DESIGNING A USER-CENTRED FEEDBACK SYSTEM THAT FOSTERS CREATIVITY

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Abstract

To improve applications, it has become increasingly more common for companies to ask users for their feedback. EatMyRide, a nutrition tracking and planning application for cyclists, wants to improve its application by gaining feedback from its users and validation on their ideas. To do this, they were looking for a feedback system that fosters creativity and from a user-centered approach. For creating this feedback system, literature research was done into the two key factors: feedback systems and fostering creativity. Next to literature research existing companies that use feedback and feedback platforms, as well as similar applications to the EatMyRide application, have been analyzed. Following this research, multiple concepts were created, and lo-fi prototypes were made. These concepts differentiated between validating ideas or gathering general feedback that fosters creativity. These concepts were first re-evaluated and further specificated before realizing the prototype. During the realization of the prototype, it was tested and evaluated with multiple users. Most suggestions were implemented and led to a final prototype that was evaluated, during this evaluation the EatMyRide viewed the feedback system as a promising and valuable prototype that would help them create a more user-centered application.

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Chapter 1: Introduction

1.1 Background

Cyclists can improve their performance by using dietary strategies, before, during, and after a ride, it reduces the effects of fatigue [1]. The EatMyRide application is an example of an application in which cyclists can get a nutrition plan for their ride as well as for the day to improve their nutrition strategies. EatMyRide is a sports nutrition tracking and planning application that is currently specifically for cyclists. The app helps cyclists create their nutrition plans that are fully personalized and customizable based on cyclists' fitness levels and abilities. The application automatically analyses the performance of previous rides and bases the cyclists' abilities on that. The application has a free and a premium version, to show all the possibilities of the EatMyRide application the premium version is shown in figure 1. The EatMyRide application consists of four main features; Plans, Create nutrition plan, Explore and Profile. The plans, explore, and profile features are pages on the application and the create nutrition plan is a pop-up screen where the first step is to select a ride, see figure 1[1]. On the 'main'-page, the plans page, a user can add all their nutrition of that day: breakfast, lunch, diners, and snacks in between.
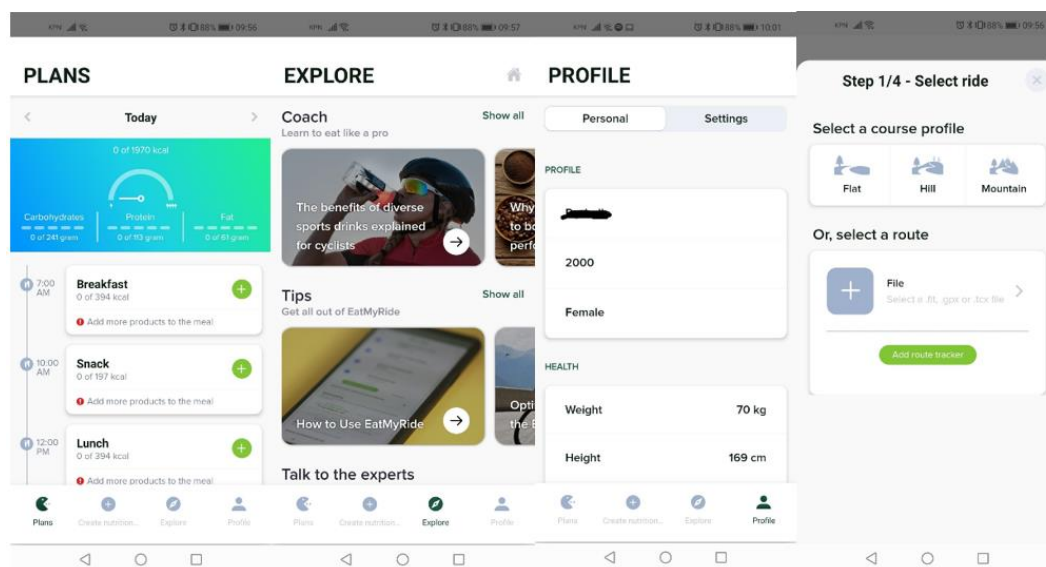
Figure 1: Main pages of EatMyRide application

The app also provides the feature for users to integrate with route planners, which makes it possible to have a matching nutrition plan to the planned ride. Moreover, the nutrition plan can also be uploaded to wearable sports trackers, now only for specific Garmin wearables such as the Garmin smartwatch. This is an important feature since an increase in wearable technologies has led to a mass-scale of self-tracking instruments for individuals to achieve their goals [2]. Meaning that all kinds of different levels of athletes, amateur, and elite, use the wearable device for different reasons in sports practices [2]. However, according to the interviewed athletes in [2], all the athletes use the wearable to gain data about themselves and use this data in different ways. For example, to self-motivate themselves or to ease management of their sports activities. By having the ability to connect cyclists' sports devices with the EatMyRide application, the app reminds users of when to take certain nutrition as well as see data about their ride itself on the same device, which can help with the performance of cyclists.

The EatMyRide application is a start-up company that is still growing and wishes to be more inclusive about their users' needs and staying in contact with their users as much as possible. By making the application more user-centered it can become more personalized to the wishes of the user. However,

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[1] Figure 1 are screenshots of EatMyRide application (premium version)

the EatMyRide app has a very broad spectrum of different users covering a large variety of different cyclists: (semi-)professionals, fanatic cyclists, and amateur cyclists. These different cyclists all have different wishes and needs when it comes to their nutrition. By asking and making use of the given user feedback continuously, the application can stay up to date with the wishes of each user. Because the EatMyRide application has different target groups, it will be important to have a customized feedback system for the application that finds the problems that users face when it comes to their nutrition planning. Moreover, EatMyRide wishes to have a feedback system that fosters creativity in users' feedback, because they want the user's unique input to enhance and improve their application and believe that by stimulating creativity users will stand still and think about their wishes and needs. Next to stimulating creativity in answering feedback, a part of the feedback system should also include the way the EatMyRide application can validate which ideas, based on user feedback, should be developed.

1.2 Goal

Therefore, the goal of this graduation project is to design a user-centered feedback system that fosters users in giving creative feedback, which can be implemented into the EatMyRide application to make the app more user-friendly. Next to understanding how to best collect user feedback put this into a feedback system, I will focus on figuring out how proposed solutions from the EatMyRide can be validated. These goals will be achieved by researching feedback systems and creativity, online surveys and user studies better understanding the users and asking them for input on the created feedback system.

1.3 Research question & Approach

The mentioned sections above have led to the following research question:

"How to develop a feedback system that fosters creativity giving an insight into users' needs from a user-centered approach for the EatMyRide app?"

To answer the main research question the following multiple sub-research questions will be answered:

1) What fosters creativity in providing feedback about user's needs?
2) How can creativity be incorporated into a user-centric feedback system?
3) What feedback system design is most stimulating creativity while being accepted by users of the EatMyRide application?
4) What kind of systems are being used to get feedback from users?
5) How can proposed ideas from EatMyRide be validated by users before technical development?
6) What should be the protocol for asking for feedback about the EatMyRide app?

This paper is constructed as follows. In chapter two the literature background research is discussed, this research is divided into three sub-topics: creativity, feedback systems, and feedback fatigue. In this chapter sub-research questions one and four will be answered. In chapter 3 a state-of-the-art research is done into how different companies currently ask for feedback and shows multiple examples of feedback platforms. In chapter four a more in-depth explanation of the EatMyRide application is given as well as applications that can be connected with the EatMyRide and applications that are similar to the EatMyRide application. Chapter four concludes the background research. In chapter five the approach for the design and the methods and techniques used for designing the feedback system are discussed and explained. Chapter six discusses more in-depth the wishes and needs from the EatMyRide as well as idea-generating sessions in which concepts are made up. Chapter seven is an online user survey to the EatMyRide users to get an idea of the users of the EatMyRide application and their views towards feedback. In chapter eight the concepts from chapter six are tested and re-evaluated and further specifications also based upon the online survey are made.

