot of visual support. Furthermore, the assignments are short, so participating in the research will not cost too much effort for the employee that participates in the study. After the participant has carried out the exercises, the workbook returns to the researcher. Details of some assignments of the workbook are described later on in this chapter.

The goal of the exercises is to find the answers on the research questions 1 and 2 listed at the beginning of this topic. This is including their

interests, motivations, dreams, as well as their current barriers and motivations for physical exercise and their view on healthy living. The workbook not only includes exercises about dreams and physical exercise but also includes a photo assignment.

During the sensitizing period there has been close contact with the participants in order to keep them going and help them if they had any questions. It was made clear to them that they can contact the researcher at any time for questions. When questions from the workbook are not understood or the participant has trouble reading, an instruction video was sent to them.

Overall, the booklet is made visually appealing with the goal of motivating people to fill in the exercises and create an overall pleasant experience for the participant. This filled in workbook not only provides the researcher with fruitful information about the target group, it also prepares the participants for the interview. Meaning that they learn and think about the topic of physical exercise, before they are asked about it.

Workbook

The workbook consists of different small assignments. The activities are spread over 4 days and every day a person would spend around 15 minutes on filling in the workbook. There are two types of assignments: Some assignments are focussed on the dreams and interest of the participants, other assignments are about the participants view on health and exercising. For instance, one exercise asked about their dream present (figure 16), their idol or dreams for the future. Another assignment was to map out with stickers on a web what they considered as healthy (figure 17). The total content of the workbook can be found in appendix A.

On day 3, the assignment is specifically about physical exercise. They are asked how much exercise they do, what they think about exercising and what their motivation is to do physical exercise (figure 18). For this last one, the ExersizeMotivationInventory2 is used as inspiration for the assignment (Markland, 1999). This tool clearly shows different reasons for physical exercise and links it to a certain type of motivation, which is suitable to discover what kind of motivations the participant has for doing physical exercise. The motivations that the questions are based on are stress management, ill-health avoidance, enjoyment, affiliation, positive health, appearance and strength and endurance.

Photo assignment

The goal of the photo assignment is to discover the participants surroundings and important aspects in their lives (figure 19). They get clear assignments, like photograph your kitchen or workplace, but also more emotional and abstract assignments like who the most important person is for them. Since the low SES group might have trouble reading and understanding, the photos serve as a way to visually express what is important to them.

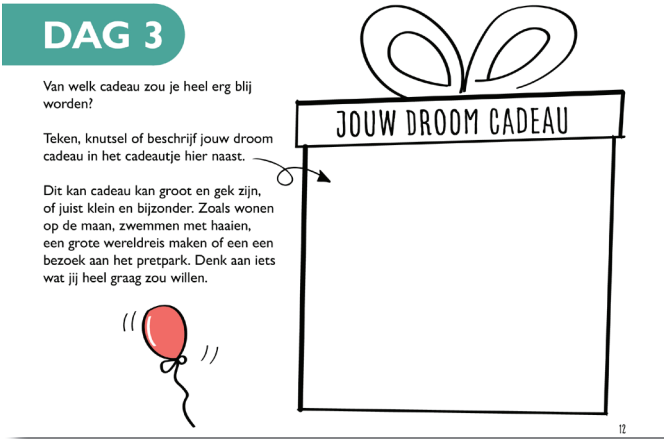


Figure 16: Assignment about dreams present

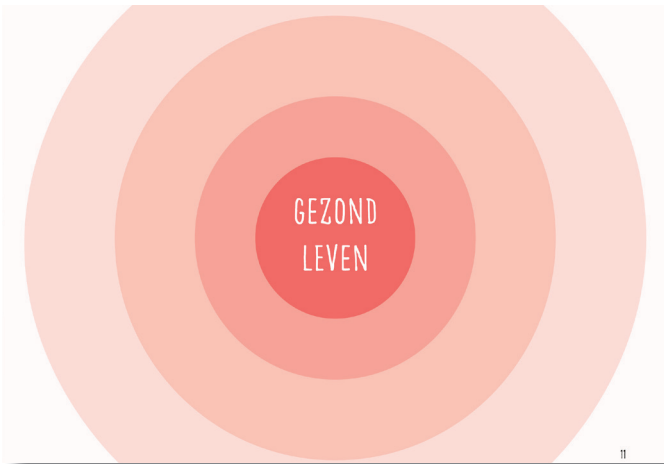


Figure 17: Web for healthy living

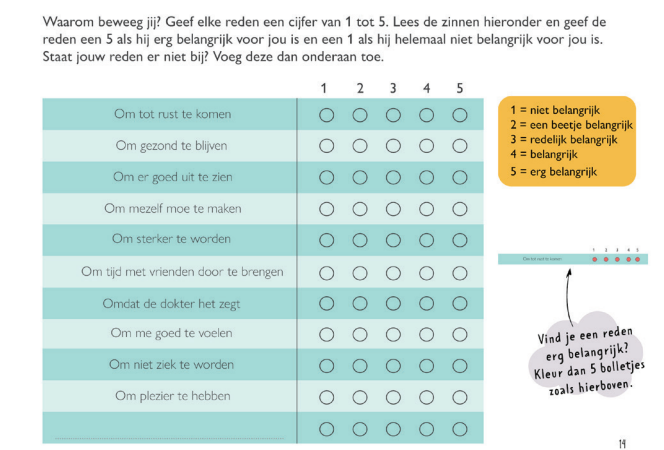


Figure 18: Assignment reason for physical exercise



Figure 19: Photo assignment



Figure 15: Sensitizing package

Participants

The participants were firstly recruited by the company supervisor, this is someone they know and trust. Many people that were approached found participating a bit scary and needed multiple explanations about the content and goal of this research. Finally, 8 people consented to participating in this research and they were firstly asked for informal consent and then they were handed a sensitizing package. The group consisted of people with different jobs within DZB. The age differed from 31 to 53. Among the group were 5 females and 3 males.

- ▶ All participants returned a filled in workbook.
- ▶ 6 participants took images with the disposable camera, 2 returned the camera without having used it, they reported to feel uncomfortable with taking pictures.
- ▶ 7 participants participated in the post-interview, 1 participant stopped working at DZB and was therefore not included in the interviews.
- ▶ 6 participants concluded the assignments without any help, 1 person had trouble with one assignment and received an instruction video, 1 participant received instruction videos for every assignment.
- ▶ All participants were asked halfway the 4 day period if everything was going well with the workbook and if they had any questions or needed help.

Ethical considerations

The employees of DZB include vulnerable people who can be sensitive. In order to protect this group from being harmed emotionally or feeling uncomfortable, the following ethical regulations were taken into account.

The goal and course of the study is clearly explained in a consent form (appendix B). Before starting the sensitizing period, this consent form is read by the participants or read to them to make sure they understand what it meant to participate in the research.

Firstly, on this form the participant gives consent that they voluntary participate in this research, it explains that they can withdrawal from the study at any moment and that they do not have to answer a question if they do not want to.

Secondly, they give consent on giving the information from the workbook to the researcher and that the data from the workbook will be anonymised. Names are not documented and pictures are blurred. However, they are made aware that the anonymised information can be used for this report and the final presentation of the researcher.

Thirdly, the participant can provide consent for the interview being audio/video recorded and the researcher taking notes during the interview. It is made clear that this data will be anonymised and only used for the purpose of this research.

Interviews

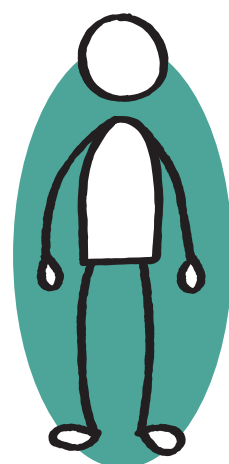
As mentioned before, the sensitizing period helps the participant to be better prepared for the post-interview. The answers of the participants are more rich, since the participant can dive deeper into the subject. The interview is done individually and takes around 45 minutes for each participant, the interview is video and audio recorded. It is decided to do an individual interview to give the participant the comfort of speaking freely about their personal experiences and avoid the risks of being influenced by other participants.

The interview consists of 3 parts: (1) some questions about health and health motivation, (2) a session of co-constructing stories for possible design solutions and (3) a session to see which game elements can motivate for physical exercise. Below is described what the different activities entails and what kind of questions are asked. The full interview guide can be found in appendix B.

1. The goal of this first part is to discover participants' view on health and to see if they are willing to change their current habits. There are questions asked such as: *Are you happy with your own health?; What do you think about physical exercise at work?; Do you*

want to do more physical exercise during the day?

2. The goal of this part is to co-design possible interventions. There are 3 initial ideas described in storyboards. The participants are stimulated to change parts of the idea and express their opinion about it. This session and its results are further described in the chapter 4 about ideation. After showing the storyboards there were questions asked such as: *Does this idea fit you/someone like you?; What would you change about the idea?; Which idea fits best with healthy living?*
3. This part is to find motivational elements for physical exercise that can be incorporated in the intervention. The motivational elements are discovered by showing the participant PLEX cards with game elements (figure 20) (Lucero & Arrasvouri, 2010). The used PLEX cards can be found in appendix C. The participant was asked to choose two elements that would motivate him and two that would discourage him in doing physical activity. Finally, they were asked if these chosen elements would also motivate them in work context.



8 PARTICIPANTS
5 female & 3 male



8 FILLED IN BOOKLETS



7 INTERVIEWS



6 RETURNED CAMERAS



Figure 20: Interview participant with storyboards and PLEX cards

3.2 DATA ANALYSIS

From data to knowledge

The analysis procedure can be explained by the DIKW hierarchy created by Ackoff (figure 21) (Ackoff, 1989). DIKW stands for Data, Information, Knowledge and Wisdom. The data consists of the filled in workbooks, interviews and photo's. The data is interpreted by the researcher and written down on post-its, which transforms the data to information. By interpreting the data, meaning is given to it. Also, a piece of data can contain multiple interpretations. The information is then clustered such that different themes can be discovered. These themes and relations show the knowledge that merge from the data. When using this knowledge, a bigger picture can be created which can form the basis of fundamental ideas. The higher you move up in the DIKW scheme, the bigger and more significant ideas can be created. This allows for creating a framework that connects backwards to the data. This framework serves as communication as well as a starting and reference point of the conceptualisation phase. In this way, the data, information and knowledge is used to design and develop future concepts.

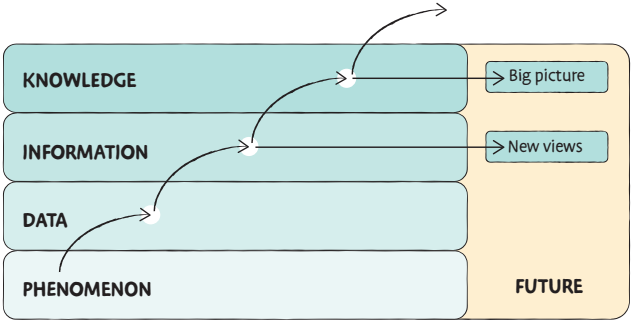


Figure 21: DIKW hierarchy (Ackoff, 1989).

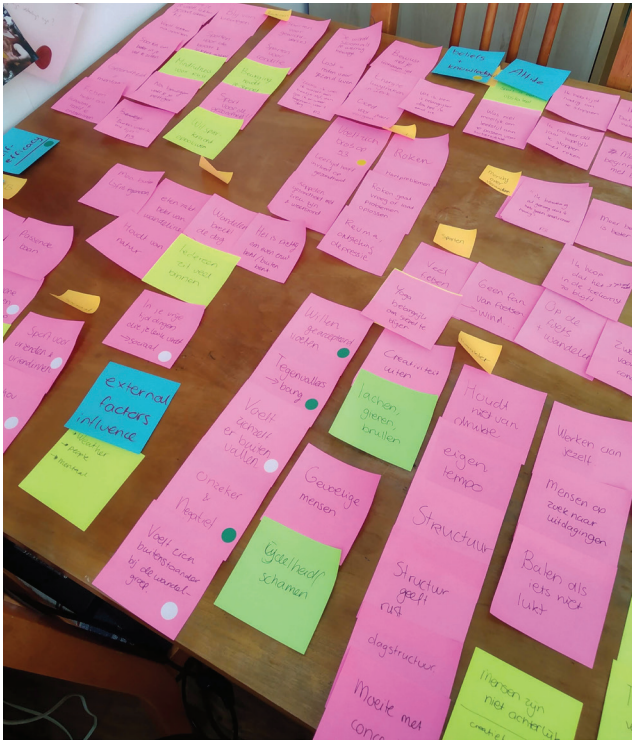


Figure 22: Analysis executed on the table showing different clusters.

Analysis on the wall

In order to move higher in the DIKW hierarchy, the interview data and the information from the sensitizing materials are analysed with the 'analysis on the wall' method (Sanders & Stappers, 2012). This analysis approach helps to realise what is learned from the data. An analysis on the wall is very suitable for small sample groups, like the 8 people that participated in this research. A big table is used to conduct this analysis (figure 22). The information that is written down on post-its is placed on the table and clustered in different categories to find patterns, relations and themes throughout the data. These categories are developed around the research questions described in chapter 1 of this report. This clustering is done in order to create insights and find knowledge emerging from the information.

Additionally, the data is looked at through specific lenses, these design lenses are topics based on elements of behavioural change theories. Namely: self-efficacy, autonomy, social relatedness and attitude towards health. These are the elements that seemed leading throughout the literature study.

3.3 RESULTS

The insights (appendix D) from the data analysis are translated to 3 personas and a general description of a DZB employee with low SES attributes and motivational elements. These documents are created to communicate the information and knowledge from the field study towards the company and supervisory team. For each result, the research question that are answered are mentioned. Firstly, the themes and insights of the different lenses are shortly described, since they serve as the starting point of the creation of the different materials.

Themes

While sorting the data, different themes were found:

- Opinion about behaviour change
- Beliefs and knowledge about health
- Reasons for physical exercise
- Barriers for physical exercise
- Current health issues
- Characteristics
- Current interventions
- Sports
- DZB

These different themes each contained a broad range of information. This information is incorporated in the personas and general description of DZB employee, which are explained in the next topic of this chapter.

Lenses

The data is analysed through different lenses of self-efficacy, autonomy, social relatedness and attitude towards health. These lenses come from the literature study about behaviour change models and motivation. Analysing through these lenses allows to discover facts about the actual behaviour of the employees and reasons for this behaviour. For all these lenses there are found insights, which connects the field study to the literature study. It can be concluded that all lenses were found back in the data. These insights are also incorporated in the personas and description of the DZB employee. A small summary is described on the right.

“ Why do they [DZB] interfere?
Is what I am thinking
- participant 6 about autonomy ”

Self-efficacy

This topic is recognised in the data by the participants mentioning that they are insecure and afraid of failure. Observed is that they see things in a negative light and see a lot of obstacles on the road. Sometimes they rather not participate in an activity, since they are afraid of having a set-back again.

Autonomy

Participants mentioned to have experience with being pushed into healthy behaviour. For example, they can only choose one sort of fried snack in the canteen, while it used to be 5 sorts of snacks every day. This approach might help the people to make healthier diet choices, however the target group is not happy with this decision from higher up. In order to have a positive effect on the employees, participating in a health intervention should be voluntary and the group does not like to be patronised. They like to do things at their own pace, and their own will.

Social relatedness

Sense of belonging was often recognised in the information the participant gave. People are proud of being a part of DZB and mention to want to do activities together with their colleagues. Additionally, they tell that physical exercise can serve as a way for them to meet with other people, like making a walk together. The other side of this lens showed that people are also very afraid of social exclusion and being rejected by others.

“ At DZB we are all the same!
- participant 3 about belonging to a group ”

Attitude towards health

The employees of DZB live in the moment. They do not worry much about the future. Although they know what is considered healthy, they listen to their own body and if they feel healthy, they think they are. Overall, there can be said that the people are satisfied about their health and do not have much intention to change their current behaviour.

