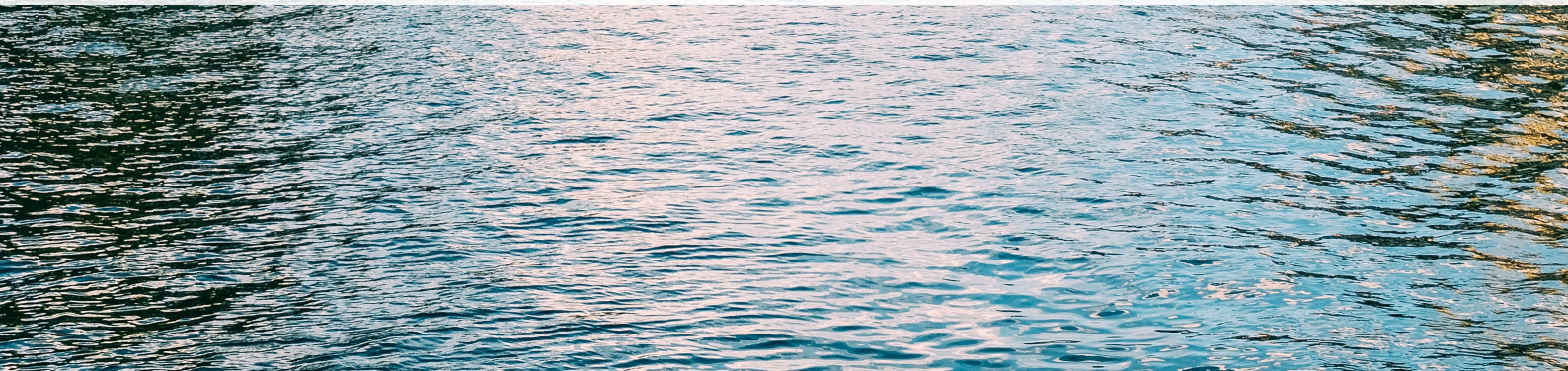
ECOmmute

Sustaninable mobilty for Amsterdam City



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Course: Improving human performance in practice

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Client profile

Gemeente Amsterdam

Our client is the "Gemeente Amsterdam," which is the Amsterdam Municipality.The Amsterdam Municipality covers the city of Amsterdam itself, along with a small number of towns nearby. The municipality consists of five clusters, an administrative and corporate staff, and seven city districts. The clusters are each specialized in a specific field, such as sports, youth or parking. [1]

Cluster Ruimte en Economie

The "Cluster Ruimte en Economie" (the Cluster of Space and Economy) is the cluster responsible for helping Amsterdam develop into a strong metropolis by creating the necessary spatial and economic requirements. This cluster has 12 departments, from which "Verkeer en Openbare Ruimte" (Traffic and Public Space) is the owner of the urban traffic and transport system (except rail), director of the mobility chain, and owner of the urban properties on behalf of the administration.[1] As our gamification approaches are targeting parts of the public transport system, we will address the Traffic and Public Space department of the Amsterdam Municipality.

Amsterdam Muncipality's goals

The city of Amsterdam is experiencing continued growth with an increasing number of inhabitants and tourists and the public space is getting increasingly crowded.[2] One of the main goals of Amsterdam is to continuously monitor and improve traffic and public transport within the city to keep the city accessible, clean, and attractive. Due to the increasing number of people living in the city, the space for cars, bikes, busses, trains, and pedestrians is becoming limited and decisions have to be made for what mode of transportation to prioritise in which parts of the city.[2] More urgently, the air pollution in the Netherlands exceeds European standards, and is associated with risks for respiratory illness. Unclean transportation methods have been found to be the leading cause of air pollution. [3 4]

Banning diesel fuelled cars and motorcycles by 2030

These factors have led to the long-term goal of the Amsterdam Municipality - The Clean Air Action Plan - to ban all gasoline and diesel fuelled cars and motorcycles by 2030.[5] To make the transition easier, they stated that they will give subsidies and parking permits to motivate people to switch to cleaner cars. [4 5] In the meantime, their goal is to lessen the amount of cars in the city centre. It is especially important to reduce the amount of solo drivers, as the city does not have a parking spot for every inhabitant and they create more pollution per person. Furthermore, Amsterdam aims to encourage the use of shared (electric) vehicles, bicycles, and scooters. Continuously improving the bicycle road network and pedestrian paths, the city tries to move more people away from the car and onto the bicycle and sidewalk.[4 5]

Our team of consultants will focus on the Amsterdam Municipality's goals concerning decreasing individual car use through motivating people to share cars, use public transport, cycle, or walk.

Achieving Amsterdam Muncipality's goals with gamification

In a modern world where essentially all people have smartphones, implementing an app that makes environmentally friendly methods of transport fun and rewarding is an excellent way to help Amsterdam municipality achieve their goals and keep the people of Amsterdam happy.[6] We propose to develop ECOmmute, an app featuring various game mechanics, as well as a simple interface for car and bicycle-sharing. With scoring, rewards, social factors, and challenges we nudge the app-user to use public transport, share their car, and opt for cycling and walking rather than driving. Thus, lessening the congestion and pollution in the city centre and suburbs.

ECOmmute

Introduction

What is gamification?

Gamification is the use of game elements and game design techniques in a non-game context.[7] In our scenario, a non-game context is Amsterdam city's mobility behaviors. Currently the main aspect of travelling is going from one place to another. However, gamification brings a new aspect to travelling – an opportunity to gain something extra and make the experience of travelling fun.[6] By using gamification, we not only want to enhance the experience of travelling but, more importantly, also instigate a behavior change which will increase responsible and sustainable behavior.[8][9]

Gamification benefits

Gamification has many benefits for the users and the client, the Amsterdam Municipality.