In chapter nine the user study is explained as well as the results of the user study, the focus of the user study was to get a better insight into how the application is used. This user study was held parallel to chapter ten, the realization and making of the feedback system. In chapter ten the feedback system is built and evaluated multiple times with usability tests. Chapter eleven is a final evaluation of the last prototype and in chapter twelve the final prototype with small adjustments based upon the final evaluation is shown as well as possible future implementations are given. Chapter thirteen is a discussion of the complete project in which also the limitations and future suggestions are given. And in the last chapter, a conclusion is given.

Chapter 2: Background research

In this chapter research on what fosters creativity and how this is important for the feedback system is given. Next to research into what fosters creativity, a section is divided into describing what kind of feedback systems are already out there and the limitations of these systems are discussed. The last section of this chapter focuses on how the increase in feedback demand from companies has led to feedback fatigue among customers and discusses how to overcome and improve the response rate.

2.1 Fostering creativity

This section aims to give an insight into how to foster creativity and explain in what way stimulating creativity can be best used to help gain insightful feedback. Creativity is an important factor to stay on top of the market [3] and staying original to users' wishes [4]. However, how can the input from users be as creative as possible? Can creativity be stimulated in any way? In the following lines, the definition of creativity, factors that can stimulate creativity, how creative thinking could be involved, and how this could be implemented into a feedback system will be explained.

2.1.1 Definition of creativity

To know how to stimulate creativity, it is first important to have a clear definition of creativity. While Tassoul [5] states that creativity has a wide variety of various definitions and each being true in its context, Kaufman [6] disagrees with this. Kaufman even critiques the statement as false on the value that creativity always consists of two key factors. According to Kaufman, creativity always has to represent something new, different, or innovative and it has to fit the task at hand. If either one of the two factors is not true, an idea cannot be called creative. A given formula on what creativity is: Creativity = Originality X Appropriateness [6]. However, even though creativity is based on two key factors, it has a different meaning depending on the discipline in which it is used; creativity in education is called innovation, and creativity is called entrepreneurship in business [7]. Nonetheless, Kaufman [6] also critiques the use of innovation as a synonym for creativity since there is a difference between the two. Creativity is about coming up with new ideas and deciding on which ones are the best, whereas innovation is also about realizing and implementing these ideas. Cropley [4, p-63] states that: "Creativity is about solving problems and satisfying needs by developing novel and useful solutions". Combining these different views and inputs on what creativity is, leads to the following definition: creativity is about coming up with original ideas fitting the problem at hand.

2.1.2 Factors stimulating creativity

Having a clearer description of creativity, the next step is to figure out what environmental and other factors can help stimulate creativity. Creativity can be influenced by a multitude of different aspects, starting with setting restrictions to enhance creativity. According to Kowaltowski et al. [7] setting restrictions helps students feel more confident in the ideas they come up with and fosters the creative design process. Moreover, they state that having in-depth knowledge about the situation or problem is also important to come up with creative solutions. Other aspects that can stimulate creativity are environmental changes such as ambient noise [8], dim illumination [9] and the colors green [10] and blue [11]. Changes in the environment can thus influence and trigger creativity, however, it is not sufficient to be creative. To do that the environment has to interact as a system and whole with the person, process, and product [4]. All in all, there are quite a few different variables that stimulate creativity.

2.1.3 Influence creative thinking

Next to factors that stimulate creativity, creativity can also be fostered by creative thinking processes. There are many creative thinking methods, however, it is important to critically look at these methods and formulate how they work. Table 1 gives an overview of a couple of different creative thinking methods and how they work. Table 1 gives only a small overview of different creative thinking techniques because giving a complete overview of every creative thinking method goes beyond the

scope of this research. The selection of these specific methods is made based on own experience with creative thinking methods. Later in the ideation phase, chapter 4, this table can be used to determine which methods can be implemented into the feedback system.

Method	Explanation method
Brain dump[2]	Writing down/dumping every day you already have, so your head is empty so you can come up with more original and new ideas.
Bad idea's brainstorm[3]	This method consists of four steps; first participants are informed about the purpose of the session. The next step is coming up with as many bad ideas as possible. These are ideas are put in one pile and each idea is discussed what makes them so bad. The last step is looking for ways on how to use the found insights beneficially.
Mind map [5]	Creating an overview of ideas and concepts about a central term.
The checklist[4]	Asking yourself the following six questions (Why, where, when, who, what, how) can help provide more imaginative possibilities.
Random stimulus [5]	Confronting one's point of view with randomly chosen stimulus, for example, random words from a book and developing ideas for the problem starting with that word.
Six thinking hats [12]	This method consists of six different hats with each hat having a different meaning/perspective: facts (White), Intuitive (Red), optimistic (yellow), Pessimistic (black), Creative (green), managerial (blue)
Random word generation[3]	Pick two random words and try to fit this to the content of the problem.
Picture association[3]	An image search on the topic/problem than choosing a random image, to create a story/idea around it.
Get up and go out[3]	Go for a walk and let nature inspire you.

Table 1: Overview of different creative thinking techniques

2.1.4 Conclusion

The goal of this research about creativity was to give an explanation about creativity, show what factors can stimulate creativity, and an overview of different creative thinking techniques. In short, the definition of creativity consists of two key factors, originality, and applicability to the problem. Furthermore, creativity can be stimulated by different environmental factors such as sound, light, and color or other factors such as restrictions. Also, an overview of the creative thinking process is given,

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[2] https://hatrabbits.com/braindump/ (Last visited: 03/04/2021)

[3] https://hatrabbits.com/bad-idea-brainstorm/ (Last visited: 03/04/2021)

[4] https://www.koozai.com/blog/content-marketing-seo/eight-awesome-creative-thinking-techniques-plus-tools/ (last visited:11/04/2021)

that can be implemented to also foster creativity. These discoveries can later be used during the ideation for sparking creativity from users.

2.2 Different feedback systems[5]

To design a feedback system, it is important to know what feedback systems are already out there. This section focuses on the literature into giving a clear explanation of what user feedback is, gives an overview of different feedback systems, gives an insight into how to analyze the feedback, and finally gives an overview of the limitations current feedback systems have.

2.2.1 User feedback

To understand a feedback system, it is important to know more about user feedback. User feedback can be given in various ways, is influenced by user's behavior, and is significant for the company because of several reasons. Morales-Ramirez et al. [13] propose the following definition of user feedback: "User feedback is a reaction of the user upon her experience in using a software service or application"[13, p-300]. In other words, user feedback is a user's way of telling the company what they find of the product/application. Moreover, Morales-Ramirez et al. [13] state that feedback can be given in the form of natural language text, but also in ratings, images, or icons. Morales-Ramirez et al. [13] and Dzvonyar et al. [14] both agree that user feedback can be about one of the following three types of feedback: a bug report, a feature/design request, or a suggestion on improvement.

To receive feedback, it is crucial to properly motivate the user. According to Almaliki et al. [15] the behavior of users on giving feedback varies greatly. Examples of factors that influence user behavior on giving feedback are interface design, frequency, and volume of asking feedback. For example, Almaliki et al. [16] state that if users are asked to give continuous feedback, users will be poorly motivated to give the feedback. This means that to get frequent feedback users must be motivated. When it comes to receiving feedback the initiative of receiving feedback can either come from the user itself, also called push feedback, or the initiative can come from the company/software analyst, which is called pull feedback[17].