The employees of DZB

Research question answered

- **RQ1:** What is the current view and knowledge of the employees about a healthy lifestyle?
- **RQ2:** What are the main motivations, habits and needs of the employees?

Personas

Personas are archetype of the users. They show among others the needs, wishes, motivations and behaviour of someone from the target group. These personas are based on the information from the contextmapping study and interviews. During the design process, the personas help to bring focus or estimate if the user will understand the intervention by including the personas in a user scenario (Cooper, 1999). There are created 3 different personas for this project: The ‘Content routine worker’, the ‘Straightforward explorer’ and the ‘Friendly outsider’ (figure 23). Thus, during the conceptualization phase of this project, the personas are taken into account. Although personas are a great way to find out if the intervention will be understood and used correctly by the target group, the intervention should still be evaluated with real users by means of a user test and verify the intended use of the concept.

Additionally, these personas help to communicate the insights to the company and to verify if the researcher was able to retrieve a clear image of the people at DZB. The personas show the regular life of the employee, as well as the motivations and barriers to do physical exercise.

The personas were discussed with the company supervisor since he has experience working with the target group and could check whether the personas were matching the people of DZB. During that discussion was asked by the researcher if the personas are recognisable and

if something is still missing. In the first instance it was clear, however the supervisor pointed out that the inconvenient aspects the character can encounter were missing in the persona. Those were later on added to make the persona a more realistic representation of a DZB employee. Also, the personas were a bit too specific, so they were generalised to make them more representable for the whole target group. Additionally, the company supervisor mentioned that one specific archetype was missing. This missing character can be described as the timid introvert. However, these sort of persons did not participate in the contextmapping research and they are out of scope for this design assignment. These people probably found it too scary to participate in the study and therefore the more confident, social and open-minded employees of DZB participated. Since DZB has many different people working in their company, it was not possible to reach the full sample. In the conceptualisation phase, focus will lie on these 3 personas. The evaluation phase will show if the design is working for the proposed target group and people will be recruited that are generally more involved.



THE CONTENT ROUTINE WORKER

Active - sensitive - humoristic

“I move more than enough! I cycle to work every day and walk with the dogs”

During work I always walk a lot. I like to joke around with my colleagues and often compliment them on their work. I cycle to work every day and after a day of work I always feel tired and satisfied. Work keeps me busy, sitting on the couch is not for me.

When I’m at work, I don’t have to think too much about my other problems and I won’t get bored. Working gives structure to my day. Rest and regularity is what I need!

I am very attached to my colleagues, we always work hard together and we are a good team. It is a joy to have this group around me. They understand me a better than some others. Because I have problems with my joints, work can be though which makes me quickly irritated an angry. Then, my colleagues understand that I then take some time for myself so I can get back to work afterwards.



- To feel good in your body
- To be in shape
- To enjoy



- Does not feel the need
- No time



THE STRAIGHTFORWARD EXPLORER

Curious - Confident - Social

Overall, I feel good. However, during my work do I sit still a lot and sometimes I notice that I get a bit stiff. As soon as I feel that, I immediately start exercising and then I feel good again the next day. So I can sense very well when I should start living a little healthier again.

Sometimes I find it difficult to find the motivation to exercise. I am often busy with other things. Since I live alone, I would rather spend my free time drinking a beer with some friends than getting tired in the gym. When I come home after a long day at work, I more often find myself on the couch playing video games, which I find very relaxing. During my work and beyond, I enjoy discovering new things and taking on new challenges. I have to be sure that the challenge is achievable, I don’t do very crazy things that often.

“As soon as I feel that I am getting a bit stiff, I will do physical exercise again, for 1 day”



- Work on physical condition
- Lose weight
- Build muscle strength



- Difficult to start
- Busy (social) life

Figure 23: Personas.



THE FRIENDLY OUTSIDER

Insecure - helpful - ashamed

"I feel comfortable in nature"

My friends are very important to me. Sometimes we go for a walk together which I find very relaxing, then I can laugh so much with them. To unwind, I like to be in nature and listen to the birds. During the break at work I often also take a walk, because that breaks up the day so well. But I will only go when the sun is shining.

At work I need peace and space, if someone imposes something on me or puts pressure on me I get very stressed and I don't get my work done properly, I prefer to do my things at my own pace.

I have tried various sports, but I often feel uncomfortable. The group does not suit me and I have the feeling that I am looked at strange when I fail in doing something. That's why I'm not even trying to join a group anymore.

"It should not be like you should, you should, you should."



- Clear your head
- Relax
- Stay flexible



- No confidence in new sport
- Joint pain
- Afraid of rejection

Figure 23: Personas.

General description of DZB employee with low SES characteristics

As addition to the personas, a general description of an employee is created (figure 24). This description is a combination of insights from field work as well as literature. This creates a simple, complete and more general overview of the characteristics of a DZB employee with low SES attributes. Next to the personas, this description serves as a summary of what the user needs, interests and feelings are. These elements can be taken into account while designing the intervention. The different aspects of the description and how they are applied are explained on the right.

- **Needs:** The universal and abstract needs the employee has. These are the needs needed to feel positive and comfortable at work.
- **Attitude towards health:** The view and behaviour the employee has about their own health.
- **Feelings:** The feelings the employee regularly encounters. These are feelings that are common with people with low SES.
- **Home situation:** The living and personal conditions of the employee.
- **Inhibition for physical activity:** The obstacles the employee faces in wanting to do physical activity.
- **Drivers for physical activity:** The motivational elements for the employee to do physical activity.
- **Work situation:** The reasons for work and the situation at work for DZB employees
- **Interests:** Hobbies employees have, the place where they like to be and where their needs are fulfilled.

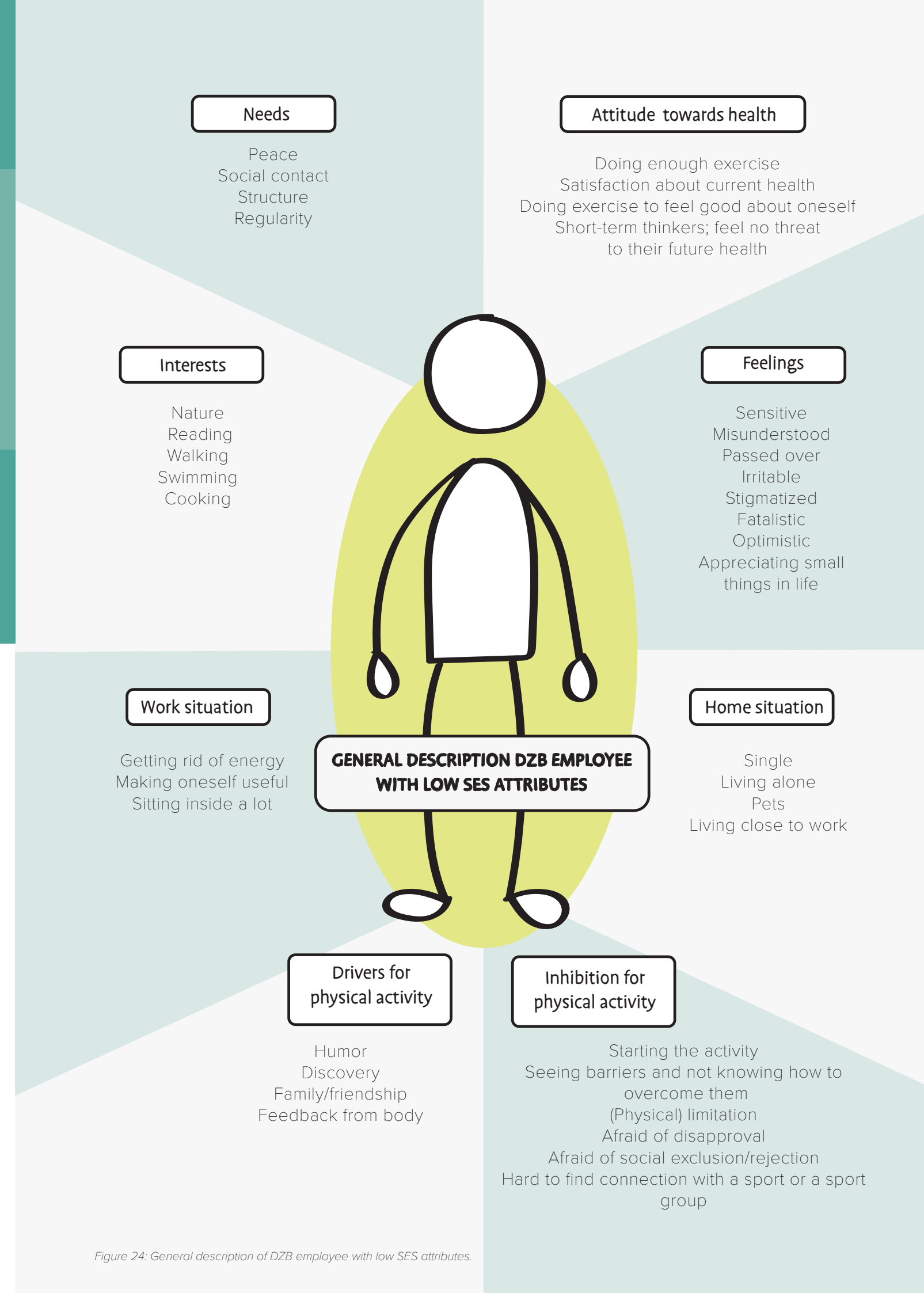


Figure 24: General description of DZB employee with low SES attributes.

Valuable insights

In this section, some of the elements mentioned in the general description of a DZB employee with low SES attributes are described in more detail. These are the insights that give answer to the research questions mentioned in the beginning of this chapter. The attitude towards health, the inhibition for physical activity and the drivers for physical activity are described.

Attitude towards health

Living in the here & now (short term thinkers)

► **RQ1:** What is the current view and knowledge of the employees about a healthy lifestyle?

From the interviews it became clear that the people really live in the here and now. As found in literature, they are short term thinkers and they often feel no threat for their future health. This is also recognised in the answers of the participants. Since the participants do not extensively consider the future, they are not aware of the threats that come with an unhealthy lifestyle. Therefore, they are also not aware of the added benefits of living healthy, because these effects are often only noticeable over a longer period of time.

Satisfaction about current health

- **RQ1:** What is the current view and knowledge of the employees about a healthy lifestyle?
- **RQ3:** At what level are the employees prepared to change their current habits?

When participants were asked if they have a will to change, they reported to be satisfied with the way things currently are. They do not feel ill often, which means to them that they are healthy. They interpret the fact of not being ill as having a good lifestyle. The participants show that they have no direct intention to change their current lifestyle.

“ Health means feeling good about yourself and having structure in your day - participant 3 ”

After the interview period, literature was consulted again to clarify this particular aspect of their behaviour. An explanation is that people show a way to deal with the tension between the contradicting values of healthy living. The participants likely seek balance in their behaviour. They feel healthy, and therefore they allow themselves to have some unhealthy habits. They say thereby to be satisfied, since people do not like inconsistency in their behaviour (Teuscher et al., 2015). An example is people who smoke saying that they ‘do not smoke that much’, while they know their behaviour is harmful for their health.

Inhibition for physical activity

Social norms

► **RQ2:** What are the main motivations, habits and needs of the employees?

While discussing the different ideas for interventions, it became clear that the people are very aware of what others think of them. This is probably caused by them standing out a bit, and being passed over and judged during their life. When showing the storyboards with intervention ideas to them, they mentioned to be afraid of being laughed at and did not want to stand out. They are hesitant of participating in several ideas, but thought they are fun and interesting for others to participate in. This showed that they have interest, but do not want to commit to it immediately. Additionally, it was told that finding

“ I once went along with the walking group, but then I felt strange and not part of the group - participant 4 ”

REASONS FOR PHYSICAL EXERCISE

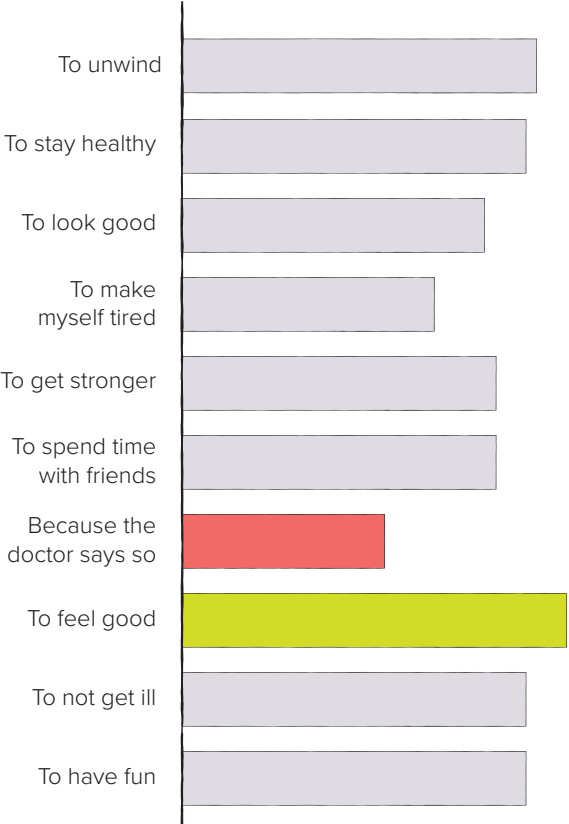


Figure 25: Table with reasons for physical exercise.

a connection with a sports group was hard, since these people are not like them or they do not feel comfortable to participate in the group.

Drivers for physical activity

Feedback from their body

► **RQ2:** What are the main motivations, habits and needs of the employees?

During the interview most participants told that if their body felt a bit stiff, or if they had other bodily pains, they were motivated to do some physical exercise. While they felt the benefits of it, and there body felt better, some of them did not continue the activity on other days.

“ Sometimes i feel stiff when i wake up, then I will do exercise that day - participant 2 ”

This situation of listening to the feedback of your body can also be found in literature. Someone trusts their inner feeling of what the body needs and does not see the need to take action before he/she is bothered by health complaints (Teuscher et al., 2015). Making decisions based on the way they feel makes sense to this group. As long as they feel good, there is no need to worry, which also refers back to the target group being short-term thinkers.

Thereby can be mentioned that in the booklet the participants report that they participate mainly in physical exercise in order ‘to feel good about oneself’ and feel good in their body. The reason they least feel connected to was ‘because the doctor said so’ (Figure 25).

Motivational elements (humor, discovery, fellowship)

- **RQ2:** What are the main motivations, habits and needs of the employees?
- **RQ4:** How do the employees believe they can be supported in pursuing a healthy lifestyle?
- **RQ5:** Which game elements match with the characteristics and motivations of the employees?

During the interview several cards are shown with elements that can also be game elements. These elements are taken from PLEX cards (Lucero & Arrasvouri, 2010) (figure 26). On these cards, the different elements are clearly illustrated with images, so it is clear what is meant with the specific word on the card. The participants are asked to pick two words that will motivate them to do physical exercise and two words that will discourage them in doing physical exercise. The words that are mostly chosen as motivators are *Humour, Fellowship and Discovery*. The words are chosen as being discouraging are *Competition and Fantasy*.

“ Then you have a winner and loser and
I don't think that's appropriate
- participant 3

Humour is already working as a motivator for them during their job. Having fun with others while working makes the day go by faster and makes the job more enjoyable. Most participants also mention to experience this while doing physical exercise.

Fellowship was marked as being very important, doing it together and having others around them seemed important to them. Many people mentioned that they would like it to do more in a group with the company and seemed to be seeking for a sense of togetherness within DZB. This need also refers to the physiological need of social relatedness: they want to have a feeling of belonging to and being part of the company.

Discovery is mostly described as discovering new environments. They mentioned to like scavenger hunts, go on vacation or explore Dutch nature. They come across as being curious, and also mentioned that people within DZB are known for their curiosity.