From a user's perspective, the benefits of gamification can be:

Education and empowerment – e.g. showing how much gas emissions they prevent by using a sustainable method compared to a non-sustainable method of transport[6]

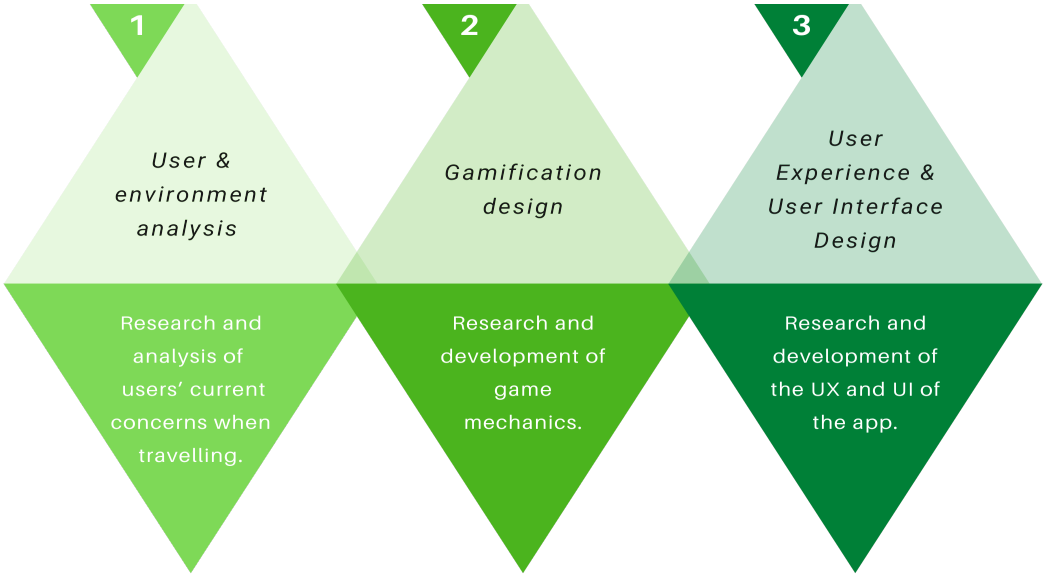
Enjoyment in participation (feeling good) – e.g. completing/winning challenges, cooperation, getting tangible rewards[6]

Tangible rewards – e.g. vouchers, free rides, tax reductions[6]

When users enjoy the gamification elements we have incorporated into the app and engage with the app on a deeper level, the Amsterdam Municipality will reap the benefits. Gamifying the use of various transportation methods in Amsterdam city will promote sustainable mobility and decrease the amount of cars. It will not only have environmental benefits, such as reducing pollution and congestion, but social and economic benefits as well. Game elements, such as competition and challenges, will promote social facilitation, whilst tangible rewards, such as shop vouchers, will promote the economy.[7]

Behind the Scenes - Mode of Transport Identification

The app will use information from the GPS sensor and gyroscope and accelerometer sensors which are present in almost all smartphones. GPS is short for Global Positioning System and works by sending signals back and forth to at least four radio-navigation satellites that tell the phone where it is currently located with an accuracy of up to 30 cms.[10][11] The accelerometer measures linear acceleration of movement while the gyroscope measures the rotational velocity of the smartphone.[12]



Project plan

To achieve our goals and develop a functioning app, we used our unique experiences and knowledge of psychology, design, strategy, and technology. The three steps of our project plan were (1) user and environment analysis, (2) development and design of gamified environments, and (3) user experience and user interface design.

1. User and Environment Analysis

The first step in the app development was The first step in the app development was researching and analyzing users' current concerns about travelling (e.g. lack of parking, fare prices, travel time, comfort). Foggs's behavior model was used to identify motivation, ability, and triggers that are relevant to behavior change involved in switching from car use to more sustainable methods of transport. [13] The user and environment analysis enabled us to identify obstacles and address drivers' concerns, as well as identify what aspects of the gamified experience they will enjoy the most.

2. Gamification design

The second step in the app development was research and development of game mechanics, which is an umbrella term for game elements, dynamics, and mechanics.[7] The aim was to deliver fun solutions that enhance the user's ability to complete a task.

3. User Experience (UX) and User Interface (UI) Design

The third step in the app development was research and development of the UX and UI. Both the UX and UI are important to reach optimal engagement with the product.[8] A friendly UI helps users and enhances their experiences as well as completion of tasks.

User & environment analysis

Current situation

Currently, most travellers want to reach their desired destination in optimal time, cost, and effort. [14] In addition, there are factors such as the weather and travel companions. As with other types of decision-making, there is a trade-off between the pros and cons of each transport method based on the goal at hand.

The important takeaway is that the travel method and route depend on various factors relating to the user and their environment, which influence the achievement of their goal. Thus, the first step in developing the product is a thorough analysis of the target audience – users and their environment.[6]

Why user and environment research?

It is essential to research and understand the users who will interact with the app and adapt the development of game elements and design techniques according to their needs. This enables us to design appropriate challenges and opportunities to make better choices about the transport method that do not prevent accomplishing other travel related goals. Both user and environment analysis are crucial in developing a gamified environment that achieves optimal balance between productivity and enjoyment.[7]

Fogg's behaviour model

The goal of the app is behavior change, therefore users and environment were analyzed according to the three elements of Fogg's model of behavior. The model defines occurrence of behavior as a function of three distinct factors: motivation, ability, and triggers.[7 13 9] See figure 1.