Almaliki et al. [15] list two reasons why receiving user feedback is of interest. The first reason is that the company wants to determine the acceptance of their software. After all, the "User is king" [18, p-957], users have the power to make or break a certain product. The second reason is that the company wants real-time feedback about the environment, meaning that they want detailed feedback from users on the use and their view of the software. This feedback can then be used to improve user experience and evaluate the software. So, when designing a feedback system, it is important to never forget that customers are king, meaning that they have the power to control how well your application works.

2.2.2 Different feedback systems

Having a clear understanding of what user feedback is and the importance of user feedback, the following step is to understand in what kind of ways feedback can be given. Collecting feedback from users can be done in a multitude of different ways. According to Di Sorbo et al. [19] it can be collected through a plain text review. The plain text review is a commonly used way to offer feedback in the App Stores for the applications [20]. Users can also leave their feedback through a star rating in the App Stores [20]. Feedback can as well be collected through traditional forms of feedback approaches such as an interview or survey [21]. Stade et al. [22] observed through a survey with eighteen different companies what most frequently used channels were popular among companies to use. The most popular channels were: email, hotline, contact forms, website forms, and embedded feedback tools in companies' software. An example of an embedded feedback tool is the ContextAware feedback tool, which is introduced by Dzvonyar et al. [14], a feedback model that can be implemented in mobile applications.

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[5] Part of the literature review made for academic writing course of module 11

Feedback tools can be structured in three different ways; unstructured, semi-structured, and structured [13]. Morales-Ramirez et al. [13] out the benefits and disadvantages per structure. The benefit of unstructured feedback is that it gives users a lot of freedom in giving feedback. However, the downside is that it takes a long time to process. Using semi-structured feedback gives a bit more structure by having specific fields that must be filled in. But it still allows quite a bit of freedom for users to write their feedback. Where unstructured and semi-structured feedback gives the possibility of freedom to their users, structured feedback reduces that freedom a lot. The advantage of structured feedback however is the ease with which developers can filter through the feedback. Because structured feedback gives detailed information that users sometimes do not realize is essential to understand the feedback. In choosing a feedback system it is thus important to consider the different possibilities to collect feedback, e.g., through a plain text review or an embedded feature, and the advantages and disadvantages of feedback structures. This choice is dependent on the goal of the feedback.

2.2.3 The process of analyzing feedback

After receiving the user feedback, the feedback must be analyzed by developers. Analyzing feedback is a meticulous process that takes time. The process consists of the following three steps. First, the feedback is gathered from the different feedback systems and then merged [18]. After merging the feedback, each comment is read and prioritized by the developer. Some feedback may be less relevant than other feedback, so it is important to sort this. Finally, following the prioritized list the feedback will be implemented into the workflow [14], [18].

The process of analyzing feedback takes time due to different reasons firstly, the feedback is categorized according to the type of feedback that is received. This can be a bug report, a feature request, or feedback on existing features to improve or enhance the feature[18]. Secondly, companies receive feedback from different channels, which are merged and checked for matching feedback. And lastly, the feedback is often written in a normal text language meaning that it sometimes misses crucial information about the problem to correctly interpret the feedback [18], missing contextual information. The more feedback a company receives the longer the process of analyzing the feedback takes[18]. In other words, the process of analyzing feedback is a big part that should be included in the process of making a feedback system.

2.2.4 Limitations of current feedback systems

The ask for user feedback is increasing, however, the channels used to collect feedback have quite a few limitations. For instance, according to a developer interviewed by Stade et al. [22], is email the worst form of feedback because it is time-consuming for the developer to go through and linking the email to the user. Moreover, limitations of collecting feedback from app stores are the variety in the quality of the feedback and the lack of a sorting system for the feedback. Feedback given in app store platforms are in general short and users tend to spend a short amount of time on giving it [18], meaning that the quality varies. Furthermore, most feedback channels are not embedded into the application which leads to missing contextual information. Multiple researchers [14], [18], [20] mention the importance of having contextual information with the feedback, so developers know more about what the users mean with the feedback.

Pagano and Bruegge [18] highlight three important points of consideration, based on their user study, when asking for user feedback. The first is the importance of knowing the audience, by knowing the audience it is easier to understand what kind of feedback system would suit the audience the best. The second point is to reduce the number of feedback channels, this would help users with knowing where to go to give feedback and help developers to analyze the feedback better. And lastly, educate the audience (users), by educating them, the audience knows how they should give feedback including the critical information for the developers. This would save time but also make users feel more helpful.

Meaning that in designing the feedback system it is imperative to be aware of the limitations the current feedback systems have as well as consider the suggestions made.

2.2.5 Conclusion

This section aimed to give an insight into what systems are currently used to gain user feedback and to learn about how different factors and features of these feedback systems work. This literature review has given an insight into what user feedback is, the importance of gaining user feedback, and discussed the lack of good-structured feedback systems in a lot of companies. A lot of the companies mentioned in the reviewed papers used all kinds of different feedback channels, like email, hotline, and app stores, which made it difficult for developers to analyze the feedback. Having a greater understanding of how companies receive and use given user feedback, is important for the future development of a feedback system that it complies with the following aspects. Firstly, the feedback system should minimize the number of feedback channels used. The fewer different channels are used, the clearer it is for the user to know where feedback can be given. Likewise, it makes it evident for developers where to gather the feedback.

Secondly, it should be a semi-structured form of feedback. By using a semi-structured form, the developers are aware of what type of feedback the users give, however it still gives users the possibility to give feedback in an un-constricted way. Lastly, the feedback system should be made within the software/platform of the application, this makes it easier for users to find the place where they should give feedback. Moreover, it allows developers to gain contextual information from users. Having the feedback system in the same software, developers will not have to switch between different software programs and can stay in the same environment.

2.3 Customer feedback fatigue

2.3.1 Feedback fatigue

According to Karlberg and Jungert [23] companies that do not ask for feedback stand a chance to lose business. With the increase in demand for feedback the response rate decreased. According to Porter et al.[24], survey nonresponse in specific has been rising. Sinickas [25] attributes this to the fact that people have become tired of responding to surveys. Furthermore, Karlberg and Jungert [23] state that survey respondent's decrease is due to the development of social and technology departments in society. All authors from papers [23]–[25] agree that survey fatigue, a phenomenon that happens when participants feel overwhelmed and thus become fatigued, has a big influence on the low response rates.

Other reasons that have caused a lower response rate mentioned by Porter et al. [24] are the length of surveys, time concerns from participants, number of previous surveys, and back-to-back surveys. Examples of reasons given by participants on why they did not respond to the survey were: never got around to it, too busy, or at a bad time. All these variables factor into the burden participants feel towards answering surveys, thus causing fatigue amongst participants.

2.3.2 Improving response rate

Based on the variables that influence participants' attitudes towards giving feedback and answering a survey, suggestions are given to improve response rates. Pecoraro gives five suggestions on how to improve the response rate of customers[26]:

1) Give users an incentive, a form of acknowledgment
2) What is in it for the participant
3) Tailor to a specific target group
4) Include a short, personalized introduction
5) Less is more

Next to these tips, Sinickas [25] points out that short surveys, a correct audience, and connecting the research to the results would also lead to an increase in response rate. This way users are only targeted when it is necessary and will not feel overwhelmed. Another way to increase response rates is using monetary incentives, however, it is a complex and delicate issue, when incentives are sent frequently it can cause distress and a negative physiological reaction[23]. Going deeper into psychology, Karlberg and Jungert[23], point out multiple physiological theories that can influence a user's response. e.g., reciprocation (feeling obliged to return a favor), liking (inclined to fill it in because they like the person), scarcity (scarce opportunities to a request), authority (come from someone with authority), people act consistent and social validation (of what others do as a guideline for how to act). Moreover, motivation is a very important factor that influences the response rate. To feel positive motivation as an individual, three main principles need to be fulfilled: competence, autonomy, and relatedness[23]. All in all, the response rate of surveys, or feedback, can be improved on physical factors, e.g., time and frequency, and mental factors, e.g., motivation from users.