Figure 26: PLEX cards

Interests

Walking in nature

One final aspect to mention is that almost all participants told about nature. They addressed that nature is an important factor for them go for walks and engage in physical activity. It is an helpful environment to find peace if they feel overstimulated. Especially long walks in nature are a hobby of the participants. They also express this in the photo assignment. Many pictures showed nature or their garden as a motivation or favourite place to be (figure 27).

“ I feel good outside. I can clear my
head and enjoy the nature around me
- participant 6



3.4 CONCLUSION

Overall, the contextmapping study and generative interview contain many fruitful insights which are used in the conceptualisation phase of this project. Looking at the insights it can be concluded that the employees of DZB do not necessary feel a need to change their current behaviour. They might be willing to change, but they lack the positive belief about health and the belief in their capability to participate in physical exercises. This missing belief lowers their motivation to change. They know physical exercise is good for them, but they have trouble sustaining their behaviour if they feel healthy already.

Employees do not see the threat of living an unhealthy lifestyle or the benefits of following a healthy lifestyle, since the effects are not noticeable directly. They are living in the moment, and they do not worry much about the future. They are used to keeping their head above water during hard times and solving their problems they are currently having.

Their main motivation for physical exercise is to feel good about oneself and to find peace. This peace is often found in nature or known surroundings.

Insights for intervention

► **RQ6:** How can the designed intervention stimulate increased physical activity of the employees?

Humour, fellowship and discovery are considered as important aspects in the employees' life. They are seeking for togetherness and relations within the company. They seem to feel proud to be a DZB employee and to be part of that group. These elements should be incorporated in the game intervention, such that the employees are most likely to be motivated and want to engage in the activity.

INSIGHTS FOR INTERVENTION



DESIGN FOR ACTION



INCREASE SELF-EFFICACY



CREATE SAFE SURROUNDING



CONSIDER SOCIAL NORMS



EDUCATE ABOUT BENEFITS

Design for action

The participants live in the here and now and do not think much about the future. Therefore, the long term effects of an unhealthy lifestyle are not noticed and the barriers for changing the lifestyle often seem too big for them. For that reason, the intervention should support the action of doing physical activity, with the effect that the benefits are discovered during the duration of the intervention, such that intention can grow and used in the future. This benefit will appear in the form of 'feeling good in your body'. Doing regular physical exercise will accomplish this effect since it has a positive influence on the energy balance of a person. Since for this target group healthy behaviour can be triggered by feedback from the body, this positive effect of the intervention should be enhanced in the intervention to help employees realize the positive effect of exercise on their body.

Also, since people feel satisfied with their health, they have no to little intention to change their lifestyle. Therefore, it is important to activate people through the game. The game should trigger the action of doing physical exercise. When people experience the pleasure of doing physical activity, their intention might grow in the future to continue this and turn it into a habit. So by supporting the action of the behaviour, the motivation, capability and opportunity of a person might grow, as will the behavioural intention.

Increase self-efficacy:

When the self-efficacy of this group grows, they might feel more motivated to engage in physical activity themselves. In order to keep them motivated, the game should start easy and get more challenging throughout the journey. So people do not get discouraged by the game at the start, but keep improving themselves and realise that they are capable of doing certain activities. This grown self-efficacy in the game can be taken to real life, where they might do more physical exercise themselves. Another way to help people grow their sense of ability is by supporting their

skills and providing compliments on the growth of their skills.

Create safe surrounding

A safe surrounding will help the group to feel more comfortable. That is why the game will take place within DZB, they are familiar with the surroundings, and they only have to focus on the new aspect of the game inside their safe space. This will most likely cause a pleasant experience for the people. Also, since many participant reported to enjoy nature, it might work motivating to bring nature inside with this game, or enhance the natural element the building has.

Consider social norms

Others values, opinions, beliefs and actions unconsciously influence behaviour. While social influence can inhibit people, it can also work as a motivator since positive beliefs can influence another. Social influences can be motivating when people change their behaviour to be consistent with others or when they feel the need to do what others ask or expect them to do. Due to this fact it is important that the intervention is not too 'crazy'. It should be comfortable for the employees to participate in and it should enhance the positive aspects of social influence in behavioural change.

Educate about benefits

Since people often do not see the positive effect of doing physical exercise, it is important to let them experience this effect of feeling good in your body. However, it should also be educated, so that the message comes across in multiple ways. When experiencing and educating about benefits, the intervention has more change to establish a behaviour change within the individual.

04

IDEATION

This phase consisted of the generation of many ideas. These ideas were discussed and some were validated with the target group. This led to several insights for a health intervention that were taken to the conceptualisation phase.

4.1 First ideas

4.2 Co-constructing stories session

4.3 Conclusion

4.1 FIRST IDEAS

Creative session with IDE students

After the literature research a creative session with fellow IDE students was conducted in order to get a pack of ideas that could serve as inspiration in designing game interventions (figure 28). The creative session was held early on in the process to already spark some ideas. The materials that served as input for the session were first insights from literature research as well as elements that came from first observations and discussions with the supervisory team. The input for the session were cards with different sorts of emotion, motivation and game elements on them. The creative session was a brainstorm and the ideas were triggered with different card combinations. Forming several combinations evoked different ideas and also showed which elements were important or promising for the intervention.

The brainstorming was carried on by the researcher the next day. Different elements from the cards were chosen to create multiple ideas. First of all, the game elements *collaboration*, *challenge*, *competition* and *reward* were used. As

well as the emotions *pride* and *curiosity*. Finally, the ideas were sparked by the inner need of *social relatedness*, where helping someone and being appreciated were woven into the different ideas. After this brainstorm session, a pack of ideas was shown to the supervisory team and discussed (figure 29).

Creation of 3 ideas

From experience of the supervisors could be concluded that competition is not a valuable element in designing for people with low SES. Therefore, the ideas that were built on this game element, such as leader board or one to one game, were not used in further iterations. However, enhancing social relatedness and exploration were assumed to be promising elements to include in the game. The discussion with the supervisory team led to 3 ideas to be developed further. These ideas were used as input and inspiration for the creation of 3 different concepts: Duck search, Jump and Beweegmaatje. These concepts are explained by the use of storyboards, which are described on the next page.

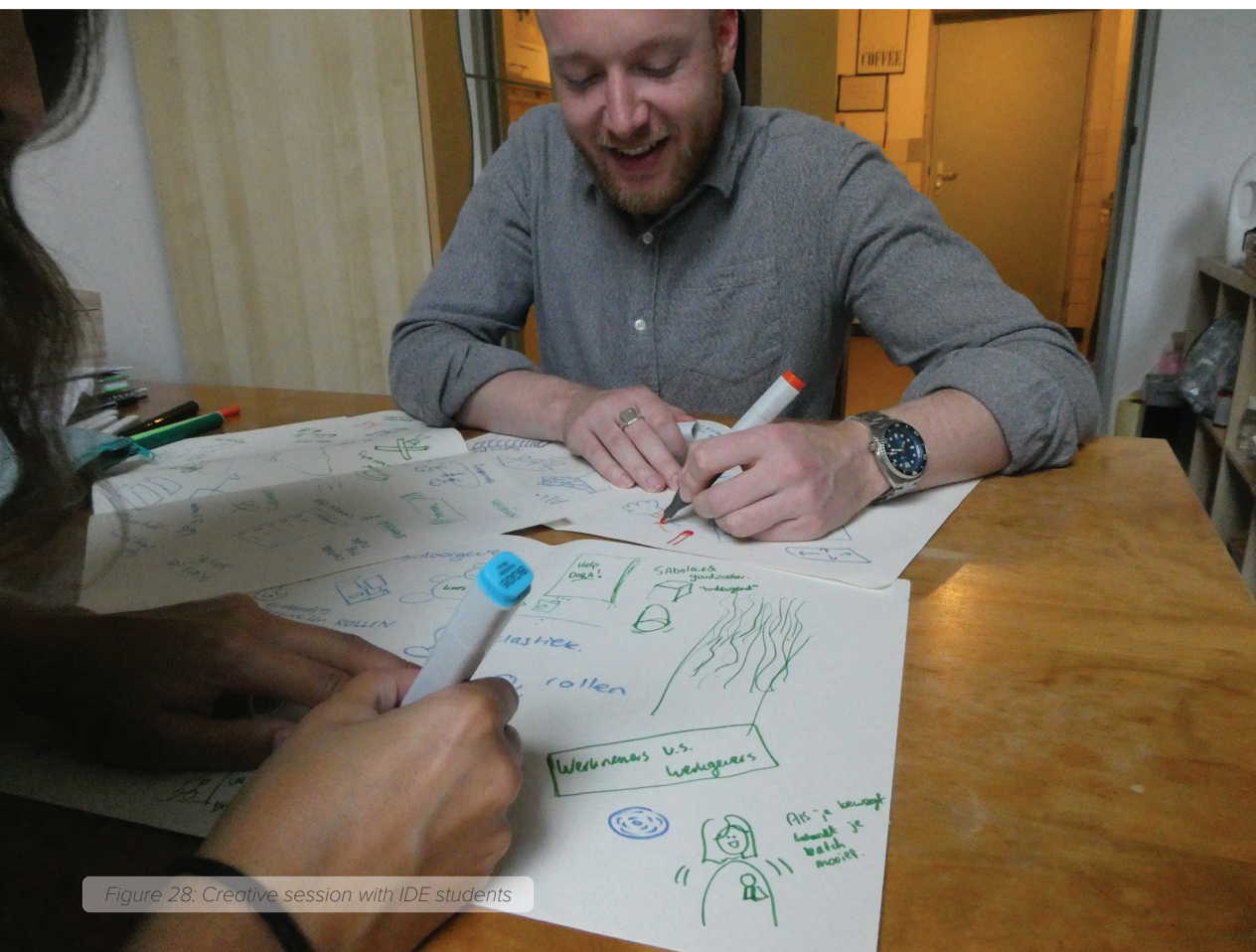


Figure 28: Creative session with IDE students

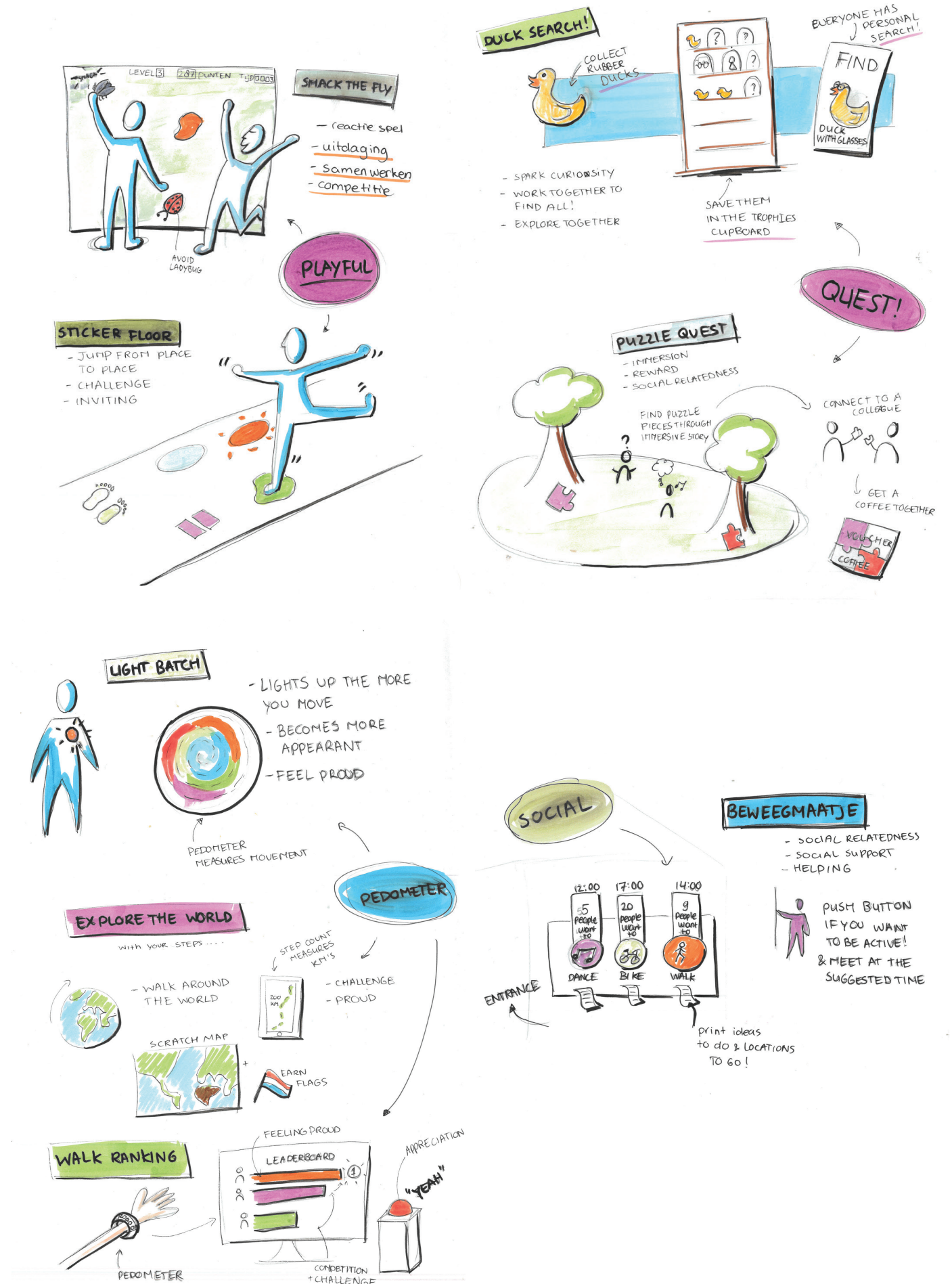


Figure 29: Different ideas from brainstorming

Duck search

This concept is a hunt for rubber ducks. The ducks are hidden in the DZB building so they can be searched for and found. Everyone gets a search assignment on a card. For instance, search the duck with the pink bow. When someone finds his/her duck, he/she can place it on the designated duck shelves. On these shelves, all other ducks are also placed. When all ducks are found, they can be hidden again for others to be found.



Figure 30: Storyboard Duck search

Beweegmaatje

This idea is a system where people can subscribe to participate in an activity. The machine suggests a physical activity and a person can decide to participate in this activity by pressing the button. On the machine it is displayed how many people are joining. The people that want to participate come to the machine again at the specific time and meet their buddies that have signed up for the activity as well.