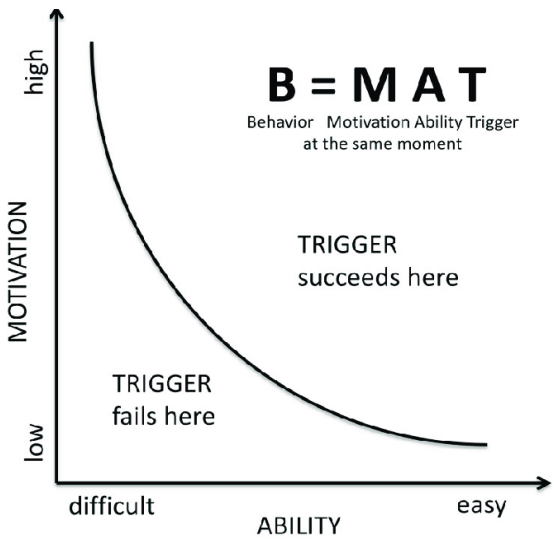


Figure 1. Fogg's behaviour model

Mapping users' motivation, ability and triggers rget audience

To map users' motivations, ability, and triggers (MAT), we used the concept of personas - profiles of the ideal customers. Personas are usually created after collecting information from real target audiences. [15] However, for this project, likely personas (and their MAT) were based on already conducted research of car users and the Dutch population.

Target audience

Because the Amsterdam Municipality's goal is to reduce cars and emissions, the target users are mainly people who still use personal cars in Amsterdam. Although the app can and would be used by people who already use more sustainable methods of travel, the behavior change research is focused on users who predominantly use cars.

What Will Motivate Users' Behavior Change?

When defining users' motivations, we distinguish two different types of motivators: extrinsic and intrinsic. Extrinsic motivation comes from external factors, such as the prospect of receiving a reward. Intrinsic motivation comes from internal factors, such as the enjoyment derived from doing an activity. [7] [16]

Understanding the Importance of the Environment

A majority of Dutch people believe that climate and environment are the prominent issues the Netherlands is currently facing. In a survey from March 2020, 66% of respondents stated they worry about the climate and environment.[17] [18] Another survey from 2018 showed that a greater part of the Dutch population sees focus on the environment and sustainability as beneficial to the Netherlands. [19]

Both pieces of information are promising when it comes to introducing an app with an emphasis on improving the environment. There is evidence that the majority of the population living in the Netherlands have intrinsic motivations to better the environment. Unfortunately having this goal or intent does not mean one will act on it and prioritise it over other goals when travelling.

Understanding the Importance of the Private Car

Research shows that driving a car is important for people because it provides status and the opportunity for personal control and autonomy. [20] Older people, who may face difficulties walking or standing for prolonged periods, may prefer cycling or driving for comfortable and independent mobility. Over 90% of older drivers believe that giving up driving would restrict their independence and mobility. [20] In addition, research shows that higher income groups use cars more than lower income groups. [14]

Steg (2003) states in her paper that "The car is especially more attractive than public transport because of its convenience, independence, flexibility, comfort, speed, reliability and because driving is perceived to be more pleasurable." The car also offers more status than public transport does. However, using public transport is perceived to be safer than driving a car. [14]

How to motivate sustainable behaviour?

The research shows that many users can have strong intrinsic motivations to keep using cars. It is important to note that not only frequent car drivers feel this way, but also people who seldom use cars. Frequent car users have been found to have less concerns about the consequences of car use than people who use other methods of transport. Research shows they tend to evaluate transport policies aimed at reducing car use as less legitimate. [14]

All above-mentioned information is important to consider when using gamification to motivate behavior change. We can encourage people to reduce car use in Amsterdam city by offering a reward whenever they cycle or use public transport; thus creating extrinsic motivations for them to perform the behavior. Research supports using extrinsic motivators to motivate behaviors, especially when people do not like the behavior. [7] [16] However, for other users, rewarding an activity they already enjoy leads to a short-term increase in behavior followed by a decrease. This is because external incentives reduce the intrinsic motivation to perform the behavior. This is called the "overjustification effect". [7] [8]

Overcoming "overjustification effect"

For this reason, we plan on designing the app using external motivators (vouchers and money) and creating more complex challenges where the reward is given based on the level of performance.

Linking the reward to performance on task has been shown to reduce the overjustification effect. Thus, users with intrinsic motivations to use sustainable methods of transport will feel motivated to continue to do so, even in the absence of external motivators.

Assesing users' abilty

Understanding user ability and the barriers defines the requirements that the interface and product will have to meet. [7] [8] Before creating an actual product, mapping users' motivations and contexts based on the research, gave us an insight into user ability when interacting with our product.

Users' Ability to Interact with the Interface

Most people use smartphones and interact with them in the morning before they go anywhere. Thus, people can interact with the app before they travel, which is crucial in influencing their choice of transport.

Accessible Knowledge and Tools to Complete a Task

Users who predominantly use cars will lack the knowledge or even be misinformed about other transport methods. Learning is crucial for behaviour change. [9] Therefore an important aspect of the app will be educating people about their emission contribution, as well as showing how easy and accessible other methods are. This will be done by notifying them about the alternative method, e.g., what tram/bus stops there are, cycling paths, how long the route will take. In addition, they will be shown how much energy they save compared to taking a car.

Finding Potential Errors and/or Barriers While Interacting with the App

Once the product is designed, we also propose contextual inquiry as the method of gathering more information. We would recruit participants - prospective users of the app to interact with the product (prototype) in the location they would naturally use it. [15] We would do it partially in person, interviewing their user experience as well as following their use through the app data, ideally over a course of a week of use. We acknowledge that this method of testing requires more resources than just talking to users after they have used the product.

However, we justify this as a better method because research shows memories are not as reliable, and it is more objective to observe the user experience in person as the user may not discover and report their own barriers as a researcher may. [7] [8] [15]

What Will Motivate Users' Behavior Change?

Sufficient motivation and ability are not enough to turn intentions into tangible outcomes. Fogg's behaviour model highlights that triggers that instigate wanted behavior are crucial. Luckily, current technological advancements allow us to create triggers at precise times and locations to instigate behavior change at the optimal moment. Notifications can be designed to direct the user's attention to the product, and according to Fogg's BM, they are most effective when the user's levels of motivation and ability are sufficiently high (See Figure 1).