2.3.3 Conclusion

Receiving feedback is dependent on the participant's willingness. Since so many companies nowadays ask for feedback, participants are feeling overwhelmed, and their willingness to respond to feedback decreases, which leads to lower response rates. Other reasons that lead to a decrease are time constraints, length, and frequency. These factors need to be kept in mind when asking for feedback. Suggestions to improve response rates are both physical changes to the survey and physiological theories. This occurrence of customer feedback fatigue is important to keep in mind during the ideation phase for it is important to understand the wishes of the user without gaining a negative image of the company.

Chapter 3: Commercial state of the art of feedback

This section describes the state-of-the-art that is focused on the use of feedback by companies and explains a multitude of different feedback system platforms. The companies that are discussed in the first section are examples of two very different companies that are very different in the way that they engage their users to give feedback. Why specifically these two companies will be mentioned per feedback system.

3.1 Applications implementing feedback

<u>Patagonia</u>

Patagonia is a company that pays great attention to gathering precise feedback. Patagonia is an outdoor clothing and gear company. Patagonia's website lets users indicate their preference on what they prefer to give feedback to, see figure 2. In the top left image, the participant can choose the kind of feedback/reaction they want to leave, either specific, general or contacting the company. Moreover, the other three images in figure 2 show what happens when a participant presses on specific feedback. The participant can click on a specific part on which the feedback is about, then the user can click on what he/she thinks about that part and can leave more specific feedback on what the participant wants to share and rate the likely hood that they would recommend it to other friends, etc. This helps the company to better narrow down the feedback questions addressed to each user. This kind of feedback can be focused on specific parts, such as UI elements or parts of a page, which can be very helpful for future improvements.[6]
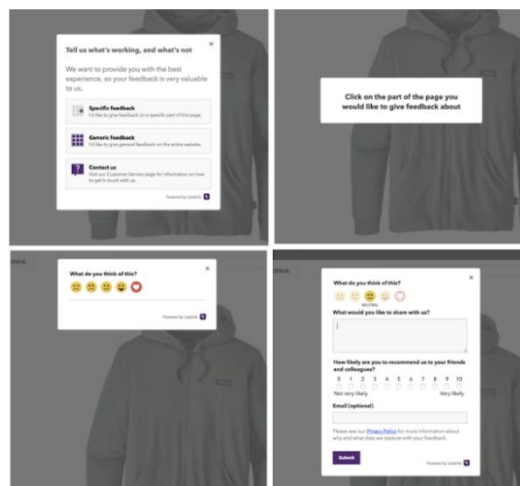
Figure 2: Example of asking for feedback in Patagonia

<u>Adobe</u>

Adobe is a large company with a variety of products. To improve their products, Adobe has its own web page focused on *feature request/bug report form* in which users have to choose the product on which they want to give feedback see figure 3. After choosing the product, e.g., Adobe XD, the user can either vote on already existing feedback or put in their feedback, in which they have to add a title, choose a category (design mode, prototype, share mode, etc.) on what the feedback is related to. Users can add a more detailed explanation and maybe even add files and their email addresses. In response to some idea's adobe added one of the following statuses: Feature-started, Feature-Under_review, Feature-in-backlog. Moreover, Adobe specifically states terms and conditions as well as that they will not respond to personal messages but will however read every single item of feedback and acknowledge the user's time to give feedback and mention their appreciation. [7]

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[6] https://www.appcues.com/blog/in-app-user-surveys-customer-feedback-nps-examples (Last visited: 01/04/21)

[7] https://www.adobe.com/products/wishform.html (Last visited: 01/04/2021)

Figure 3: Adobes feature request/bug report form

3.2 Feedback platforms

It is also possible to use external platforms to either implement it into the application or use it to gather data from every possible feedback source.

<u>Mopinion</u>

Mopinion is an example of a user feedback software that can seamlessly be embedded in multiple digital channels like a website, mobile application, and email. Large companies like KPN, KLM, and Decathlon are customers of Mopinion. Focusing on using the software for applications, the software gives the possibility to easily shape your own surveys by using a drag-and-drop interface. Moreover, the software gives the possibility to generate context, e.g., device type, app version, or user information, to gain metadata of the user. Also, with the software, it can target with precision, such as deciding when the survey should pop up following user behavior of the application. In figure 4 it shows what the feature to gain feedback would look like, a small feedback bottom on the bottom right of the application. And when pressed it shows a short survey (two questions) to gain feedback.[8]
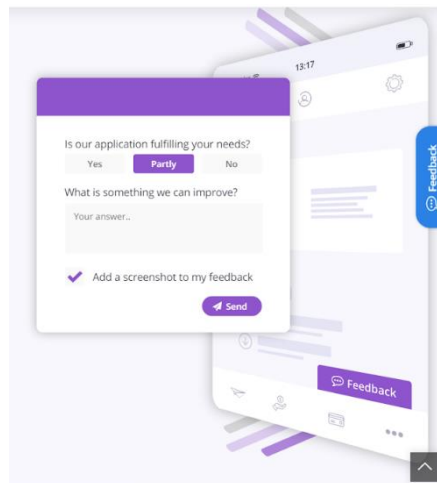
Figure 4: Mopinion example of implemented feedback feature

<u>Clarabridge</u>

Clarabridge is a platform that collects feedback from every possible source and shows it in one platform. Where an AI will analyze the driving volume, sentiment, effort, or satisfaction of customer segments. With this data, the company using Clarabridge has an overview of all the data and can then act on it accordingly. There is even an engagement feature, in which the platform connects you to all the different channels, which then will be analyzed, but also can engage in the feedback, see the

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[8] https://mopinion.com/product/mopinion-for-apps/ (Last visited: 01/04/2021)

context, etc. Moreover, it also gives the possibility to respond to customers. Figure 5 gives an indication screen on how the results from different feedback would be visualized in one big dashboard.[9]
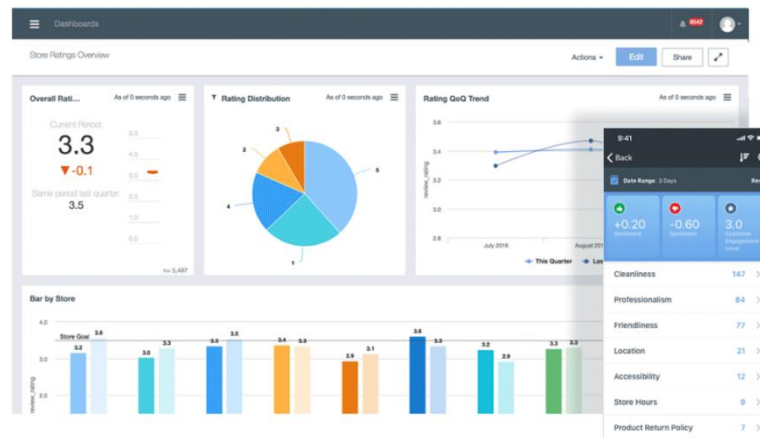
Figure 5: Example of Clarabridge data visualization of the feedback