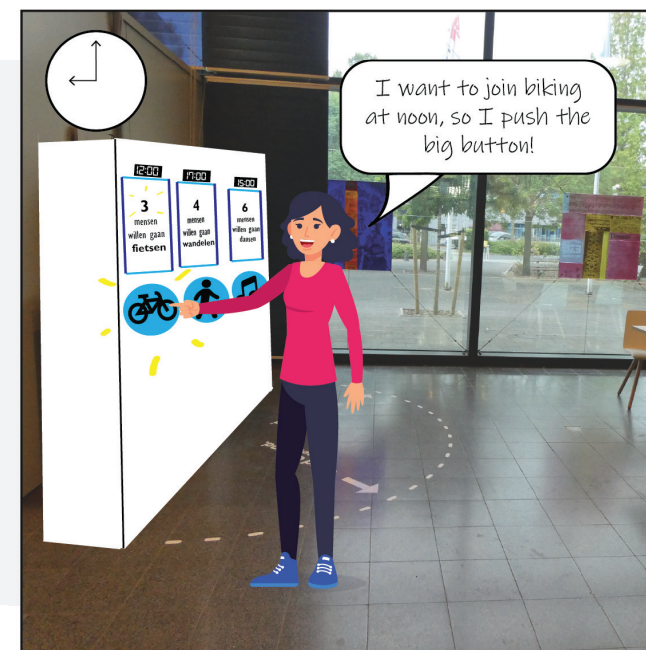
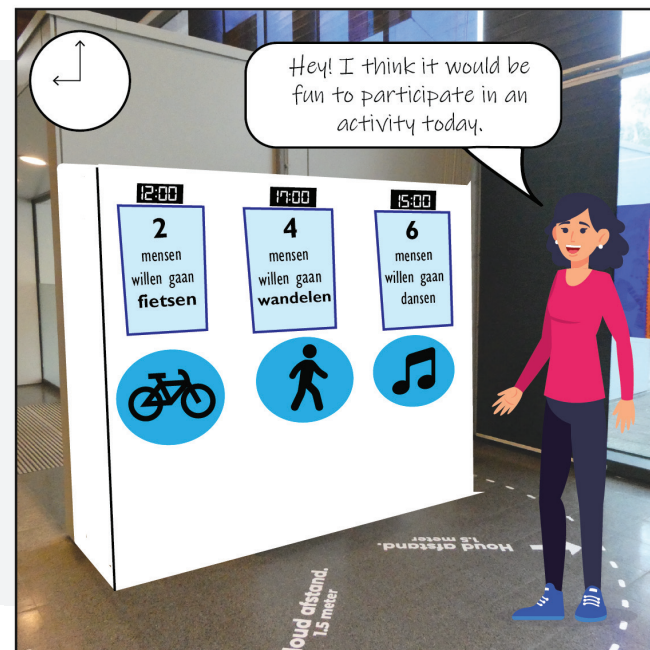


Figure 31: Storyboard Beweegmaatje

Jump

With this idea, the floor is covered with different stickers. The different colors and shapes on the floor invite one to jump around from sticker to sticker. If someone wants, he/she can place the stickers on another spot. Because of the changing pattern, if someone walks by it stays interesting to participate in this activity.

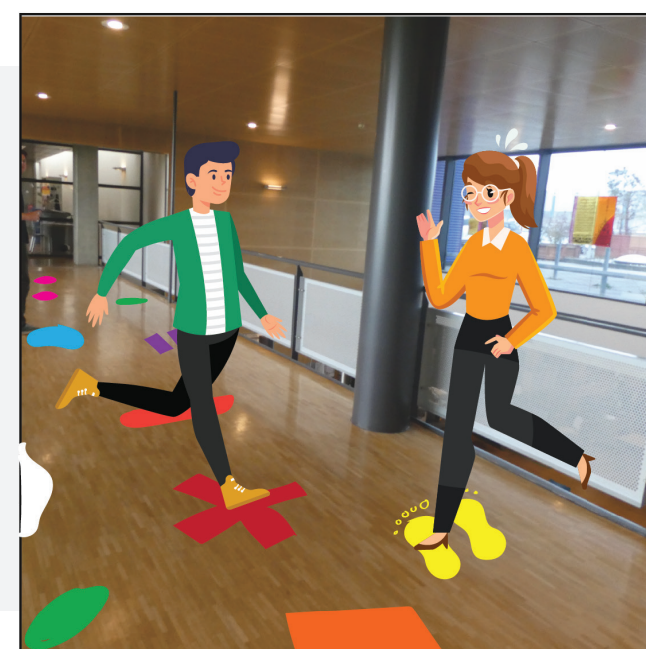


Figure 32: Storyboard Jump

4.2 CO-CONSTRUCTING STORIES SESSION

Approach

As a way to get feedback on the design ideas a co-constructing stories session was performed. Co-constructing stories is a participatory design technique for early concept evaluations to elicit user feedback in depth and recommendations. These opinions of people also reveal information about their attitude and motivations (Buskermolen & Terken, 2012). A co-constructing story session consist of 2 phases: a sensitizing phase where the user tells about past experiences and an elaboration phase where the concept is discussed. This co-constructing stories method was used in order to receive this early feedback and it was a visual method which is suiting the target group, since it helps them to envision the possible ideas better.

The 3 storyboards were shown to the participants during the interview and the story was also explained to them. They were asked what they liked and disliked about the story, what they want to change about it and if they could see themselves participating in this idea (Buskermolen & Terken, 2012). The rest of the questions can be found in the interview guide in appendix B. All 3 storyboards are each separated in 3 different cards to create the sense that the story is not determined, but open for input and change.

Results

All ideas are some sort of a game, which the participants thought was positive. They like to have fun, especially together. Many of them are doing the same job with repeated actions every day. They mentioned that such a game might break up the day nicely. Most participants mentioned that doing a sports and play day together with DZB would be a lot of fun for them. Also, such a day would be a nice way to meet other people.

“ Good plan for the departments that sit all day
- participant 5 ”

“ It’s something different, not only work, but also a moment of fun
- participant 6 ”

Discussing these storyboards with the participants gave the following insights and remarks that should be taken into account during the next iteration.

Duck search:

- ▶ There should be an award at the end of the game;
- ▶ The idea makes good use of the building;
- ▶ The ducks make it funny, however they can be perceived as childish. Which can make it less motivating for someone to participate;
- ▶ The ducks can be searched for together;
- ▶ There should be clear rules, otherwise it can lead to chaos;
- ▶ You can discover new places by looking for the ducks;
- ▶ It is a good way to step away from your work place.

Jump:

- ▶ Someone can be ashamed to be looked at weirdly or laughed at while jumping;
- ▶ It is not suitable for people with a physical disability;
- ▶ The bright colours fit the image of the company;
- ▶ If more people participate, it becomes more normal.

Beweegmaatje:

- ▶ This design lowers the threshold to make contact with others who are like themselves;
- ▶ There are many people within DZB that think it is hard to make contact;
- ▶ It can be a bit awkward or uncomfortable with strangers;
- ▶ It is a place to be social;
- ▶ Bad weather circumstances would influence the amount of participants;
- ▶ Being outside is motivating;
- ▶ It should happen once or twice a week.

4.3 CONCLUSION

The co-constructing stories session confirmed that designing a game would be suiting for the target group, since it was positively received and many participants mentioned it would be fun to participate for them and their colleagues.

Additionally, it is important to make sure the game is not perceived as childish or patronising. As mentioned before, people are afraid of being looked at weird. The game should avoid evoking this feeling. Other conclusions, that are important to consider for designing the intervention are described below.

Insights for the intervention

- ▶ **RQ6:** How can the designed intervention stimulate increased physical activity of the employees?

Provide reward

After the co-constructing story session it became clear that the game should have a reward as an external motivator. Most participants mentioned this to be key in wanting to participate, or mentioned that it was important for others to work towards a reward.

Enhance social relations/togetherness

The social aspect of all 3 concepts was really appreciated. Participants mentioned it to be a fun way to meet new people or do things together with colleagues. Enhancing the need for social relatedness should be an important aspect of the concept.

Set time frame

The intervention should take place during working hours, or in the break. So that it does not take peoples time after work. However, there should be time provided to engage in this activity.

Create clear rules and visuals

In order to make the game understandable for the target group there should be clear rules. In this way, the game will come over as structured and clear, which is very important for this specific

group. They often do not like chaos or uncertain situations, these can cause stress, which can have a negative influence on the user experience of this game.

Make it voluntary

In order to reach the desired effect, this game cannot be imposed to the employees. They should participate in in voluntary. In this way they have an open mind for the activities in the intervention and the information will reach the people better.



PROVIDE REWARD



ENHANCE TOGETHERNESS



SET TIME FRAME



CREATE CLEAR RULES AND VISUALS



MAKE IT VOLUNTARY

05

DESIGN BRIEF

This chapter describes how the insights from the literature and field study are transformed to a design goal, interaction vision and design ingredients. These can be used throughout the conceptualisation phase as guidelines and validation for the concept.

5.1 Design framework

5.2 Design goal

5.3 Interaction vision

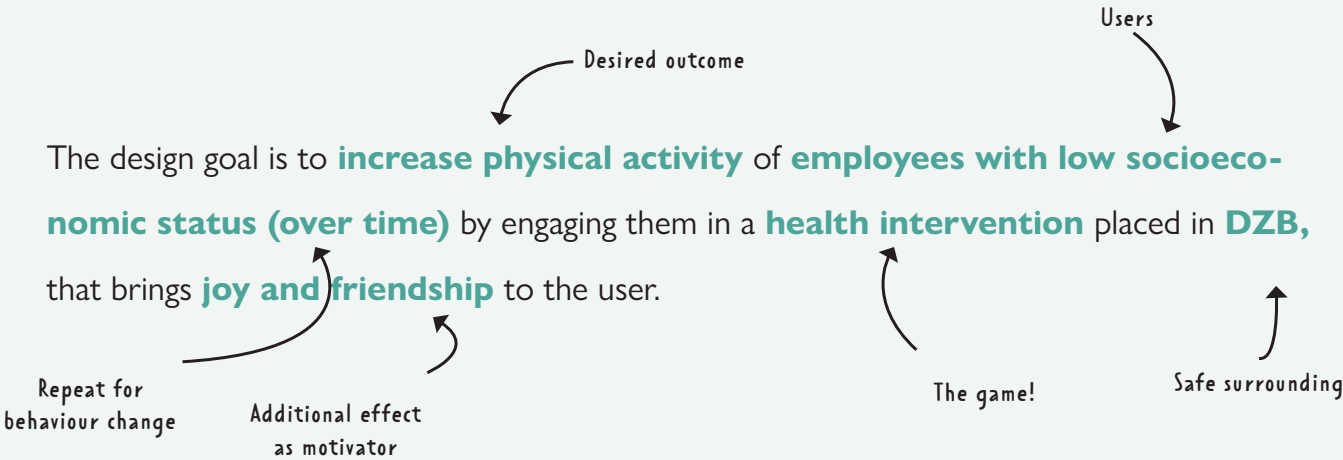
5.4 The 10 points of attention

5.1 DESIGN FRAMEWORK

The research with PLEX cards showed that humour, fellowship and discovery were mentioned as motivational factors for physical exercise by the participants. These 3 elements form a basis for future design activities and serve as inspiration for the design goal and interaction vision. This design framework helps to design, build, test and learn. So the final concept is more likely to match the employees' needs. These elements will be leading throughout the conceptualisation phase. The 3 topics will be used in design as described below.

5.2 DESIGN GOAL

Looking back at the main research question: 'What gamification based intervention motivates individuals with low SES to increase their physical activity?' and looking at the insights from the literature and field research, it is important to create a game that is understandable, easy to engage in for employees with low SES and that the game activates the user in doing physical exercise. Furthermore, the intervention should include the proper motivations for the target group to stimulate physical activity. In order to achieve the above mentioned aspects, the design goal is visualised on the right.



5.3 INTERACTION VISION

To support the design goal, an interaction vision is developed. The interaction vision helps identify the character of an interaction. It represents what 'interacting with the intervention will feel like'. An interaction vision can serve as a great way to communicate interaction qualities and this vision

serves as an inspiration for conceptualisation. A metaphor helps to give the interaction qualities a reference and story. Therefore, for this interaction vision, the metaphor of going on a canoe adventure together is used to explain the interaction qualities that should be considered in the intervention.



HUMOUR

Making sure the intervention is light, easy to engage in and that it brings joy to the participant. Everyone likes a good laugh!



FELLOWSHIP

Grow people's connections within the company. Getting to know new people, but in an safe atmosphere. Also, the intervention should enhance togetherness by enlarging the feeling of being part of DZB and working together towards more physical exercise.



DISCOVERY

Creating a spacious intervention that allows for own input and brings you to new places. In a simple and guiding way.

THE INTERACTION WITH THE INTERVENTION SHOULD FEEL LIKE GOING ON A CANOE ADVENTURE TOGETHER

By doing a canoe ride together, there is a **clear start and end**. You are **guided** by the current in the right direction, and this current is **facilitating** you by giving you some speed. While being in the canoe together, you can **work together** to increase your performance but you can also paddle alone for some time. This makes it a **low key and fun** activity to do together. This trip is a comfortable canoe ride, where you can look around and **discover new things around you**. Thereby, the canoe is your **safe area** that allows you to explore these places.



Figure 33: Canoe adventure. Retrieved from thecanoetrip.org

5.4 THE 10 POINTS OF ATTENTION

All literature and field study activities resulted in several insights for the intervention, which are described in the previous chapters. These insights are ten points of attention that should be considered in order to make the health intervention game a success. The ten points of attention are:



1. DESIGN FOR ACTION



2. INCREASE SELF-EFFICACY



3. CREATE SAFE SURROUNDING



4. CONSIDER SOCIAL NORMS



5. EDUCATE ABOUT BENEFITS



6. PROVIDE REWARD



7. ENHANCE TOGETHERNESS



8. SET TIME FRAME



9. PROVIDE CLEAR RULES AND VISUALS



10. MAKE IT VOLUNTARY



06

FINAL CONCEPT

This chapter describes the final concept that is created during this project. Firstly, the game and the scenario of use are explained. Next to that, the design choices for the concept are described. Finally, this chapter shows how several small validations gave useful input for the conceptualisation of the game.

- 6.1 Conceptualisation
- 6.2 Final concept
- 6.3 Choices for the game
- 6.4 Validations of concept

6.1 CONCEPTUALISATION

The design goal and interaction vision formed a basis for the conceptualisation phase to design a game for the employees of DZB with low SES. Brainstorming quickly led to an idea that was conceptualised over several weeks (figure 34). Over the course of the weeks, the initial idea got more details and was discussed multiple times with the supervisors. The design choices were substantiated with the design framework and 10 points of attention.

Over time, the concept got more shape and before performing a final user evaluation, some small interactions were tested with the employees of DZB. These tests were about making groups, the boat maps, the flow an theme of the game and the visual style of the game. These tests helped to validate how these parts should fit in the whole concept. Additionally, these tests were to make sure the interactions were experienced as pleasant by the target group. So that also other details of the game would also reach the user. The results of the interaction test allowed to finalise the concept. The procedure and results of the tests are described in this chapter 6.4, after the final concept is described.

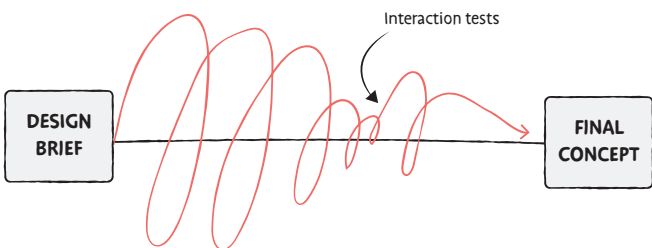


Figure 34: Diverging and converging in the conceptualisation phase

6.2 FINAL CONCEPT

The game is build around a genre. For this game the genre is ‘adventure’. An adventurous genre allows people to escape into exciting stories about faraway places, hidden secrets or voyages of discovery. This matches the discovery aspect of the design framework. The genre is accompanied by a sailors theme. This is part of the narrative of the game, where a journey is created that has focus on discovery and doing quests.

Overall, the game is a hide-and-seek game where players search boats and hide them for others. The game consists of 3 phases where in each phase a new island is reached. The ultimate goal of the game is to crack the code of the treasury. The treasury is placed on the last island and contains a reward for the group. The game is meant to increase physical activity by means of walking. Walking is stimulated by making and following boat maps (figure 35). The storyboard in figure 36 explains the scenario of use of the game. Also, the activities of each phase are described next to the storyboard. Finally, all important elements and choices that lead to the details of this concept are described later on in this chapter.

The game takes place over a 3 week period, with 2 activities every week. By spreading the activities over multiple weeks, the people have some time to digest the given information and the feedback they receive in order to reach a behavioural change towards increased physical activity.

Roles

The participants take two different roles in the game: the sailors and pirates role.



The **sailors** task is to find hidden sailboats.

The **pirates** task is to hide sailboats.

Furthermore, there is the role of the **captain**. This is the game leader who explains the game, hands out materials and answers questions. He or she is there to provide guidance to the participants.



Figure 35: Several shots of the final concept

Scenario of use

The game consist of different phases, in this section these phases and each of the activities are explained.