The timing of the app notifications (e.g., reminders, rewards ...) is critical.[7] [8] Nowadays smartphone users experience a high number of notifications from various sources and as designers we want to be careful that our notifications (triggers) are not perceived as intrusive and annoying. For example, a reminder to walk, cycle, or take public transport when you are already at the wanted destination will not have a positive effect.

Therefore, triggers to choose a more sustainable method of travel will be designed to give control over and options for what types of notifications to receive. In addition, usage statistics will be of uttermost importance. Based on the patterns, remainders and feedback will be designed to appear before and after the travelling. It will serve as a nudge to trigger the better choice, but also to increase the user's motivation to change right before they decide on how to travel.

Gamification design

Game elements

In this section, the game elements which will make the app attractive and addictive will be explained in detail. Our goal is to use these game elements to motivate users to decrease their car use and turn to more sustainable methods of travel. This will in turn help the Amsterdam Municipality achieve its goal of decreasing the number of cars in Amsterdam.

The main game elements we will focus on are scoring, rewards, reward scheduling, social factors, and challenges. These game elements have been selected based on the Self Determination Theory (SDT). According to SDT people have 3 basic needs. These needs are (1) the need to feel competent, (2) the need to feel autonomous, and (3) the need to relate to others. [21]

Scoring

Scoring is important for the app-users to feel competent and autonomous. The user can choose the type of transportation they will use to collect points (autonomy) and by collecting points they will see their progress (competency). Each time the user travels using a certain type of transportation method, they will receive points based on the method they have selected:

- Driving a gasoline/diesel fuelled car alone = 0 points

- Sharing a car or driving an electric car alone = 1 point

- Sharing an electric car or using an electric scooter = 2 points

- Sharing an electric scooter or using public transport = 5 points

- Cycling or walking = 10 points

Scoring is very important for users to know where they stand and how well they are doing in their goal of saving emissions and thus becoming more environmentally friendly. Scoring also allows for the other game elements to come into play.[7] [16]Thanks to the points collected, users can earn rewards and become socially involved with other users.

Rewards

Rewards are an essential part of gamification. [7] [16]They can help a user feel competent through showing them their achievements in a visual manner. [23] In addition, every time a user gains a reward, their brain releases dopamine, which leads to the sensation of pleasure.[7] [22] This leads to a kind of learning called operant conditioning; which means the user begins associating the app with the pleasure sensation. [7] [22]Thanks to this conditioning, the user continues playing the game to keep experiencing the dopamine release and the associated pleasure.

The rewards in our app are given based on the points the users have collected. These rewards are badges, winning challenges, and using acquired points to buy plants for the users' virtual garden. The app-users will also be rewarded with tangible rewards in the form of tax reductions and vouchers for car sharing, electric bicycles, and public transportation.

Explanation of rewards

Badges

Badges are the visual representations of achievements within the gamification environment. [7] [24]They show progress in terms of milestones rather than just accumulated points. [23] The app will have badges connected to the different weekly and monthly challenges, such as having zero emissions in a week or decreasing emission in comparison to the previous month.

Winning challenges

Winning a challenge is a reward in itself because the user's need for competency is satisfied.[7] [24] In addition, winning a challenge does not end the feeling of anticipation since there are always other challenges a user can focus on and conquer.

In our app there are weekly and monthly challenges. These challenges help keep users engaged by maintaining novelty and excitement in the app. In addition, the challenges help users alter their habits. [23] [9]For example, a user may want to decrease their emissions but not know where to start. Telling this user to not use their car will not help them in changing their habits. However, challenges such as "use public transport 2 days per week" can help them gradually decrease their car usage.

Plants for the garden

Users can buy plants in the app-shop for their virtual garden.

The more points a user has, the more elaborate plants they can buy. Tending to their plants and working on their garden will make users feel more involved with the app and their goal of being more environmentally friendly.[7] In addition, the amount of plants they have is a great visual representation of their progress and accomplishments in the app.[7] [24]

Reward scheduling

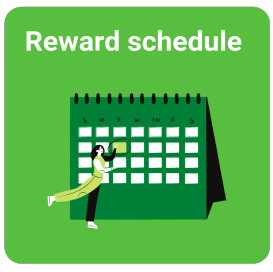
Reward scheduling helps create a sense of uncertainty and anticipation.[7] [24] This is what makes slot machines extremely addictive. The knowledge that there is a big reward that may be given out hooks the player, even though the probability of receiving the big reward is very low. In our app, users will occasionally receive a bonus reward (an additional reward to the one they would normally receive). This probability of receiving the bonus reward will motivate the users to continue playing until they receive it.

The bonus rewards are extra points given at random. Thus, every time a user completes a trip and earns points for that trip, they also have the chance to earn extra points. In addition, there are monthly bonus rewards, which are vouchers for car sharing, electric bicycles, or public transport. These vouchers are randomly given (or not) when users earn badges.

Social factors

Social factors are a game element which makes use of a person's need to relate to others. [21] This need to relate to others is what makes community and competition attractive to the user. [23] The feeling of community can be created in users thanks to badges and leaderboards. Users with the same badges will feel that they belong in the same social group and that they fit in. The three leaderboards (gold, silver, and bronze) will allow users to be grouped together with other users who are at a similar level to them, also creating a sense of community and relatedness.

In addition, leaderboards help create a sense of competition.[23] Users can see how well they are doing (how many points they have based on how many emissions they have saved) in comparison to other users. The division of the good, silver, and bronze leagues is important because people's goals should be challenging but attainable. If one has just started using the app, they should not be competing against others who already have more than a thousand points.



+ gamification design

Social pressure

The app will also make use of social pressure to motivate users to turn to more sustainable methods of transport. [23] Since people do not like being the odd one out, if their friends and family are using the app and earning points and badges, they will want to earn as many points and badges as them to fit in.