Pendo

Pendo is a platform that helps companies become product-led and help deliver digital experiences that users love, by product experience and digital adoption solutions. One of the many products of Pendo is the in-app tool, in which users can give feedback and see feedback on which they can vote, which they find most important. See figure 6, where on the left a voting screen is given and, on the right, the implemented system is shown. Moreover, the company can inform customers about what they are working on next, by informing them on the status of the ideas they vote on.[10]
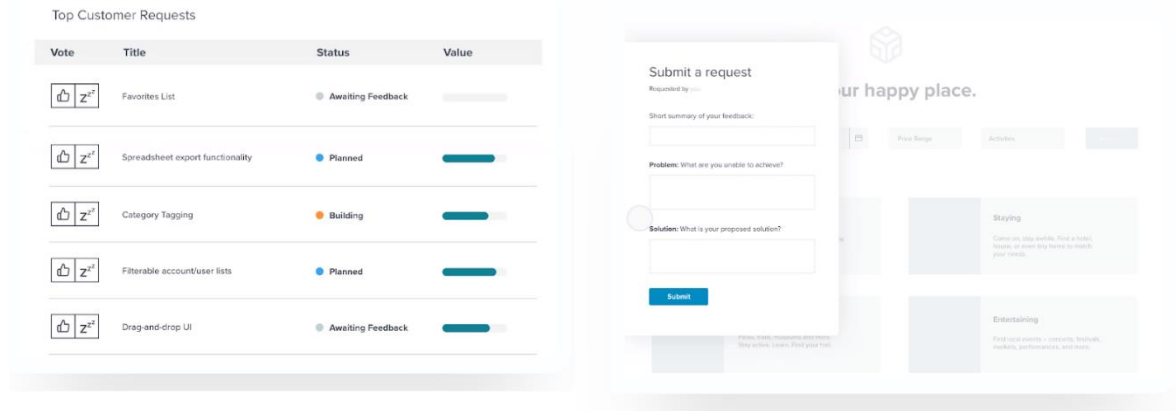
Figure 6: Example of Pendo implementation

3.3 Conclusion

Each company has a different approach to gaining user feedback, a huge company such as Adobe with a multitude of products, has chosen to receive feedback in a push feedback system, where users take the initiative to give feedback. A company like Patagonia has a feature inside of the website where users can choose what they have feedback on, followed by a rating and written feedback as well. Next to companies using their own feedback systems, it is also possible to use a feedback platform that is ready for use. With these platforms, the companies only have to make their own surveys or add a feedback survey, while the system does everything else. The platform analyses the feedback in an understandable and readable way that can be used by the company to improve the application/product.

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[9] https://www.clarabridge.com/platform/ (Last visited: 01/04/2021)

[10] https://www.pendo.io/product/feedback/ (Last visited: 01/04/2021)

The feature in Pendo in which the company can add the status of ideas and give likes/dislikes will be later used as inspiration for how to possibly show users the impact of their feedback. Meaning this takes a lot less time for companies than making it themselves. However, as customizable as it might be, it is never unique to the application/company. These applications give inspiration into what the possibilities are for a feedback system and show several visualizations on how to implement them.

Chapter 4: EatMyRide and related applications

In this chapter, a more detailed description of the EatMyRide application is given. Moreover, it briefly explains the product and application which can be connected to the EatMyRide. The last part focuses on applications that are similar to EatMyRide.

4.1 EatMyRide

As mentioned before in the introduction the EatMyRide application has four main pages: plans, create nutrition planning, explore and profile, see figure 1. Each page will be briefly explained as to what can be done on them. As mentioned before on the plans page users can add their daily nutrition and see at the top of the page the number of calories, carbohydrates, proteins, and fats that the users should take overall. The explore page consists of multiple articles about nutrition and other relevant articles (coach), tips on how to use the app but also improve nutrition, a reference to talk to experts (via WhatsApp), and a podcast reference to Spotify. The profile page consists of two parts, personal and settings, which are simple with few details. By pressing on the + icon in the bottom navigation bar (create nutrition plan) sign, the user starts creating a nutrition plan which starts with planning the cycling route.

To create a nutrition plan the user should press on the + sign (the second icon in the navigation bar at the bottom). By pressing on the + (create a nutrition plan) sign, the user is first asked to either choose between the kind terrain (flat, hill, or mountain) or add a route by file, see figure 7 left screen. When a user for example presses on the rightest pictogram (flat), the user comes to the Ride details page, see figure 7 middle screen. Where the user is asked to add the distance of the ride and the height difference, as well as the user's expected average speed/total amount of time, the start date and start time, and as premium users also the type of ride and the intensity of the ride. When this is filled in, it continues to the Select food page, see figure 7 right screen. In which the user needs to add products and can see the amount of calories is needed. If it is correct, the summary blocks will turn green.
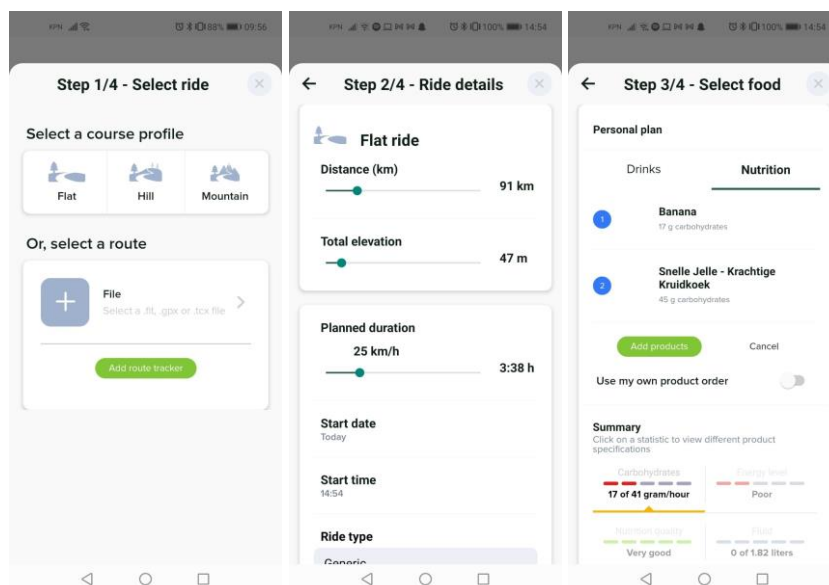
Figure 7: Select Ride, Ride Details, and Select food page from EatMyRide application

When the user finishes choosing the food products and the summary is completely green, the food plan is finished leading to the left screen in figure 8, where the user sees the details about the ride itself and can send the details to a Garmin if they have one. To see check out the nutrition plan the user can swipe to the right, see the right screen in figure 8, where a summary is of the nutrition plan for the ride.
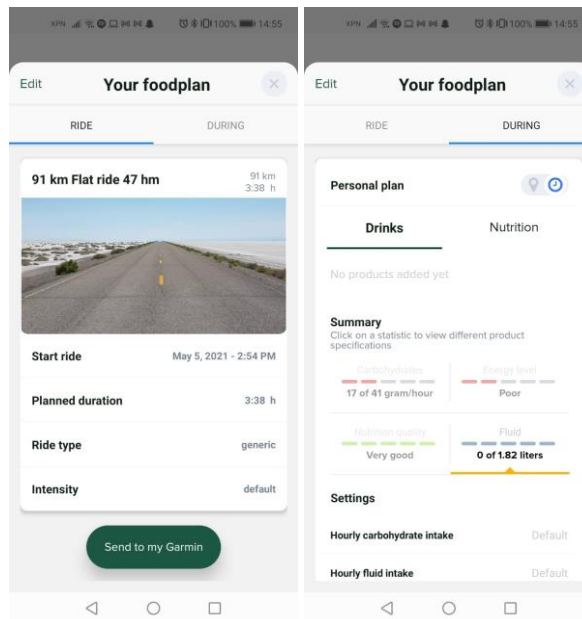
Figure 8: Food plan for a ride of EatMyRide

4.2 Applications connectable to EatMyRide

The EatMyRide application, as mentioned before also can be integrated and connected with other apps that are used by cyclists. In this section, these applications are briefly mentioned and explained what they entail.