Preparation

If someone wants to participate in the game, he or she can subscribe. After multiple people have subscribed, the captain hands the participants a letter with information about the game. In this letter the game is explained, so every participant can read this at their own pace. Also, the letter includes a meeting place and time for the kick-off of the game.

Phase 1

The first phase can be seen as a practice round for searching the boats. The players gather around the table for the explanation of the game and then start their first activity.

Activity 1: Role - Sailors

In the first activity, the players get the sailors role. They are giving a card with a boat with a coloured sail on it. This card is the search assignment of which boat someone has to find. For instance: 'Go find the blue boat'. Each player gets his own search card and all players start searching for their boat in the same area. When someone find his boat, they place it on the board with sea and islands. When all boats are found, the boats, and the group, reach the first island. When the island is reached, the first hint about the lock will be revealed.

Reflection moment

When the player finds the boat, a message is connected to it. This message is providing the player with a compliment on how much physical activity he/she has already done and gives the player information about the benefits of physical activity.

After the first activity people can go back to work or home and wait a few days for the next phase to begin.

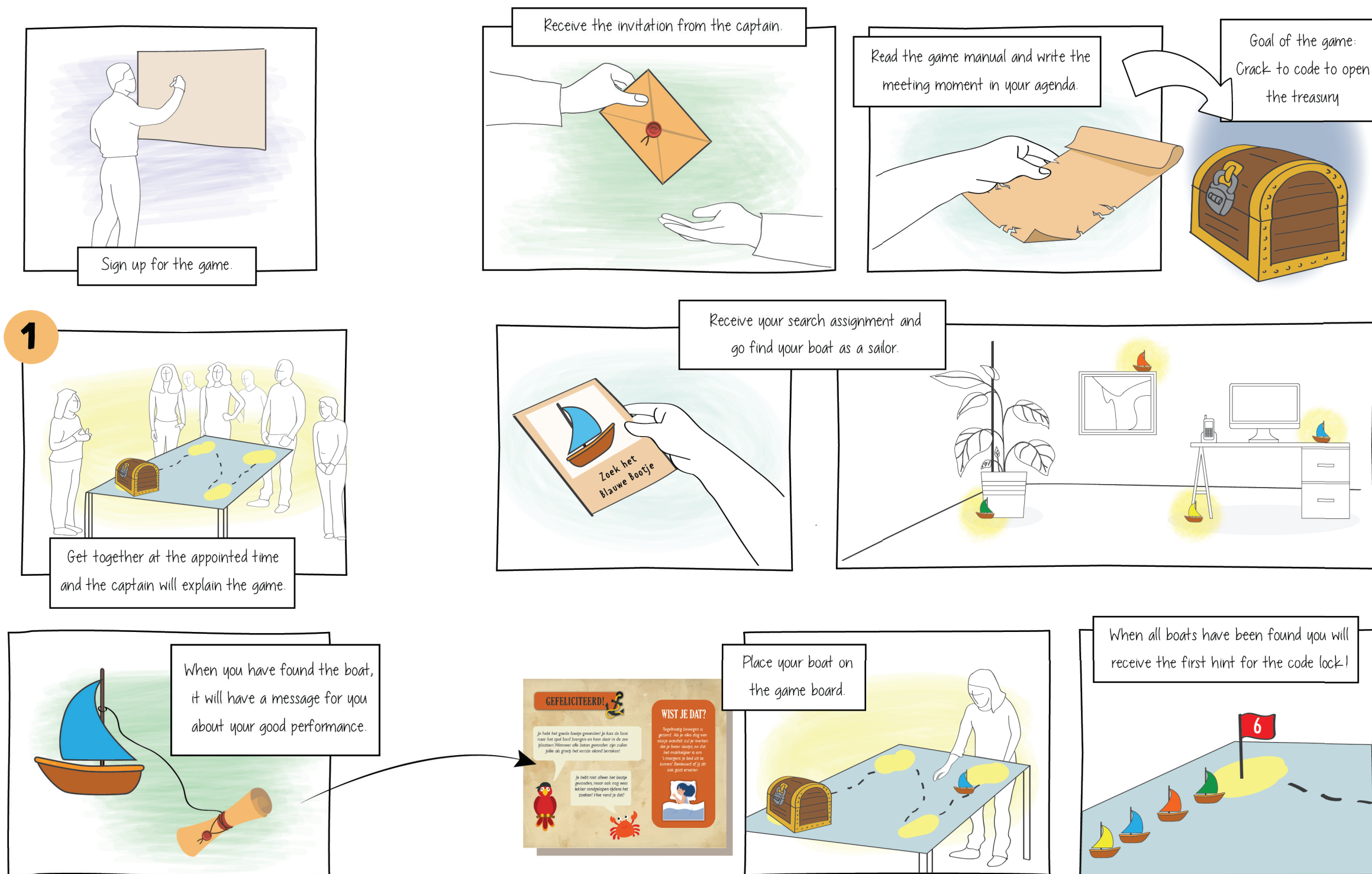


Figure 36: Scenario of use

Phase 2

This phase starts with making groups of 3. From now on, the game will be played in these groups. The groups are divided by the game 'crossing the line'. A small interaction test has been conducted to figure out which way of making groups best suits this target group. The procedure and results of this test can be found further on in this chapter.

Activity 2: Role – Pirates

For the second activity, the participants change roles to pirates. As pirates their task is to hide the boats. With hiding these boats the pirates are requested to create a treasure map, called the boat map. This treasure map comes with different stickers that can be placed to create the scavenger hunt for a boat. The pirates are free to create a map with as much of their input as they like. The interaction and working elements of the maps were first validated during an interaction test. The procedure and results of this test can be found later on in this chapter.

Each boat is hidden in a blue box with a lock. In this way, the boats cannot be found early, since the search activity (activity 3) takes place a few days later. When the pirate groups have finished hiding this blue box and created the map, the box stays at his hiding spot and the pirates return the map to the captain.

Activity 3 Role – Sailors

A few days later, the groups come together again and they return to their role as sailors. Subsequently, each group receives 3 envelopes and a key from the captain. The content of the 3 envelopes together forms the treasure map which they have to follow in order to get to their boat. When they follow the map and find the blue box, they open it up with the received key and walk the boat back to the table. When everyone has found their boat, they reach the next island and they receive a hint for the lock of the treasury.

Reflection moment

Again, this boat has a message for the group. Its content is focused on the difficulty of the challenge. The group can reflect on what they already have accomplished and they can decide together if they are up for a bigger challenge.

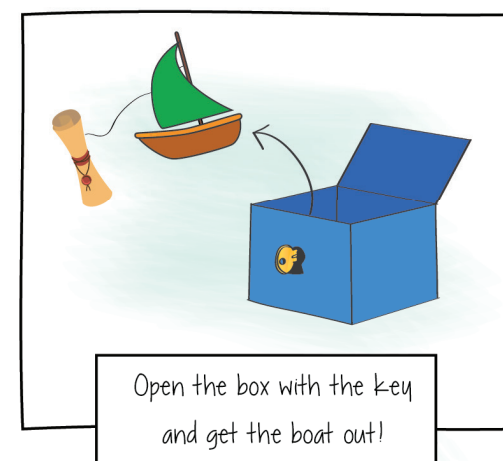
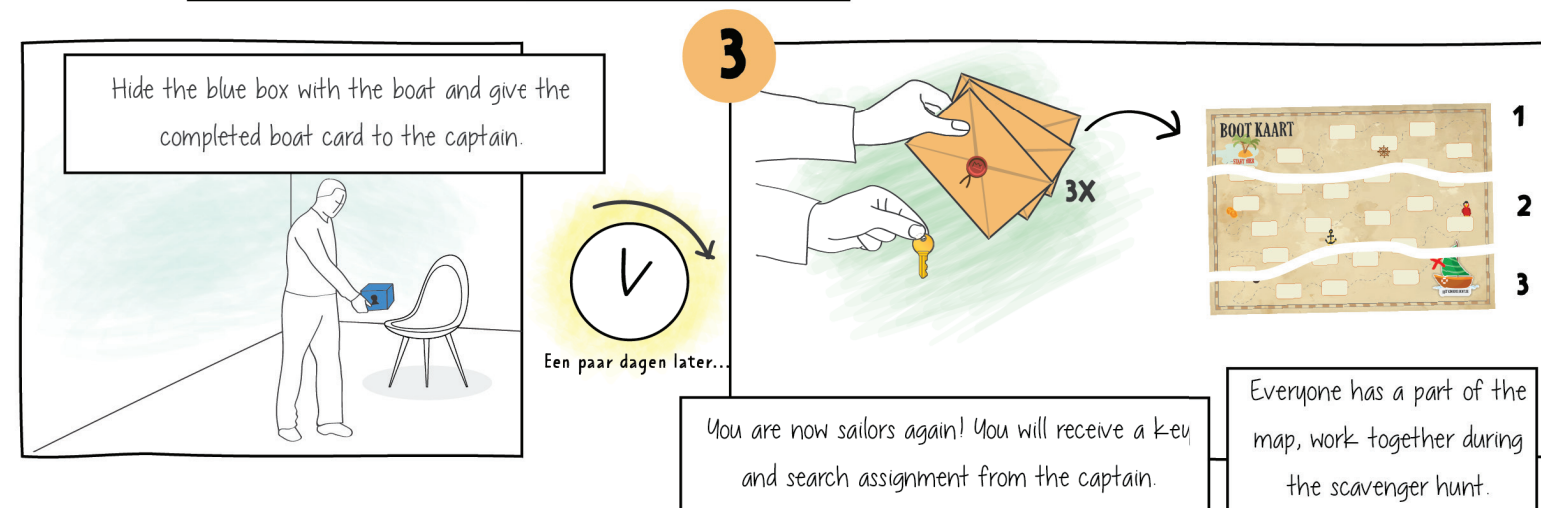
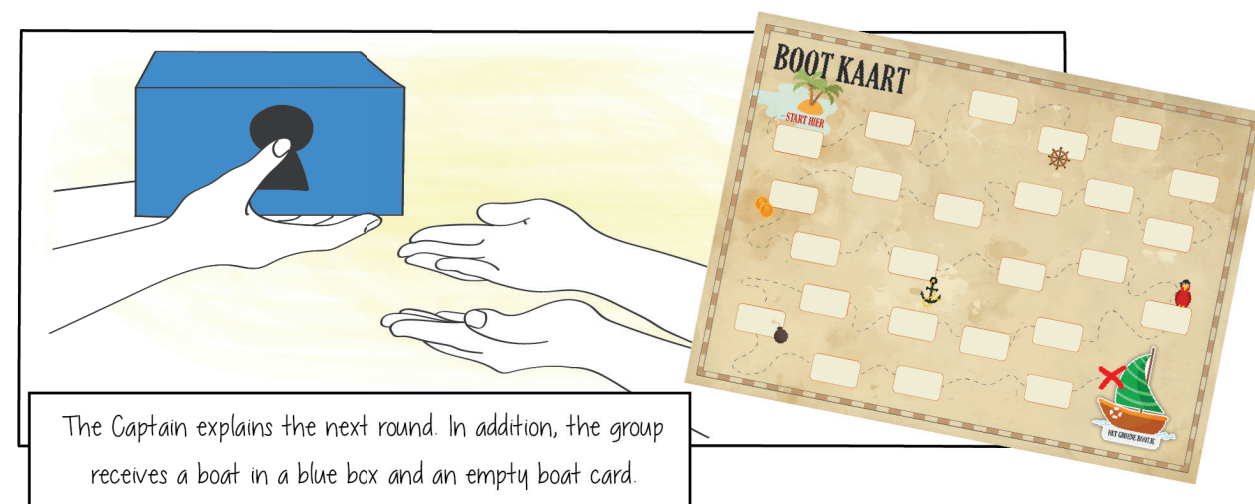
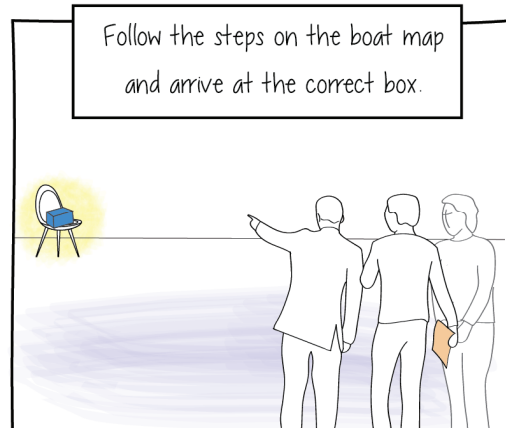
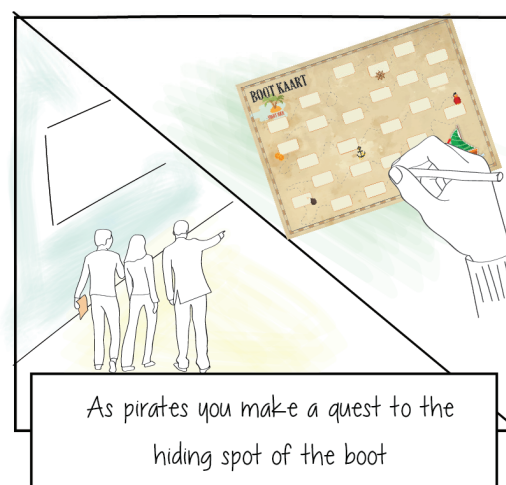
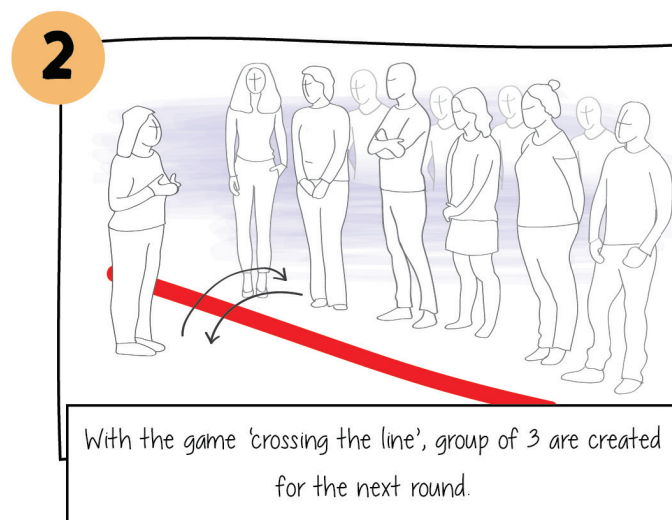


Figure 36: Scenario of use

Phase 3

Phase 3 is like phase 2. However, the players are experienced in the making and following the maps, so the pirates are challenged to increase the difficulty of the map. They might make it more extensive or have more input themselves.

Activity 4: Role – pirates

The group becomes pirates again and they hide the blue box with the boat for the other group. When the box is hidden, they return the boat map to the captain.

Activity 5: Role – sailors

Again, after a few days the groups come together and take the role as sailors. They are handed 3 envelopes and a key by the captain. They follow the boat map created by another group and try to find the blue box.

Reflection moment

When they find the boat they have a new message that shows the benefits of walking and exercising. The boat also has a little message for the future and encourages the group to make plans for the future to keep walking during work.

Finally, all groups come together at the table and place the boats. When the last island is reached, the lock can be opened and the treasure is revealed.

Reward

The reward is a company outing for the whole group. Think about going to a sports match, going to the movies, theatre or going on a boat together.

Activity 6

The group comes together one more time to have an outing together, as reward for their work in the game.