Challenges

Challenges relate to the needs of autonomy and competency that user's have. [7] [21] The users feel autonomous because they are free to choose the challenges that appeal to them. And they feel competent because the challenges they choose are suitable to their abilities and goals and thus, the users can complete the challenges successfully.[24]

One aspect of challenges is collecting. Users can try to complete challenges such as getting badge combos, visiting all bus stations in their area in a month, or using all methods of transportation (which give points) at least once in a month.

Challenges can also engage users thanks to loss aversion. [23] The weekly and monthly challenges have a time limit and users will not want to lose their progress within the challenge because the challenge disappears at the end of the week/month. [23] Thus, users will be more motivated to complete the challenges as quickly as possible rather than delaying them.

User Interface (UI) Design

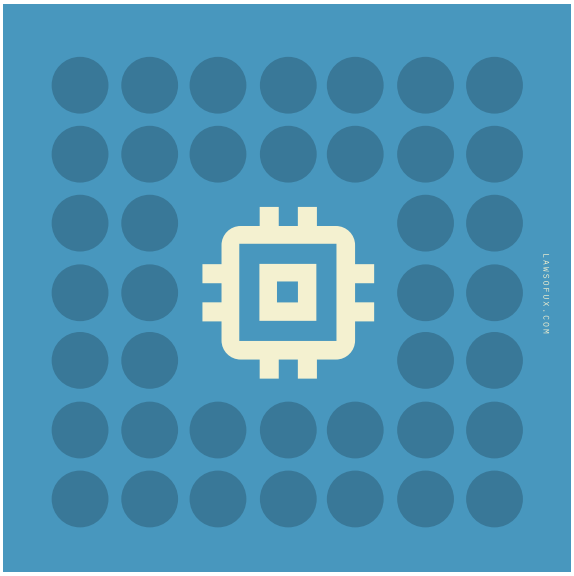
Psychology of Design

Creating a successful gamification solution does not only include an analysis of the target audience and the discussion of the gamification elements themselves, but also requires thorough thought, about how to design the interface, within which the game and environment is presented.

To grant a better understanding into our design process, this section will highlight various approaches and theories of human cognition and design, that are used in the creation of this application. Additionally, we will provide a walkthrough of our design concept that will explain where psychological knowledge of cognition and design were applied and how the user would interact with the application in general.

Hick's Law

In our design we strive for simplicity while providing enough useful information to the user on every app page. This is a difficult balance act as too much information can overwhelm, while too little information can make a page unnecessary or redundant. One of our main design goals is that the app should be easy to understand and use, providing necessary information while not being too demanding on the cognition of our users. This is especially relevant if considering that the app should be accessible for most inhabitants of Amsterdam, including users that are of advanced age or users that have otherwise limited cognitive capabilities.



With the above kept in mind, we take into account Hick's law while creating the design of our app. William Edmund Hick and Ray Hyman stated, that: "The time it takes to make a decision increases with the number and complexity of choices available". The law describes a relationship between the number of stimuli present and the reaction time of the user.[33] While Hick and Hyman came up with a formula to represent this relationship, the concept behind this math is quite simple. The more options of choice and overall complexity is present in one scope or page, the more time it takes for users to respond.

This design principle helps us to focus on what is important within our app and to omit any unnecessary information.

Cognitive Load

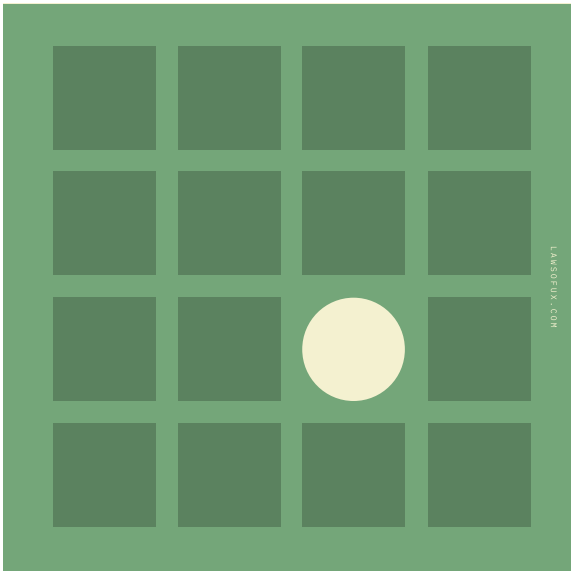
Hick's law is closely related to the psychological concept of cognitive load. It is important to understand, that the cognitive capacity of a human being is limited by various factors, such as the limitations of the working memory.[31][36] As our capacity is limited, the design of an app should incur a cognitive load that is as small as possible, as to not overcrowd our working memory with unnecessary information and stimuli that would take up space necessary for actual information processing. Additionally, as already outlined above, our target audience includes users within a wide range of ages. For this reason, we aim to keep the amount of significant mental processing required to use our app to a minimum.

Keeping this concept in mind, we will break up long or complex processes into screens with fewer options.

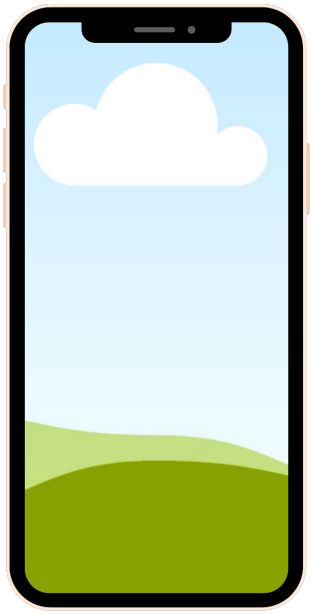
Von Restorff effect

The Von Restorff effect, also known as "The Isolation Effect" states, that when multiple similar stimuli or objects are present, the object differing from the other objects is most likely to be attended to and remembered.[32][37]

We will keep this theory in mind during the app design when displaying important information and key actions. To guide the users' attention to this information or action, we will try to make it visually distinctive while keeping it in line with our



design theme. This will help to lower cognitive load as less scanning of visually similar objects is required. Furthermore, this will ease the difficulty level of our app, as the distinct actionable buttons will be immediately apparent to our users.