Strava

Strava is a sports tracking application, a slogan of Strava is: "Designed by athletes, for athletes". This application gives users the possibility to track their own sports activities and afterward analyze the data. Strava can be synchronized with most appliances, such as phone or GPS-watch, and records all performance data. Moreover, Strava gives the possibility to share recordings on a social network. Figure 9 indicates what Strava looks like on multiple different devices.[11]

Figure 9: Example of what the Strava application looks like[12]

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[11] https://www.strava.com/features (Last visited: 11/04/2021)

[12] https://www.strava.com/mobile (Last visited: 01/07/2021)

Garmin

Garmin offers an array of wearables for all types of athletes. These include sport watches, fitness watches, and hybrid watches[13], see figure 10 for multiple products. Next to these different wearables, Garmin also offers the Garmin Connect tool, which connects the user's mobile or the web with the Garmin wearable, so the user can see the health and fitness data of their Garmin device to analyze and share[14].
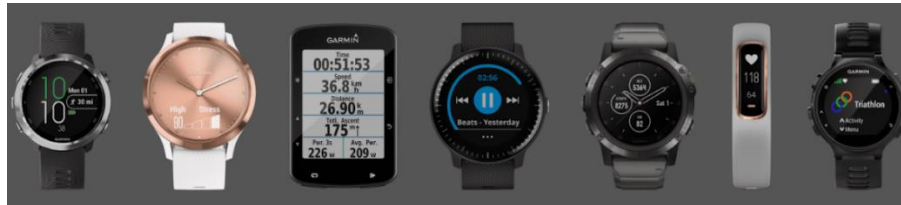
Figure 10: Examples of Garmin different wearables[14]

4.3 Applications related to EatMyRide

In this section applications that are similar or relatable to the EatMyRide are explained and discussed.

Endur8

Endur8 is a performance-focused nutrition planning application that analyses products and brands that would improve performance and tell you which should not be used. The application is only accessible on the Apple App Store for iPhone or Apple watch. The Endur8 application makes nutrition plans based on the person's body and the route. During the sporting activity, the application gives real-time alerts to fuel up. In figure 11, three different parts of the use with the application are shown, the most left screen shows making the fuel plan, the watch shows data for during the ride itself. And the right screen shows a screen of the ride afterward which users can analyze themselves to see how it went.[15]
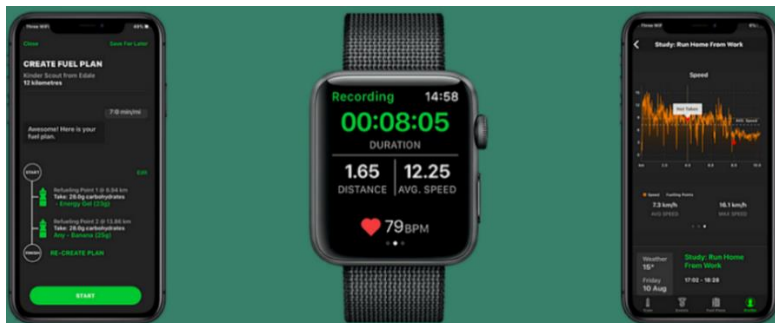
Figure 11: The Endur8 application on different devices

MyFitnessPal

MyFitnessPal is a nutrition tracking application that focuses on fitness and dieting. It has a variety of tools to track nutrition and exercise. The application can be connected to a variety of different devices, such as your phone, Fitbit, or Garmin Connect. It counts calories, and per meal can add the different food you had. The application has a free and premium version. The premium version of the application has a different layout and design than the free version as well as a lot more features. In figure 12 it shows the main screens from the free version of MyFitnessPal.[16]

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[13] https://buy.garmin.com/nl-NL/NL/c10002-p1.html (Last visited: 11/04/2021)

[14] https://connect.garmin.com/ (Last visited: 11/04/2021)

[15] https://www.endur8.com/ (Last visited: 14/04/2021)

[16] https://www.androidauthority.com/best-fitness-tracker-apps-android-913959/ (Last visited: 11/04/2021)
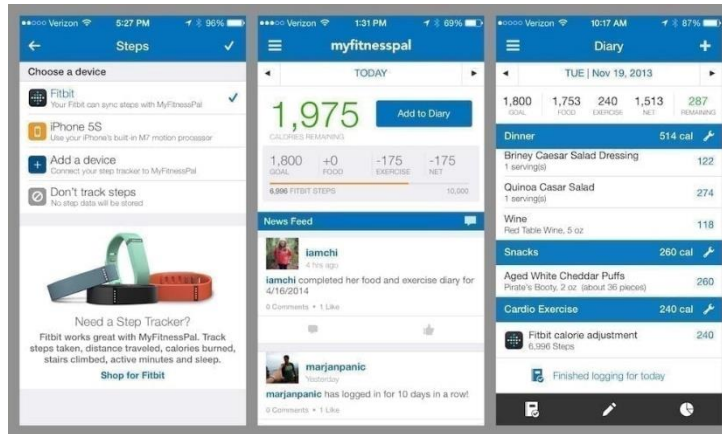
Figure 12: Layout of MyFitnessPal (Free trial version)

4.4 Conclusion

The EatMyRide application is connectable with wearable devices from Garmin, as well as connectable to a very popular application among athletes, Strava. This makes it easier for users of the EatMyRide application to plan their cycling routes, as well as see their achieved goals, on Strava about speed, route, etc., and the EatMyRide data about their nutrition. Of the two applications that were described related to the EatMyRide application, Endur8 is most similar to the EatMyRide application. A big disadvantage of Endur8 in comparison to EatMyRide is that the application is only accessible for IOS. Making the application not accessible for everyone, and focuses on a specific target group, Apple users. The other related application, MyFitnessPal, is purely a nutrition tracking application, it is not focused on giving the correct nutrition planning when sporting. All in all, the EatMyRide is unique in the way that it tracks and plans nutrition for cycling rides available for all devices.

Chapter 5: Method & techniques

For the designing of the feedback system, the design cycle described by Mader and Eggink [27] is applied. In this paper, the design process is split up into four phases: ideation, specification, realization, and evaluation. In this chapter, it is explained how these four different phases were adapted and the methods and techniques for each phase are explained.

5.1 Ideation methods

During the ideation phase, it is important to understand the stakeholders' requests, in this case, the client's wishes and needs. To gain this knowledge an online semi-structured interview was held. With the research information and the knowledge from the client interview, the ideation of concepts started. To come up with creative ideas, creative thinking methods were used such as mind mapping and random word generation, both methods are also briefly explained in section 2.1.3. For the mind mapping method, a word is put in the center, and everything related to that is put down on it, which can lead to several ideas. Next to individual idea-generating sessions a collaboration session with Lukas Vugts was done, in which different ideas were discussed and refined. The ideation phase ends with multiple concepts that will be tested and specified during the next phase.

After the ideation but before the start of specification as extra research an online survey in collaboration with Lukas Vugts and EatMyRide was done to further understand the user's interaction with the application as well as their perspective on giving feedback. The results of this online survey were also used during the specification phase.

For all tests that involved people, approval was given from the ethical board and a research project number was given: RP2021-15. Before the start of each involvement from people an information brochure and consent form were sent, see appendix 1. The consent form had to be signed before the start of each session.

5.2 Specification

In the specification, the simple paper prototypes from the ideation phase will be tested to find out which concept fits the best. The method that was used for concept testing is called proto monadic testing[17]; where first each concept is shown to the participant and specific questions about that concept are asked to evaluate the concepts. Afterward the participant is asked which concept was most liked and why. The concept testing was held as an online interview with the client (EatMyRide).

After the concept testing with the client, a re-evaluation was done on the concepts and another mind-mapping session was held. This re-evaluation led to new concepts, and experience and functional specifications of the idea.