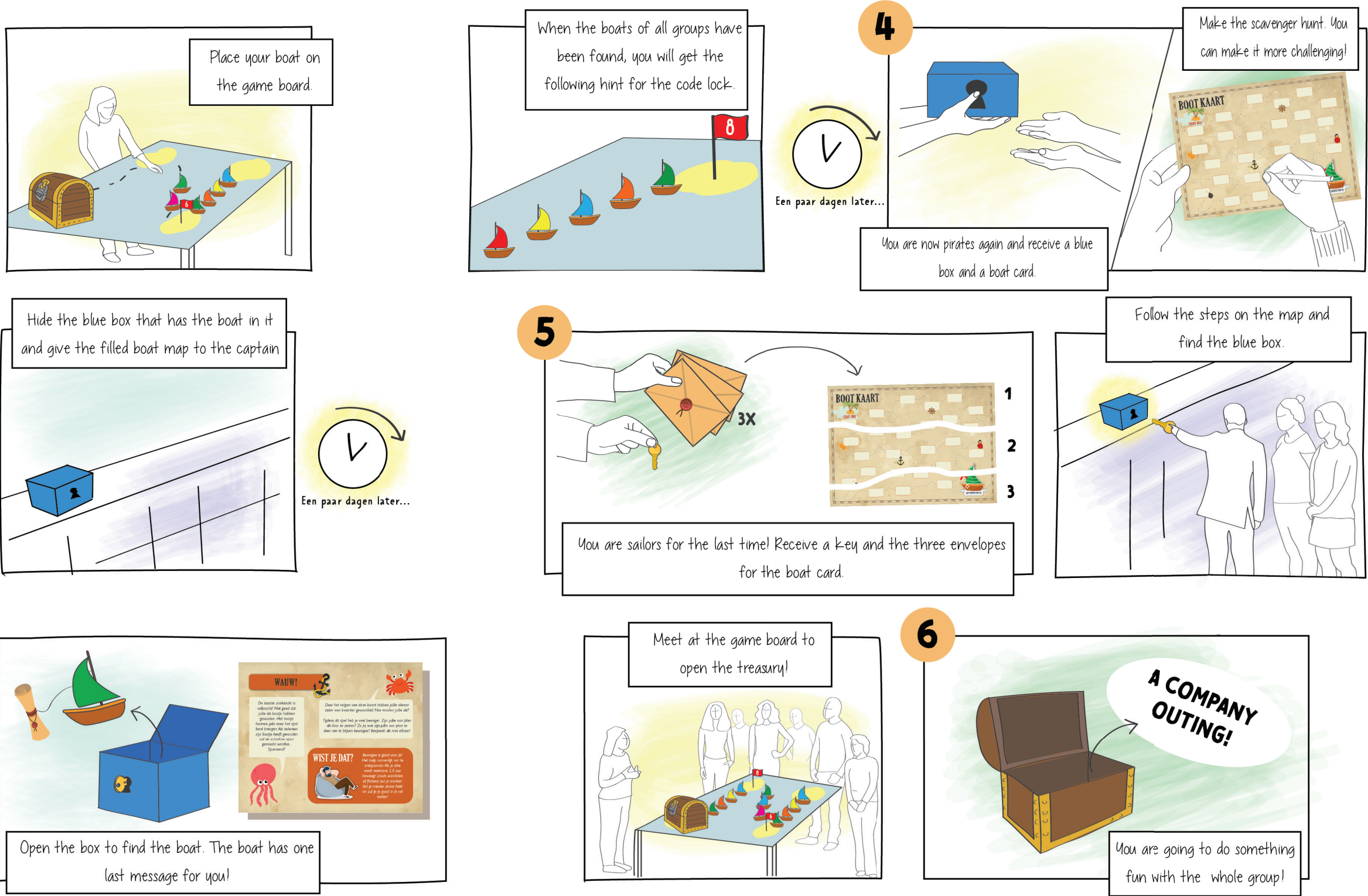


Figure 36: Scenario of use

6.3 CHOICES FOR THE GAME

In this part is described how the different points of attention, that resulted from the literature and field study, are incorporated in the concept.

1. Design for action



- ▶ Activate people by the game
- ▶ Create sense of 'feeling good in your body'

The game is designed with focus lying on the activity of following and making the boat map. This activity is activating to walk. This was also discovered in a interaction test about these maps (described further on in this chapter). This doing of physical activity will hopefully provide the experience of feeling good in your body. In the field study was discovered that a facilitator for people is the feedback from their body. When they receive this positive feedback of 'feeling good in your body', their intention to do physical exercise in the future can grow.

2. Increase self-efficacy



- ▶ Easy to engage in
- ▶ Getting more challenging throughout
- ▶ Task fulfillment and small successes
- ▶ Providing options with stickers

Since the employees with low SES often see many barriers for doing physical activity, they might have a low self-efficacy. They do not believe they have the ability to execute this behaviour of doing physical activity. By playing this game, the self-efficacy about physical activity can be increased. The game is first of all easy to engage in, and gets more challenging throughout. This rise of challenge shows the players during the game that they are able to do physical activity, a realisation they can take with them to the real world.

The game is focussed on fulfilling smaller tasks to reach the end goal. The fulfillment of these tasks and the small successes that come with it, should provide the players with a confidence boost and growing believe in their ability.

Making the boat map can be done with the provided suggestions. However, when the players feel like they can take more challenge, they can use the empty stickers and provide their own input. The stickers can be guiding the participant in making the map but the payer is free to choose which assignments to include in the map.

3. Create safe surrounding



- ▶ Inside DZB
- ▶ Slowly intensify social interactions
- ▶ Captain as guidance

The game takes place within the building of DZB. This is a known and safe area for the employees. By bringing this new game into this safe area, the employees can feel comfortable while playing. During the game they are triggered to discover new places within the building.

The game is set up in a way, that in the first round, they get to know all the players in the game and first play on their own. After that, they make groups and get to know the other players better. This happens step by step to avoid forced social interactions.

The captains role is to always help the participants when they need guidance. He or she is a person that the players can come to when they have questions or want someone to talk to about the game.

4. Consider social norms



- ▶ Not too outstanding
- ▶ Play in groups

Considering that employees expressed fear of being looked at strangely, the game and players are not too outstanding during the game. There are little funny assignments incorporated in the boat maps, however people are free in whether they do these assignments.

The game is played in groups. By feeling part of a group, people feel more comfortable in doing certain tasks, since they are not the only one doing it. When multiple people do something, it becomes more normal.

5. Educate about benefits



- ▶ Reflection moments

During the game there are 3 reflection moments where emphasis lies on the educating about the benefits of physical activity. It provided the players with some know how's and encourages them to discuss their experiences with group members.

6. Provide reward



- ▶ First incentive to play
- ▶ Sparks curiosity

The reward is placed in the treasury. It is a company outing for the group. Many employees mentioned during interviews that this was something they are currently missing at DZB. The

reward serves as a first incentive to participate in the game. The reward is kept a surprise, so curiosity is sparked during the whole game.

7. Enhance social relations/togetherness



- ▶ Group enhance social relations
- ▶ Common goal enhances togetherness

The game is for a large part played in groups. These groups enhance social contacts between colleagues.

Being part of the game means working together towards cracking the code of the treasury. But also working together towards more physical activity within DZB. Working together towards the same goals can enhance the feeling of togetherness.

8. Set time frame



- ▶ During work time
- ▶ Short time frames for easy engagement

There should be made time for the game during working hours. So people do not have to play during their break or after work. Since playing the game then might intervene with the habits they already have for this free time, such as having lunch.

The game should be played on scheduled times and the activities should not take longer than half an hour. So that it seems manageable for the participant, and that the game can be played during working hours. The time frame for this game is 2 times a week for half an hour, for 3 weeks long. The activities are short and divided throughout the weeks to keep people's attention.

9. Clear rules and visuals



- ▶ Visual support for overview
- ▶ Introduction letter as preparation

The game board serves a clear visual overview of the process of the game. Also, other materials of the game have many visuals to support the textual messages.

The participants receive a letter with the explanation of the game, so they know beforehand what is expected of them and what will happen during the game

10. Voluntary



- ▶ Subscribe voluntary
- ▶ Reward to trigger participation

The game is only for people that subscribe voluntary, since persuasion does not work well when it is imposed. Probably, when people see other people play, they get excited to participate in the next game. Additionally, the reward and theme of the game is to spark curiosity and to motivate people to participate.

Motivational elements of the game

The 3 motivational elements that formed the framework for the intervention are considered in the following way:



Humour

- ▶ The boat maps include funny assignments.
- ▶ Making the maps and following them can also be considered as a fun activity.
- ▶ The boat map and the health messages for the reflection moments include fun visualisations.

Fellowship

- ▶ Fellowship is incorporated by doing the activities together.
- ▶ Being part of a group that plays the game creates a sense of belonging to a group.
- ▶ Working together enhances the social contacts between the employees.
- ▶ Working towards the same goal creates a sense of togetherness in the group.

Discovery

- ▶ By making the and following the boat maps, participants are triggered to explore new places in the building. A map might guide you to somewhere an employee has never been or by making the map players are eager to explore new places.
- ▶ When working in a group and playing the game, there is also the possibility to discover new things about the group members, or about yourself.

6.4 VALIDATIONS OF CONCEPT

Before having a final evaluation, some elements of the game were evaluated in small interaction tests with the employees of DZB. Below is described how these evaluations are conducted and how the insights are incorporated in the final design.

Interaction test: Making groups

At one point in the game, groups of 3 are made. To make sure this group making process is a pleasant experience for the participants, an interaction test was performed where 3 ways of making groups were tried and discussed with employees from DZB.

Method

6 employees from DZB were recruited and brought together, they made groups of 3 in 3 different ways. Afterwards they filled in a questionnaire (figure 39) about every method and there was a short discussion among the group about which way worked the best and why. The questionnaire, consent form and test setup can be found in appendix F.

The 3 different ways of making groups were:

1. Everyone gets a playing card, the ones with the same playing card become a group
2. 'Crossing the line'. For this option different questions are asked, and the participants are asked to either stand on the right or left side of a room (figure 38). When the groups are equally divided, the game stops. Examples of the questions are: Step over the line if you love to go on a motor boat, stay on your side if you love sailing; Step over the line if you like nature, stay if you like the city. Step over the line if you want a parrot as pet, stay if you rather want a monkey as a pet.
3. Making groups on their own. The participants were asked to divide the groups themselves.

In order to assess the interaction test, a few testable targets were set up both on feasibility and user experience.

Feasibility:

- ▶ The method of making groups will ensure equal number of people in the group
- ▶ Creating the groups will take no longer than 10 minutes

Experience

- ▶ Making the groups will be experienced as comfortable and fair
- ▶ Creating the groups will be easy to understand

Results

Eventually, one employee did not feel comfortable participating, probably because it was on short notice. It is important with this target group to explain clearly what is expected and to give them some time to ask questions. However, the test could easily continue with 5 participants, where a group of 2 and a group of 3 was created.

Below is shortly described how the 3 ways of making groups are experienced. All 3 ways met the feasibility target of getting equal groups in under 10 minutes. However, the experience for each way was different. This is visualised in figure 37.

1. Groups with playing cards

Making the groups with playing cards is mostly experienced as funny and easy. Also, this one was most reported as being fair. Since the participants do not have influence on the process of making groups.

2. Crossing the line

Making groups with questions is reported as the most fun activity, and also as easy. One participant reported it as being unfair. Thereby the participant meant that people can influence each other's choices while crossing the line.

3. Making groups on their own

Making group on their own is experienced as fair and easy but less than the other two ways of making groups. Also, this method has the most negative reports. Like being unfair and uncomfortable.

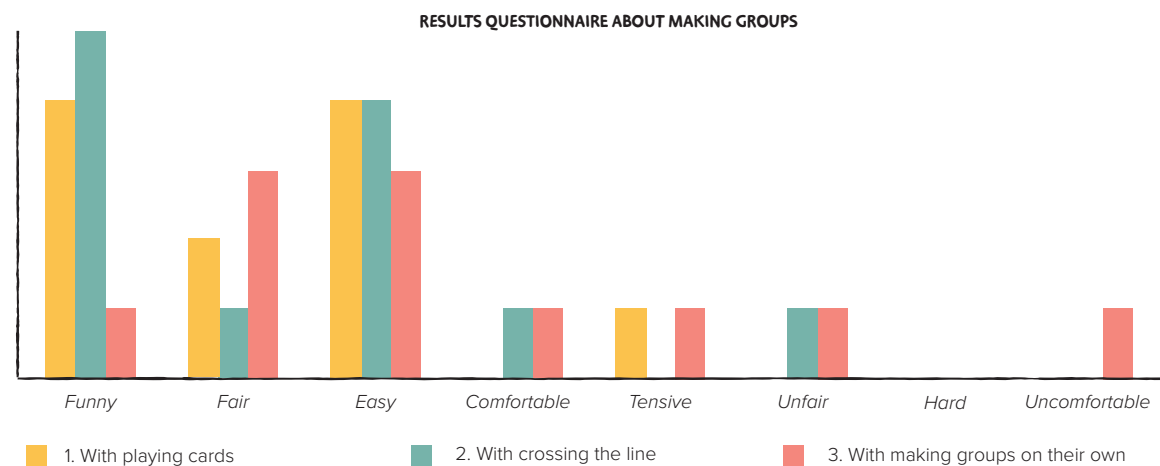


Figure 37: Chart of results questionnaire about making groups

Group discussion

The discussion afterwards gave most fruitful insight about forming groups. The insights are divided in different topics and described below.

Natural helpers

Looking at the joint activity, it became clear that these people really like to help each other and are gentle to each other. Some first helped someone else with filling in the questionnaire and helped them to understand and read, before they started their own questionnaire. Also, they made sure everyone was heard during the discussion and they listened carefully to each other. This kind of social interaction will also have a positive effect on the game experience.

Because this group has encountered social difficulties or has felt left out, they are very aware of other's feelings and some are dedicated to making sure everyone feels comfortable.

Having a buddy

For some it is important to have a buddy, so they feel comfortable. For some people it is harder to find contact with others. A buddy might help them to also learn about the other people in the group.

“ I rather stand with someone that I trust
- participant ”

Structure

Making groups on their own is reported as being the worst idea. Because people can feel left out and uncomfortable, which is the last thing that should happen during the game. Also, it might cause chaos in the group. The way of making

“ Making groups ourselves can be messy. People want to know what is going to happen
- participant ”

groups should be more structured.

Influence

Having some influence on the group forming was experienced as positive. With crossing the line, people could decide themselves which way they would choose and they are not just placed in a group. Both the playing cards and crossing the line were experienced as fun, however having some influence was often mentioned as being important.

Conclusion

The crossing the line method would be most suiting for this game and target group. During the activity people were laughing very loud. The questions were a bit silly, like 'would you rather own a parrot or a monkey?' Which made the participants laugh. Moving around and seeing what others do also triggers a fun atmosphere where unexpected

thing happen and people learn about each other's interests. Also, they liked to have some sort of influence over the group forming, otherwise you have no idea with you will end up with.

“ Making groups should be done in a fun and playful way
- participant ”

With the crossing the line the design elements are incorporated by having humour in the activity and discovering new thing about each other while doing the activity. The result of the activity is a group of people that you can be social with during the game, which enhances fellowship.



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Figure 38: Making groups by 'crossing the line'



Figure 39: Participants filling in questionnaire about experience

Interaction test: Boat maps and game details

Before being able to test the whole game, the interaction and operation of the boat maps should be tested. If this part of the game is not working somehow, the game fails and the other mechanics of the game are harder to validate. Therefore, it was decided to do a quick and dirty prototype of the maps and test them with 4 participants.

During this test the researcher took the opportunity to also validate the flow of the game and receive feedback on the visual style of the game. Therefore, this interaction test is divided in 3 parts.

Method

As preparation, a blue boat printed on paper is hidden somewhere in the DZB building. The researcher created a map that ends at the place of this blue boat.

The participant is firstly explained about the procedure of the interaction test is. This setup is described below.

Part 1

1. Follow a boat map
 - ▶ The participant is handed a filled in boat map and follows the instructions towards the blue boat.
2. Create a boat map and hide a boat
 - ▶ The participant gets an empty map, 30 stickers with possible instructions and a blue boat paper.
 - ▶ The participant creates a map for someone else by placing the stickers on the map.
 - ▶ The participant hides the blue boat paper
3. Discussion about the boat map
 - ▶ The participant is asked multiple questions about the experience he just had. Questions such as 'What did you find difficult about making the map?' 'What did you think about the suggestions on the stickers?'. All questions can be found in appendix G.