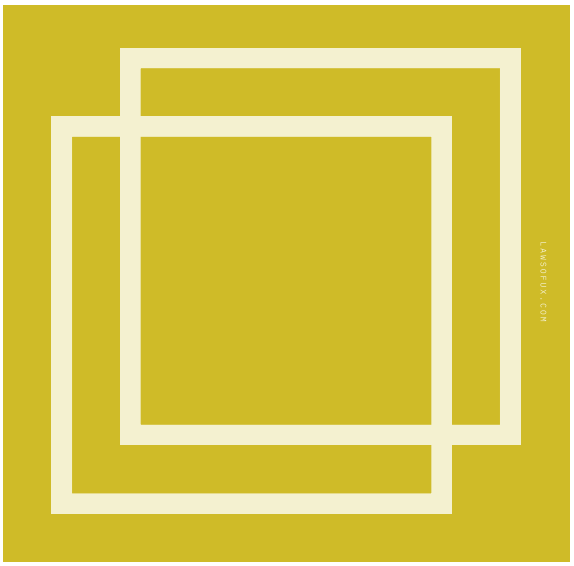
Jakob's Law

The Jakob's law states that users are very likely to spend most of their time on other sites and apps. This means that users prefer your app if it works the same way as all the other apps they know.[37] Users will transfer expectations they have gathered from other apps that appear similar to our app. As such, by creating an app that is following a design theme commonly used by other similar apps, we can create a superior user experience in which the user can focus on the app content and tasks, rather than on having to learn whole new models and functionalities.

We implement this knowledge by following the design guidelines outlined by Google within their "Material Design ", as found on material.io.[38] As this material design approach is widely followed within many apps of the Google PlayStore and especially within apps from Google themselves, users are readily familiar with this design language and the mental models that come with it.

Psychology of Colours and Brand Image

Colour psychology suggests that colours and shades can affect our emotions and our mood.[27][35] How different colours influence individuals may vary depending on culture, age and gender. Although colour associations diverge between cultures and are different depending on



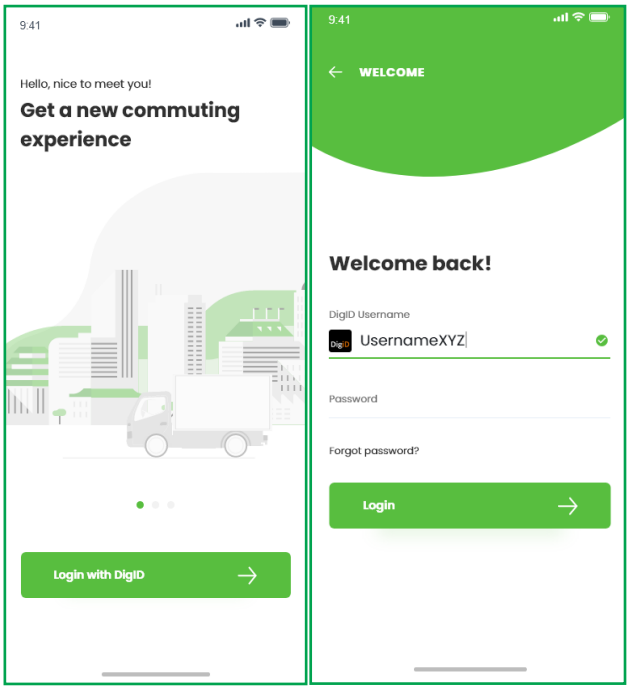
the context, colour preferences seem to be relatively uniform across gender and race.[26] Due to colour having an impact on human behaviour and their emotions, colour psychology is widely used in marketing and branding.[25] Green colours in brand and app design are often associated with links to nature, such as green foliage and vegetation, and are considered to be synonym with calmness and success.[28][29][30] In the same way, blue colours are regularly associated with blue sky and water and may express openness and peace to users.

With these emotional connections and associations in mind, we designed our app to include a green theme throughout all of the pages. This should message to the user that our product is helping the environment and that they are contributing to positive developments while

engaging with the app. Furthermore, we included a hue of blue in the "garden" section of our app, which nicely fits in our overall theme and supports the notions of openness and environmentalism.

Onboarding

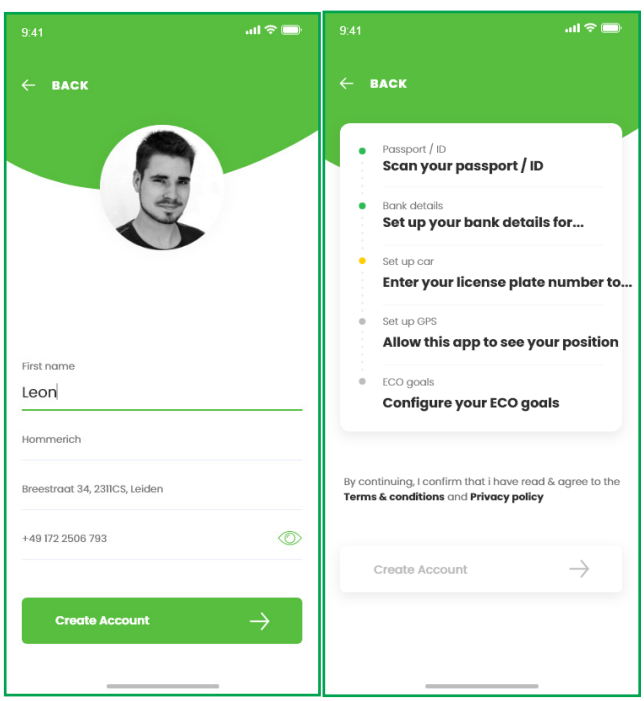
The user will be greeted with a welcome page where he or she will learn about the purpose of the app and the basics of using it. He or she will be quickly introduced to the scoring system and then will be prompted to sign in with the DigID. On this screen the colour psychology and brand image is incorporated. Furthermore, with the use of "onboarding", cognitive load is reduced and the user experiences and easy start with the app.