5.3 Realization & user study

After the specification, the next step is the realization of the prototype. Parallel to the realization of the prototype a user study was done. The focus of this user study was to get a deeper understanding of the interaction with the application and users' experience with the application. The participants of the user study were cyclists or triathletes interested in trying out the EatMyRide application. A pre-interview was held to determine more information about the participants. After that, the participants were asked to use the premium version of the EatMyRide application for eight days while filling in a diary probe. This was followed up with a post-interview in which users were first asked follow-up questions on their experience with the EatMyRide and questions on the answers from the diary probe. During the post-interview usability tests were held with the prototype, in which participants were asked to interact with the prototype, and answers on the design and usability of the prototype were

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[17] https://www.questionpro.com/blog/what-is-concept-testing/ (last visited: 26/04/2021)

asked. Also question on the use and their opinion on how to improve the application was asked. In total three separate usability tests were held, after each usability test the concept was improved.

The first prototype was made as a clickable front-end prototype inside of Adobe XD. Later prototypes became more advanced by making them with React Native and programming the prototypes. Ending with one final back and front-end finished prototype.

5.4 Evaluation

All though during the realization phase the prototype was already multiple times evaluated a final evaluation was done. This evaluation involved both one participant from the user study as well as an evaluation with EatMyRide. In this evaluation, similar questions were asked as in the previous usability tests about the prototype in general. Next to these questions, a system usability scale was done. A system usability score provides a quick, easy, and reliable tool for measuring the usability of a product[18]. The system usability score consists of ten statements with five response options for participants (strongly agree to strongly disagree). The evaluation ended with a list of possible improvement for future work.

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[18] https://www.usability.gov/how-to-and-tools/methods/system-usability-scale.html (Last visited: 01/07/2021)

Chapter 6: Ideation

The focus of this chapter is on finding an idea that gathers feedback from users in a creativity-stimulating way. In chapter seven additional requirements are gathered and in chapter eight the focus turns more on how to deliver a complete experience and what visualizations will be most fitting to the application and kind of feedback based on client concept testing and the results from chapter seven.

6.1 Interview with client

The first step in the ideation phase was to get a better understanding of the requirements from the EatMyRide and further investigate their reasons, needs, and wishes for the feedback system. This was done through an online interview in collaboration with EatMyRide and Lukas Vugts.

6.1.1 Methodology

The main goal of the interview was to find out the client's needs and wishes about the feedback system, in specific on how feedback should be asked, analyzed, and implemented. The interview was held online via the Teams-platform. The interview was semi-structured, which left the freedom to ask follow-up questions if answers needed further exploration. The complete list of questions of the interview with also the unscripted questions can be found in appendix 2.

The interview went as follows: first, the goal and reason of the interview were explained to the client. After this the client was asked for ethical consent and participation, in which it was made clear a recording would be made, participation voluntarily is and the participant could withdraw at any time. The client agreed and the interview started. The interview was split up into four sections: target groups, feedback, protection, and motivation of users, and creativity. Some examples of the questions that were asked are: "why is feedback important to you?", "How are you keeping/getting users motivated to give feedback?" and "why is fostering creativity among users while giving feedback important?".

After the questions, the participant was thanked for participating and the many insights that were given. As well as a short explanation on what future steps would be taken. Analyzing the interview was done in two steps, first, the most important/interesting parts per answer were highlighted. Then these highlighted parts were put together into one conclusion.

6.1.2 Results

Analyzing the feedback led to the following results and conclusions. Per section of questions, a summary is given on the answers that jumped out.

Target groups

There are a lot of different cyclists, one more fanatic than the other, meaning that there is a very broad spectrum. EatMyRide has split the users up into three target groups: pro, fanatic, and amateur. The three target groups are based upon contact with multiple cyclists and seeing differences in cycling and other characteristics. The definitions of the three target groups are then also very broad and loosely described. The EatMyRide company only takes these target groups into account, but they are not fully implemented in any way.

Feedback

The importance of receiving feedback to the EatMyRide is that they want to know what users think of the app, what they appreciate and whatnot, getting users to tell them what they think of the app and how to engage them. With the rise of users and the growth of the application, EatMyRide is looking for a new system, to gain these insights, that is scalable. EatMyRide is looking for feedback on functionality and the user interface. Moreover, by gaining feedback from users, EatMyRide can better identify their users and learn more about their users.

When it comes to motivating users, the main question remains: how is it relevant to the user and how can you draw people back? EatMyRide imagines that it should become part of the routine to give feedback. They also prefer to gather active instead of passive feedback from users, meaning that EatMyRide prefers to make giving feedback part of the routine of users creating an active interaction with the users. Currently to motivate users to give feedback, sometimes EatMyRide rewards users with a premium account or a free dietician coach session.

Creativity

The EatMyRide is interested in stimulating creativity because they believe that by stimulating creativity users will better know what they want. To improve the application the EatMyRide is looking for critical feedback and must know what is going on. Stimulating creativity will allow users to deeply think about what they want.

6.1.3 Conclusion

In conclusion, the EatMyRide company is searching for a new system to gather insights on their users, to learn more about all their users, and to gain feedback from users where the users have deeply thought about their needs. The EatMyRide company images that this can be done through using creativity in the system itself. Moreover, during the interview, it became clear that EatMyRide is interested in two types of feedback: general feedback and specific feedback. Together with Lukas Vugts, the decision was made to divide the two types of feedback among each other, which from this point this graduation project will be on creating a feedback system that fosters creativity for general feedback. While Lukas his graduation project will focus on more specific feedback during the experience/interface with the application.