Part 2

4. Discussion about setup of the game
 - ▶ The participant is shown a simple storyboard about the game. This storyboard is based on the scenario of use describe earlier on in this chapter.
 - ▶ Afterwards, questions are asked about the theme, the roles, the activities, the time span, the reward and the complexity of the game. All questions can be found in appendix G.

Part 3

5. Discussion about visual style
 - ▶ At last, the participants were shown 3 mood boards with different visual styles. A cartoon style, an abstract/sleek style and a realistic style (figure 41). The participants were asked which style they think would best fit the game and would be most appealing to the DZB employees.

Part 1: Following and making boat maps

The participant is observed by the researcher on the following topics

- ▶ **Complexity:** are the activities understandable for the participant?
- ▶ **Humour:** do the participants show joy during the activity?
- ▶ **Personalisation:** how much own input does the participant give in the map?
- ▶ **Activation:** are the activities provoking the participant to walk?

Results

The tests are observed and analysed on the topics complexity, humour, personalisation and activation, which gives the following results.

Complexity:

- ▶ Understandable
- All participants find the game easy to understand. The tasks are clear as are the provided materials. The stickers were guiding the participants in creating the map. However, the stickers should clearly explain what to do. For example, when it says 'turn a quarter turn', it should describe which way to turn.



Figure 40: Participants during the boat map interaction test

- Increase challenge

The map of the test was quite short (only 10 steps) and participants expressed that the challenge can be increased by making the map longer. They enjoyed the activity and would like to do it for a longer time.

“ If the map is longer you can explore more places in the building
- participant ”

- Remove step count

The size of a step is not the same for everyone. Therefore, including step count in the assignments was not working during the test. People ended up at different places than intended and got stuck by walking against a wall.

- Keep it simple!

Although the challenge can be increased by making the map longer, the assignments and explanations should stay very simple. However, the assignments should stay exciting to perform and not come over as patronising.

Humour:

- Considered as fun activity

During the test, people laughed at the assignments on the map and told that they think it was funny to include the more ‘silly’ assignments, like ‘hop 6 steps’ while creating the map. One participant that did the test alone was a bit hesitant because of the silly assignments, but when being in a group, it would probably be considered as more normal to do.

Personalisation:

- Own input

Participants used the stickers as example but liked to write assignments themselves or add to the suggestions. There should be enough empty stickers to personalise the whole map if the players want to do so.

- Examples as starting point

Although people like providing their own input. The stickers serve as inspiration and starting point. They show what kind of assignments can be thought of. Also, when people have a harder time reading or writing. They can still have their input with these pre-made stickers.

Activation:

- Following an making is both activating

After receiving the map to follow, all participants stood up to follow it and search for the boat. This was activating them to walk. When making the map, 3 out of 4 participants did this while walking around and trying different options for assignments. 1 participant tried to do it by guessing, however, after some assignments the participant stood up and walked the route to check it.

- Small assignments are good for balance and coordination

The small assignments that were incorporated to make it more fun are also good balance exercises. Like ‘stand 10 seconds on one leg’. These kind of assignments are not only perceived as being funny, but are also good for flexibility and balance.

- Doing together activates more

Out of the 4 participants, 2 participants worked together. When people work together they support each other and they decided sooner to start walking or try out different things. In the interviews is also expressed by multiple participants that people within DZB would tackle along with a group and help each other.

Other points of attention

The activity is inside to have a safe area to play the game in. However, many participants like to be outside, as was also mentioned during the field study. Therefore, it is possible that during the end evaluation, people will express to wanting to play outside.

There is not a clear starting point for the game. The participants should be explained to include this in the map.

Part 2: setup of the game

Flow of the game

Participants reacted positive on the activity with the boat maps and understood the idea. They had a good time and could imagine many colleagues to appreciate it as well. They think it will stay interesting over a 3 week period. Some people had to get used to doing the activity They were a bit hesitant, but seemed to have fun while doing it. The reward is a great plus to get the people involved in the first place. Employees expressed that a reward serves as a sense of appreciation, which many employees wish for.

Adventure theme

The theme of the game was liked by all participants and they did not think it would be perceived as childish. These were also participants that work for a long time with DZB and know a lot of employees, so they were able to imagine what their colleagues would think.

The role of sailors and pirates was also appreciated. The people working in the storage facility are even called pirates, since they are wearing sort of pirate like hats.

The participants expressed that there can be people that think the game is childish. However, when people work in groups and many people participate. These people can change their opinion and still participate, they can be a bit anxious at first, but will participate later on.

Part 3: visual style of the game

Before designing all materials of the game, there is first discussed with employees which kind of visual style seemed most appealing to them. If this first layer of communication does not match with the target group, they might not feel motivated to subscribe for the game. Therefore, 3 different storyboards were shown. A cartoon/stip drawing one, a realistic one and an abstract/sleek one (figure 41). The participants were asked which one they think would be best for the visual style of the game.

All participants mentioned that the cartoon board would be most appealing for the employees of DZB, the bright colours and clear drawings will stand out to the employees and draw their attention.

The realistic board was considered as beautiful. However, participants mentioned it to be too serious and probably not trigger most employees of DZB.

Finally, the abstract/sleek mood board was not considered at all. People mention to like to colours, however the shapes were unclear and employees would have a hard time understanding it.



Figure 41: Moodboards. (1) Cartoon style, (2) Realistic style, (3) Abstract/sleek style



07

EVALUATION

As final activity, the game is evaluated with employees of DZB. The aim of this user test was to find out if the game is fulfilling the proposed design goal *to increase physical activity of employees with low socioeconomic status (over time) by engaging them in an health intervention placed in DZB, that brings joy and friendship to the user.*

Also, by this evaluation the research question can be answered. This research question was as follows: *What gamification based intervention motivates individuals with low SES to increase their physical activity while being at work?* The setup of the evaluation is explained in this chapter. Next, the results are described and subsequently some future recommendations are suggested as are some limitations of this project pointed out.

7.1 Preparation

7.2 Approach

7.3 Results

7.4 Recommendations

7.5 Limitations

7.1 PREPARATION

Prototype

In order to play the game as it was designed, a full prototype of the game is built (figure 42). The game board is made of wood and the boats are 3D printed. The boats stick to the board with magnets, so the boat have a designated location on the board. Additionally, blue boxes are made to hide the boat in. Thereby, a treasure box is created to hide the reward in. The game has a playful look with bright colours and round shapes. This look matches the visual cartoon style as preferred by the target group (see chapter 6.4). The materials contain much blue colours and a touch of yellow to match the corporate identity of DZB.

The paper materials were placed on brown cardboard to give them a professional and firm look. They have a modern pirate style with many cartoon like images to make them fun to look at and invites the player to read them.

7.2 APPROACH

Participants

The prototype is created for 12 players. In the first instance, 12 participants were recruited to participate in the game. However, on the first day 2 people reported to be ill. Because of the Covid-19 circumstances people were very careful with cold symptoms and stayed home sooner. Eventually, the game continued with 10 participants. Also, not every participant worked all week, so some days there were more people present than other days. In figure 43 is described how many people participated each day. The first hide and search activity was done in 3 groups of 3. The last hide and search activity was done in 2 group of 3. Eventually, 9 people were interviewed, since 1 person participated in the first three activities only.

The participants were from 5 different departments of DZB, namely: catering, administration, reception and two different assembly departments.

DAY	AMOUNT OF PEOPLE
Mon	7
Tue	9
Wed	9
Thu	6
Fri	6

Figure 43: Amount of people that participated each evaluation day

Test

The 5 activities, explained in the storyboard of use, are tested over a 5 day period. It was estimated that each activity should last around 30 minutes. The participants got an explanation from the researcher each day and then started the activity. During the activity the researcher was there to answer questions and do observations.

Interview

After playing the game the participants were interviewed about their experience. This interview took around 15 minutes for each participant. Firstly, they filled in in a Likert questionnaire about the game, their health and physical exercise. After filling in the questionnaire, there was elaborated on some of these questions. Also, the participants were asked if they had improvements on the game and what the effect of the game was on their habits in physical exercise. The interview guide can be found in appendix H and the Likert scale questionnaire in appendix I.

Analysis

During the game, the researcher has made videos and observations. These observations were written down on observations sheets (appendix K). Before the evaluation, the participants were asked for their consent for filming and collecting information in the interview. This consent form can be found in appendix J. After the testing period, the videos were looked at again and the information was written on post its. This information was briefly clustered which gave interesting insights. Finally, the information was analysed on whether it matches the design goal, interaction vision and design framework.

7.3 RESULTS

Interview

During the interview people expressed to really enjoying the activities. They thought the assignments were fun. However they were sometimes a bit embarrassing to perform, but did them anyways.

All participants told to enjoy working with other colleagues and doing something else than working together. They liked that they got to know new people at DZB.

“ You only know each other from seeing, now you can have a conversation together. - Participant 2

The conversations with the participants made clear that the effect of the game was different for all participants, some participants expressed to being more aware of their physical condition, others saw this only as a fun game and still others actually did more physical work at their work place during that week.

“ This week I did stretch exercises at my department. That is something I did not do before the game. - Participant 2

Observations

While the game was played it showed that playing stimulates physical activity. All participants were set to action by creating and following the maps. Most participants took the strategy of first hiding the box and then creating the map. With both hiding activities, one group decided to sit down or stay at one spot and tried to imagine the journey towards the hiding spot. This group took most time to create the map and found it a challenge to place the last few stickers on the map.

The groups worked well together and there was observed a lot of laughter. People did the funny

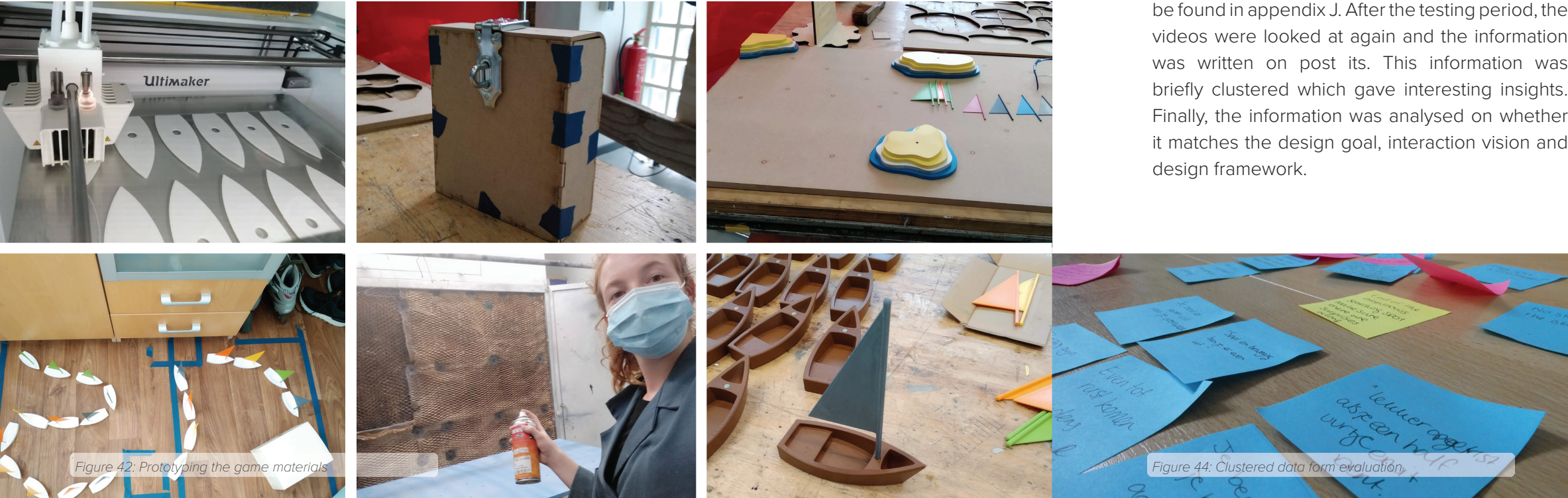


Figure 42: Prototyping the game materials

Figure 44: Clustered data from evaluation

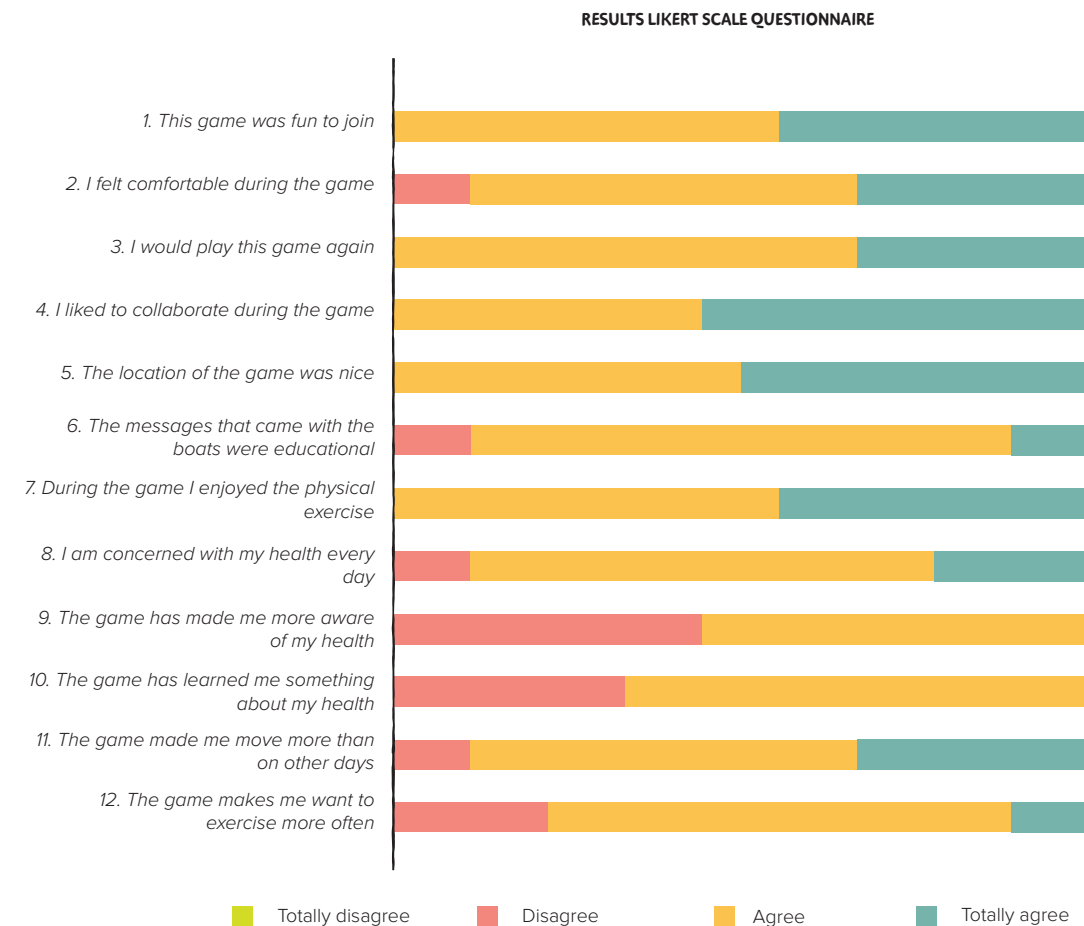


Figure 45: Results Likert scale questionnaire

assignments on the map and hopped through the hallway or stood on one leg. Also, when a boat was found, the faces of the participants lit up and they seemed genuinely happy with their find.

Likert scale

The results of the Likert questionnaire show that people liked the game (figure 45). Most participants answered positive on the questions regarding the game. The answers show that people enjoyed participating and felt comfortable. One person reports to not feeling comfortable, this was due to covid-19 and not because of the game. Some participants do not think they learned something about health or became more aware of their health during the game. It can also be concluded that people really enjoyed working together during the game, since most people totally agree with this statement.