Sign In

On this page the user will be able to sign in with his or her DigID for quick and easy access to the app. As every citizen that is registered with the municipality already has one of these ID's the signup process should be effortless. Furthermore, this provides connection to the municipality and makes sure only actual citizens use this service. In this and all other screens Jakob's law is incorporated, as the button placement and style is familiar to that of other apps that use the material.io design language.

On the next screen the user will have the opportunity the check for the correctness of his or her details and set up necessary documents.



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Menu

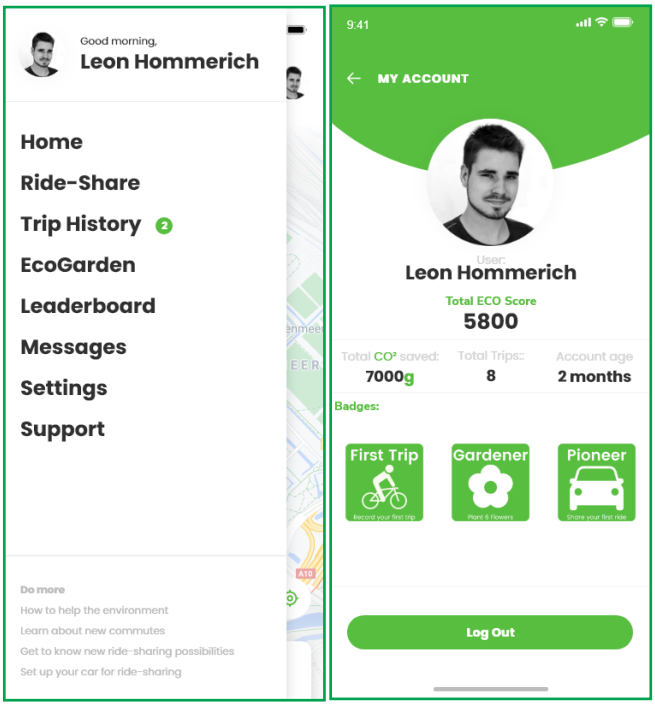
As common with other apps, the user can slide out a menu from the left side of the screen to navigate easily within the app. This feature makes use of the Jakob's law, due to its familiarity, of the Hick's law, as choices are limited and simple, and recognizes the Von Restorff effect while highlighting new messages or newly recorded trips.

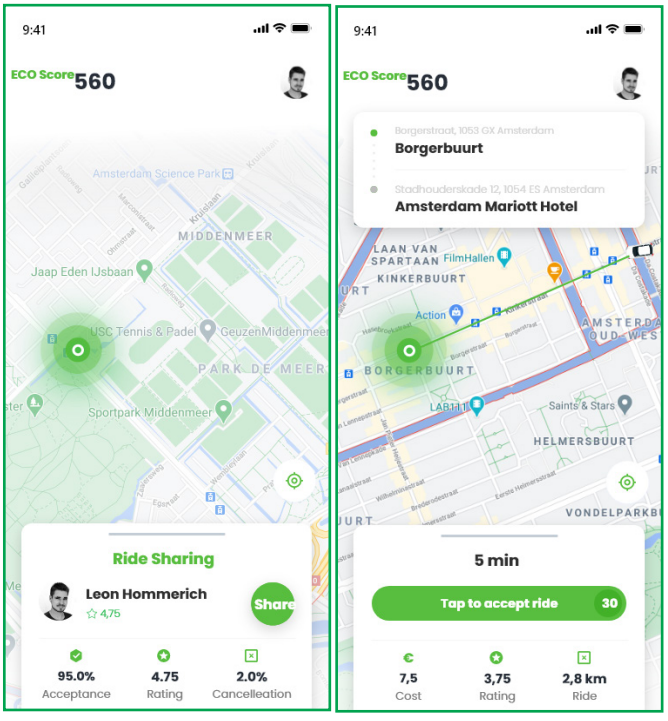
Profile

From the menu screen the user has access to all functionalities of the app, as well as his or her profile. Here the user can see their total ECO Score, can observe their total CO^2 saved, and can find out how long the account has been active and how many trips have been completed. Furthermore, the user can see his or her collection of badges that he or she has acquired over time due to the activities completed.

Map & Ride-Sharing

One of the main screens of the app is the map screen. Here the users can see where they are currently located and can offer their car for ride-sharing on the spot with just one button. Furthermore, the user can see nearby opportunities for ride-sharing. Tapping on the map they also can look for specific routes just like one would do in Google Maps and get suggested potential eco-friendly commutes. This may include bike routes, busses, trains or ride-sharing opportunities.