Interpretations

After clustering the data from the questionnaire, interviews and observations several interpretations of the data could be made. These are described in the following paragraphs.

It got them moving!

Playing the game prompted immediate action. During the hide activity, players first started to find a hiding sport for their blue box. When making the maps most players walked around to make sure the steps on the map would lead to the location of the box. When searching for the boat, the players followed the assignments on the map and did the more funny exercises. They did jumps, squats and hopped through the hallway. Most groups included a lot of walking up and down the stairs in their maps, which is also a good exercise to improve physical condition. Making the maps for another group was a great motivator for the players to increase the challenge and they tried to cover a large part of the building in their map.

“ After all that hopscotch, I really did move well ”
- Participant 8

As mentioned before, there was a group that hid the blue box, then found a seat and created their map from there. They tried to imagine the

“ I liked to find new places within DZB. ”
- Participant 8

journey, instead of walking it and trying it out. The researcher tried once to get them to explore the building. However, this did not motivate them and they remained seated. Probably, this group was not playing the game with the intention to increase their physical exercise but were focussed on creating a challenging map for the other group. The sitting group both times had the same person that took a leading role, this might also have influenced the other people in the group to not stand up and move around and try out the route.

Engaging and fun

People seemed to enjoy themselves during the game. They were immersed in the experience and kept focus on the game during the playing time and everyone participated all days that they were working. Certain elements of the game, such as the key, the blue box and exploring the building enhanced the curiosity of the players. This curiosity made them motivated to fulfil the assignments during the game. Also, placing the boat on the game board and seeing the boats of other groups

come together gave people a pleasant feeling.

“ You arrive to put down the boat and then you see all those happy faces, that gives me satisfaction. ”
- Participant 2

The more silly assignments such as jumping or hopping increased the fun in the game. Participants were eager to incorporate these fun elements in their map and they came up themselves with creative ideas. Such as: ‘introduce yourself at the reception’, ‘clean your hands’, or ‘do a ballet exercise’ (figure 46).

These elements were what made the game more special and surprising to play. Also looking at the Likert scale, in combination with what people reported, this game was positively received by the employees and they had a good time playing it.

Enjoyable to meet other colleagues.

All participants expressed that they liked working in the groups. It was a good way to meet colleagues of other departments, or get to know your close colleagues in another way. Three people is a good amount of people because everyone can



Figure 46: Filled in boat map form participants

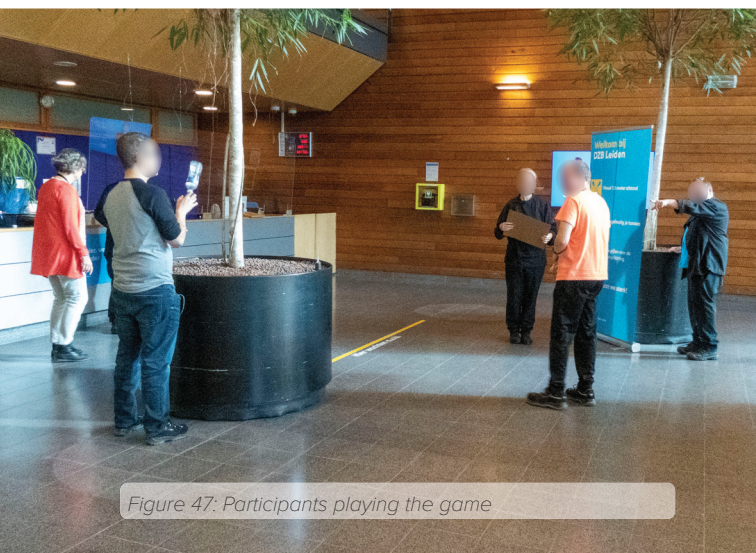


Figure 47: Participants playing the game

be included in the game and dividing the tasks is easy and clear.

People with certain mental disabilities, or people that cannot read can still participate in this game. They were taken along by the other group members and asked about their opinion. However, it needs to be made sure that someone that cannot read comes in a group with people that can.

There was shown togetherness in the groups, people like to joke around with each other. Even after the activity was done, they stayed for a few minutes to chat with each other. This shows that colleagues like to come together and are interested in each other's personal life. Since there is not yet a platform for the employees to engage with employees from other departments, playing this game or being involved in a health intervention together can be a great way of doing so.

Halfway the game, new groups were made because there were less participants at this point. This was not intended at first, however it turned out very positive. People like to get to know even more people of the group. Also, since the activity repeats itself, another group made the second activity more interesting and different. The second time the groups were made this was done by the researcher. This turned out positive and the people were satisfied with their group. This was also the case since it was a small group of 6 people that needed to be divided in two groups. When playing with more people, the way of making groups can again be done with a game of crossing the line or another group making game, so making the groups making process will be considered as being fair.

Challenge to make the map

Making the map was considered a challenge by some participants. However this was a challenge they liked to take and it was not considered as discouraging. Also, the group that showed most difficulty in creating the map was the group

that remained seated during most part of the hiding activity. They took most time and got a bit stuck placing the last stickers on the map. This shows that walking actually improves the user experience during the game, and makes it easier for the players to create a scavenger hunt. The researcher tried once to motivate these people to walk. However, there was decided to not influence the participants too much and observe how they would play the game. The players could have been helped more by the captain to stimulate them to walk to make them experience the benefit of it on making the map.

A bit embarrassing

Some participants mentioned that they were aware that the assignments were a bit 'crazy'. However, they also told that they did not care what others thought of them and laughed while doing the assignments. When two people hopped through the hall way, the third person would follow. However, if not everyone participated, others in the group became more hesitant to do these certain exercises. While people were aware that they were doing something a bit unordinary, they still enjoyed it and tried to embrace the game. When more employees would learn about the game, it would become less outstanding to play, which would probably make the employees feel more comfortable to play.

No clear health message

The results of the Likert scale and the interview showed that not all participants learned about their health or became more aware of their health during the game. The cards with health messages that were included with the boats were positively received but not read by everyone. Since the blue box only had one message for three people, it was not always passed on to the others. The cards however gave a clear message or were a good reminder of what someone already knew about health. The messages were an extra find in the game, they were not there to be used afterwards. This might have made the messages to be easily forgotten or even remain unnoticed.

“ ”

I was pleased to know that I had walked a kilometer so quickly

- Participant 3

A moment away

Employees expressed that playing the game was relaxing for them. It was a moment away from their workplace. People are working all day with the same people around them, which can cause irritations. Meeting some other people and playing a game was considered refreshing. Also, since you use your brain in another way, you really had the feeling of being a moment away from your work. At DZB people do a lot of routine tasks at work, being stimulated to be creative and use your brain differently was a positive effect of the game that was not expected at first.

Positive effect on awareness

People told to feel happier after playing the game. Some people experienced benefits and others increased health awareness. Two people really realized the importance of physical exercise during work, so that one person already changed some habits and performed stretching exercises hallway each day. This participant did this because she noticed physical exercise had a positive effect on improvement of the physical disability.

“ ”

I noticed that my physical condition has decreased.

- Participant 1

Other people mentioned to have plans to do more physical exercise at home after playing this game. Playing the game made them aware of their physical condition and they noticed they had to work on it. Playing the game created a moment to think about their health. However, just having plans does not necessary mean that they are going to do more exercise. It is difficult to say if their intention has actually grown during the game, or that this fades away after a few days. Also, participating

in the interview might have caused people to express they want to increase physical exercise, since they know this is what is the desired answer, also desired by themselves.

People are hesitant to doing more physical activity at work, they are worried about their working hours and the opinion of their boss. They are thinking about their work duties and colleagues. Therefore they might mention to wanting to do more physical exercise at home instead of at work. They do not yet see DZB as a possible place to work on your physical health, since it is not standard at DZB.

Too simple

Although the game was considered as challenging and fun. The overall activities were considered a bit too simple by some people. Since the map already showed the end point, not everyone saw the point of walking the whole map. They still followed the map to do the game and because the other group made the map. However, they knew they could start at the end of the map if they wanted to.

Creating an interaction that was comfortable, guiding the player and had clear rules, might have caused the game to be too simple. The participants expressed that it would be interesting to have more of a puzzle throughout the making and following of the maps. So you can get surprised, which motivates to walk the whole map.

One last point of attention is that the first searching assignment was a good way to introduce the group to each other and the game. However, the search area of this part was too small. The boats were hidden in the hallway and participants found it easy to find the boats. Since they subscribed for a physical exercise game, they expected more movement during this activity, like the exercise they got with the other four activities.

Conclusion

From this evaluation can be concluded that the game was activating people to walk. Playing the game was considered a fun challenge. However, this challenge could be increased at certain moments in the game to keep the players engaged.

People enjoyed playing together, which gave them the opportunity to get to know other people within DZB that they otherwise do not encounter. Also, playing in groups took away a bit of the embarrassment some people had about doing some of the fun assignments. When one or two people hopped through the hallway, the other followed eventually.

Furthermore, some people got more aware of the positive effect of physical exercise and already changed their habits a bit. However, many people also did not learn about their health and did not read or remember the health messages that were provided during the game.

Finally, the game was considered as relaxing moment away from work. It challenged the player to use their brain in a different way than used. However, the game was a bit too simple for people, so to keep this positive effect of the game, adaptations should be made to keep the player curious and engaged.

During this game the elements of discovery, humour and fellowship were all recognized during observations and interviews. People pointed out elements of the game that they like that refer back to the design framework. Thereby can be concluded that the game was successful in enhancing these three elements as motivational factors for the target group.

7.3 RECOMMENDATIONS

Include more surprising elements and a narrative throughout the game

Since the game was considered too simple at certain moments it would be an improvement to include more surprising elements throughout the journey. Fun hints could be found or puzzle pieces could be collected to increase the engagement of the players while following the map. The game was setup to be easy to understand for everyone, this caused it to be quite straightforward. More narrative could be included to give players a bigger goal for playing, such as helping a drowning sailor find his boat, or helping to crack the code before the pirates do. Including more narrative can increase engagement, which can also stimulate more walking. Escape room games could serve as inspiration to include these hints throughout the journey.

Have the captain take a motivator role

During the game the researcher had the role as observer, video maker and game leader. This caused that there was missing someone to take the lead in motivating participants to walk around. Someone should take the role as captain to improve the users' game experience. This motivator should focus on the narrative of the game and use that as a way to get people to move. Important to note is that this captain should use game elements as motivator, since playing the game is about cracking the code of the treasury, and not only about physical activity.

Include technology

The prototype created for this project is tangible and does not include digital technology. This is a conscious choice that is made because of the time span of the project as well as the experience employees of DZB have with technology. Although some additional research should be conducted about the employees' technology skills, adding technological elements can improve the game experience. Think about a step counter, when a certain amount of steps is done, a new hint gets unlocked. An other example is beacons spread to the building that provide players with new information when they are scanned. Also,

finding and placing the boat on the game board can be supported by a light or sound to make the interaction more special. Or even a message popping up as soon as the boat is placed on the board. Technology could help in including surprising elements in the journey people make by following the boat maps.

Increase health message

This game is intended to take place over a 3 week period. It is recommended to try this game again and spread the 5 activities over 3 weeks to see if behaviour change occurs. Since the health messages did not have an effect on everyone, or weren't even read by everyone, this element of the game should be improved. One idea can be that everyone gets their own health message on a magnet. Employees can place this magnet on their locker (since everyone has a locker at DZB), whenever they use their locker they get a reminder of the benefits of physical activity. Seeing the message multiple times helps with remembering it, and can influence peoples intention to develop change their behaviour. Overall, the health message of the game should more present.

Additionally, it can be interesting to include this game in a larger program. The game can serve as a starting point to get into physical activity. By doing physical activity in the game it shows the employees what they are capable of exercising and makes them experience the positive effect of physical activity on their mood and body. This increases their self-efficacy. After the game, the employees can set goals for the upcoming weeks. Within DZB someone can support them with setting goals, since people with low SES often experience problems in self-regulation. The employees are supported to translate the behaviour in the game towards healthy habits in real life. During this period, elements from the game (such as the magnets) can return and provide a positive recap moment. There can also be a recap moments on the goal an employee has set. For instance, with a message in a bottle. The employee can write down goals, put it in a bottle and after a few weeks

it returns, so the employee is reminded again of their physical exercise goals.

Team Fit, the vitality team of DZB, can take responsibility in setting up this game and building the health program around it. Thereby they should involve the right people that have expertise in health coaching or eliciting behaviour change.

Use framework for other interventions

When DZB is planning on creating more health interventions for their employees, the design framework and 10 point of attention could serve as input. However, still a human-centered approach is important where possible interventions are consulted and tested with employees. This research is mainly focussed on physical exercise. Changing behaviour in smoking or diet can contain slightly different motivations or underlying needs.

7.5 LIMITATIONS

Short-term evaluation

Due to the time span of the graduation project, the final evaluation was performed in one week, while the game is intended to take place over a three week period. This short-term evaluation could have influenced on the effect of the game on behaviour change. Changing habits does not happen overnight. Therefore, it is difficult to conclude whether this game has an influence on peoples' physical activity habits. Therefore, A longer testing period would be recommended in order to see user involvement and effect of the game over a longer time.

Social distancing influences collaboration

Fellowship is an important motivational aspect of this game. Social distancing made it harder to fully enhance this social element during the game. It was harder to collaborate while making and following the map. Although the sense of togetherness was surely there, the covid-19 regulations could have had an effect on the experience during the game. A positive aspects was that people liked coming together with others during this time, since that did not happen often anymore.

Much work to repeat

The game board and boats are created and can be re-used. However, the stickers, health messages and boat maps need to be printed again. This can ask for much manual work and requires a certain skill of a person. Therefore, responsibility for setting up the game should be clearly assigned. The tangibility of the game has a positive effect on user experience, but might bring some logistical problems.

Less people than participated in the final evaluation

The game is designed for 12 people. Eventually, not that many people participated in the game. Only 6 people participated in the last two activities. This might have influenced the overall experience of the user. Some people at DZB are sensitive to crowds, so the smaller group might have positively influenced their experience. Other people would like have to see more challenge, which could have been there if more groups participated.



08

CONCLUSION

The initial question stated at the beginning of this project was:

'What gamification based intervention motivates individuals with low SES to increase their physical activity while being at work?'

This question came along with several sub-questions that are answered during the literature study, field study and a co-constructing stories session. The answer to these questions led to the creation of a game based intervention that is evaluated by the employees of DZB.

Looking at the research question, it can be concluded that this game is activating the employees with low SES to do physical activity. The game provides a moment and a surrounding to perform physical activity while being at work.

By following an human-centered design process, the deeper motivations of the people were discovered. By implementing the motivational elements of discovery, humour and fellowship in the game, an engaging experience was created. During the journey people could discover new places in the building and laugh at doing or making funny physical assignments. Also, During the game they got to know their colleagues in another and a better way. These elements build a positive experience around physical exercise which motivated people to perform the exercises in the game. Doing physical exercise in the game might increase their awareness of their ability, which can increase their intention to perform physical exercise in the future. However, the game should first be evaluated over a longer period of time, in order to find if playing this game has a effect on behaviour change towards increased physical activity.

This game shows DZB an possible and promising approach to health initiatives. With health not being a standard component in the company, applying gamification at work can be a first step towards healthier employees. Gamification proved to be a great method to involve people in desired behaviour or communicate new information, without patronising them or making choices for them.

This project includes many insights about the target group. The motivational elements as well as the 10 points of attention could be used by DZB during the development of future health initiatives. However, a human-centered design process stays essential to discover the underlying needs and motivations of the employees. This attitude can help DZB to work towards improvement of their employees' health and gives the opportunity to include importance of health as a standard within their corporate culture.



09

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10

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Image references

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