+ UI walkthrough

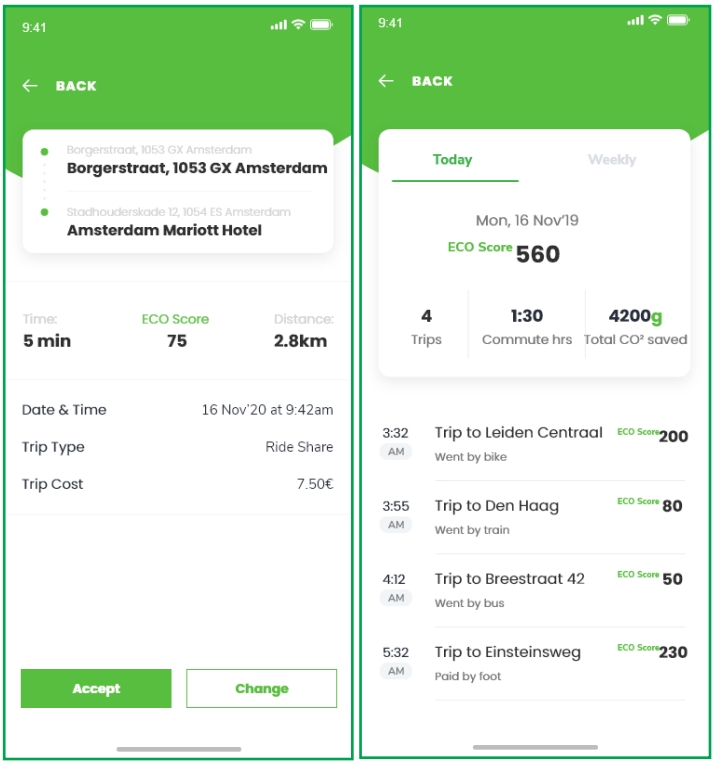
After competition of a ride, the user will have the opportunity to see the results of their trip and make changes if the trip type detection is incorrect. As the buttons differ at the end of the page to signal differing actions for each button, the Von Restorff effect is used while creating this screen.

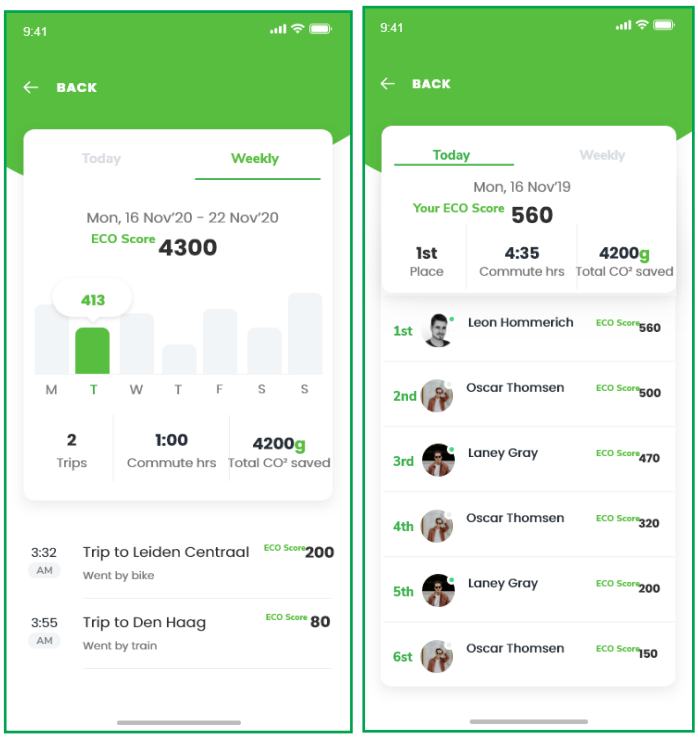
Trip history and statistics

Here the user is provided an overview for their completed trips and how many ECO points he or she has received on which day. There also is a weekly view.

Leaderboard

With the leaderboard further comparison to other users is possible which should encourage activity within the app. While having an overview over their own progress, similar to other pages within the app such as the garden, they can observe their placement among their friends and see others' ECO Score. As this screen is similar in its theme and structure to other screens within the app, it makes use of Jakob's law.

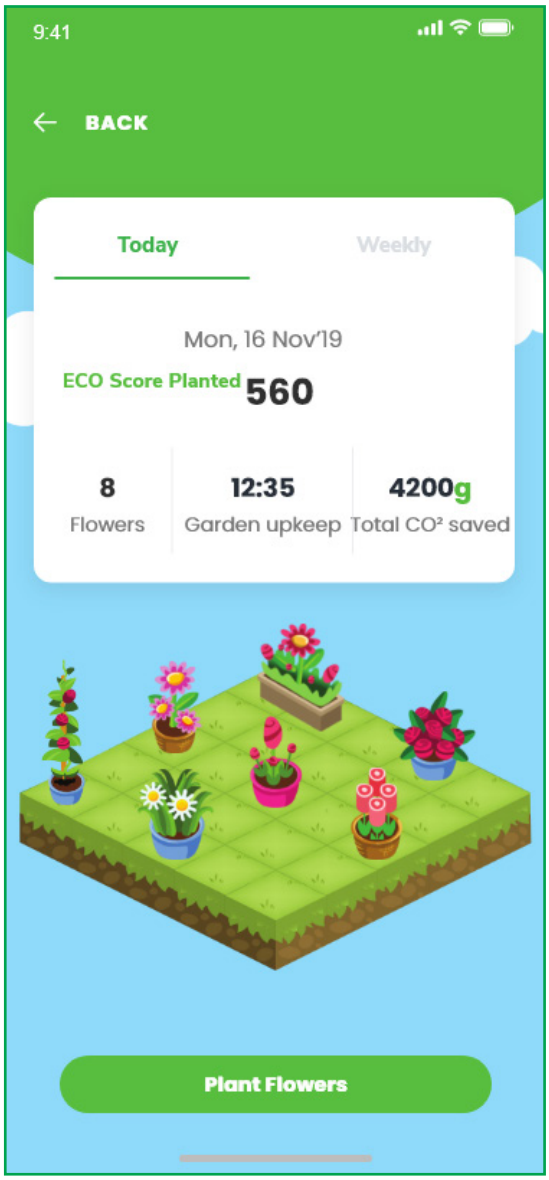




+ UI walkthrough

ECOGarden

The EcoGarden provides one way for the users to spent their earned ECOpoints. Here they can buy flowers and upkeep to develop a garden with a rich flora. They can compare their garden to their friends and have an overview of how much they did to save the environment. Hick's law is kept in mind to keep this page as simple as possible while providing a somewhat complex feature.



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