6.2 Idea-generating sessions

After the interview with the client, I did an idea-generating session. The most useful method used was the mind map, other methods such as random word generation was tried but led to no interesting concepts. I created a multitude of mind maps to get as many different concepts as possible. In figure 13, the mind map with the most interesting ideas is displayed, each color representing a different creative thinking technique or important part of the feedback system. The factor and feature parts are mostly thoughts on designing a general implementation while the other parts were focused on how to implementing and stimulate creativity. This was done by trying to implement creative thinking methods mentioned in table 1 in section 2.1.3. The factors mentioned in the mind map, e.g., noise, are factors that influence creativity are based on the research from section 2.1. However, I decided to not use the factors noise and light, due to that the factors spark and help creativity but not stimulate the creative thinking process.
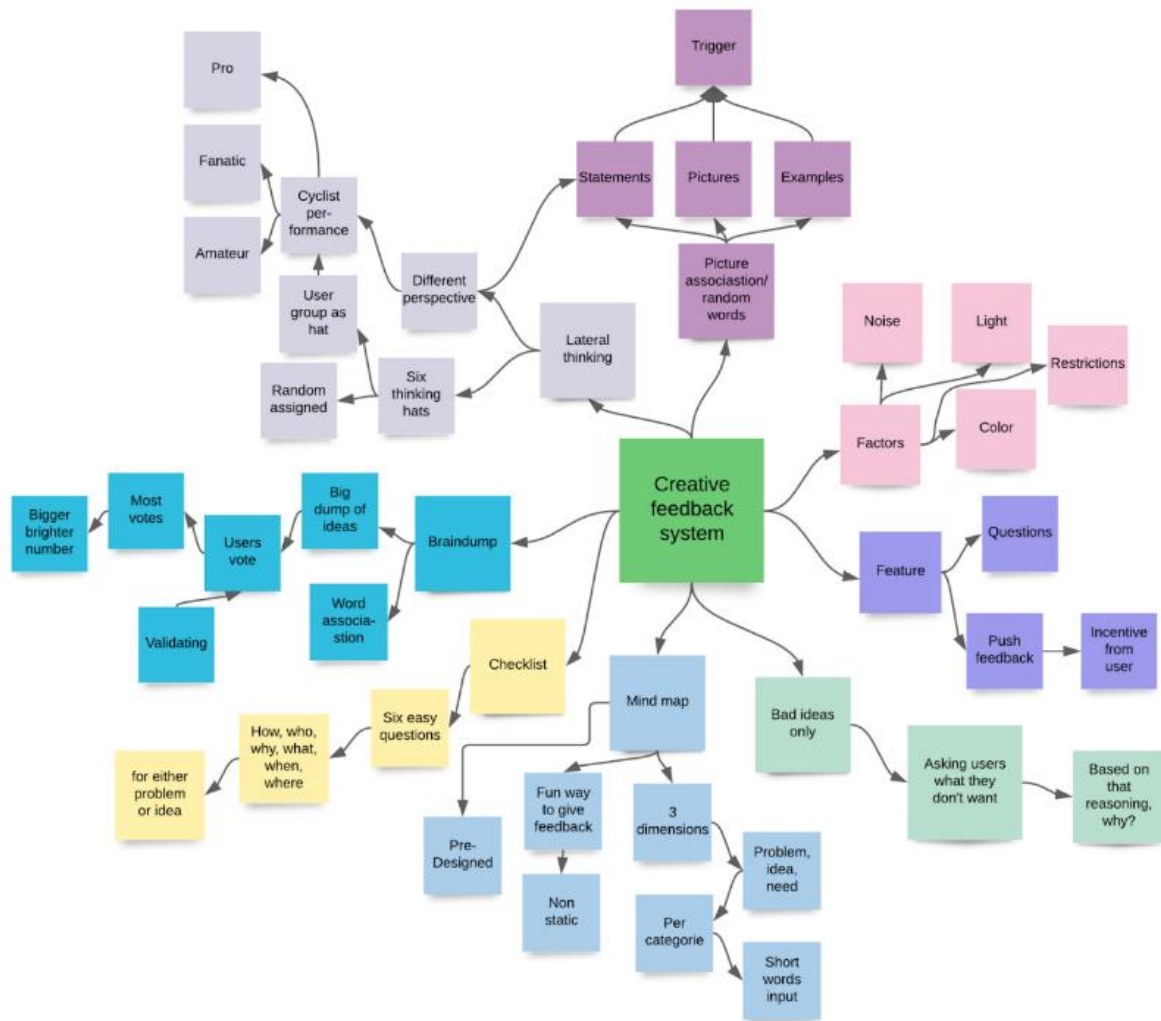
Figure 13: Mind map of idea-generating session[19]

After the idea-generating session, multiple different concepts were conceived. In the table below each concept is briefly explained. These concepts are divided into two distinctive groups: formative feedback and summative feedback. Formative feedback is feedback that leads to ideas for the company and helps trigger new inspirations. Summative feedback is more an evaluation and validation that the company can use to validate the ideas. The focus of the prototype will be more focused on formative feedback because the focus is on the creative process element as discussed before.

Concept	Description	Kind of feedback
Bad idea	Users are asked what they do not want to have, by showing examples of ideas, in which users have to say what is lacking and what does not work. So, asking users to identify the problem/need that is not yet met and finding suggestions to further improve the application.	Formative

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[19] Made with https://www.lucidchart.com

Brain dump	User fills in feedback in the way of a mind map that is divided into three color categories; problem (orange), need (blue) and idea (green). In which users can leave short word associations. So if they have a problem they can fill it in in the orange section in one short sticky note, or with multiple notes and can even add their needs or ideas on how to solve the problem with the other colors.	Formative
Checklist	Have a checklist feedback system in which the user is asked standard 6 questions and fill them in: How, who, why, when, where, what. What (problem or request or idea), why + adds the type of feedback (bug, request or idea), when/where/how (problem occur), who (so user can be later on be contacted if necessary).	Formative
Lateral thinking	Users are asked to choose a category/persona (Amateur, fanatic, or pro) which they most relate to and give feedback from that perspective. Then (pre-made/example) statements are shown from the other categories and from the chosen perspective it gives their critique/attitude towards that idea/statement. Which might also trigger their own idea on how to solve it.	Summative
Mind map	Users choose the type of feedback they have; idea (green) or problem (blue/red), which leads to a new page in which a word cloud of all names of ideas is shown. Users can vote on the shown names/ideas by linking the ideas separately, the more it is voted the bigger the word becomes. Users can also add their own ideas.	Formative
Ranking	The company gives a statement/idea and the user has to rank them on priority which ones he/she finds most important. There will also be a comment section in which the user can explain their ranking.	Summative
Voting	Users see two examples of user stories/or ideas, and they can vote on which one they like most and add their own input on why they would or would not want it. Moreover, they get notifications/updates if there are new ideas that they can vote on/or the final idea.	Summative

Table 2: Overview of concept ideas

6.3 Results & Conclusion

In this section, the final chosen concepts are explained as well as ideas on how to create and experience and possible interactions with the complete feedback system. The section ends with points of attention for future development of the feedback system.

6.3.1 Final concepts

Based on the ideas from table 2, I chose the following four final concepts:

- Checklist (formative)
- Lateral thinking combined with rating (summative)
- Mind map (formative)
- Voting (summative)

Each concept has its advantages and disadvantages, per concept those advantages and disadvantages, as well as a short explanation, will be discussed and a sketch of the prototype of the concept is shown. The pros and cons are based upon my own rationale. In chapter eight the client is involved in giving his feedback upon the concepts. Two of the concepts; checklist and mind map are focused on asking users for their own opinion and input on problems and/or ideas. While the other two concepts; lateral thinking and voting are focused on validating ideas the company has come up with the hope that it also inspires users to add their own feedback on the ideas.

Checklist

The checklist is easy, short, and right to the point for leaving clear feedback, see figure 14. Depending on the type of feedback; problem, request, or idea, two or three questions will be added. All questions are open questions, this will hopefully trigger users to explain their wishes and needs. Two points of attention of this design are:

- How creative stimulating is this concept?
- Will it trigger users to think about their needs?
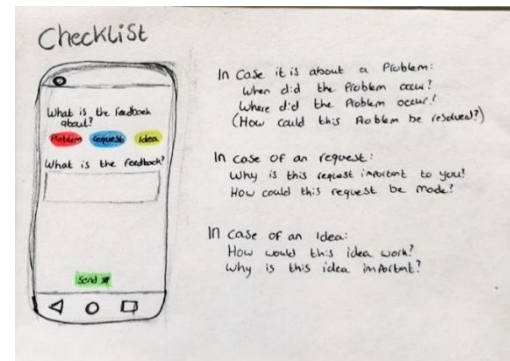
Figure 14: Checklist paper prototype

Lateral thinking

For the lateral thinking concept, its uniqueness lies in the fact that users must choose a perspective/persona that fits them the most, this is also displayed in figure 15 on the left screen. These personas can either be based on the three target groups from EatMyRide; amateur, fanatic or, pro, or it can be based upon user's opinion towards feedback, the kind of user (very active or not), personality traits or, specific traits regarding the idea statement from the company. So, for example, the idea is about nutrition, then the personas are about nutritional perspectives. After choosing a persona, users receive a statement/idea from the company and are asked to rate this and can leave a comment in which they can give their opinion on the idea or explanation about their rating, see figure 15 on the right screen. As said before this is mostly focused on validating ideas from the company where users need to think about which persona, they identify the most, and give feedback from that perspective.

Figure 15: Lateral thinking paper prototype

Mind map

This concept is most unique from a visual perspective, see figure 16. A user chooses the type of feedback they have, either an idea or problem, and goes to the next page, where a word cloud is showing other ideas from other users. Users can press on the names of the ideas and a pop-up of the idea will be shown with an explanation and the possibility for users to vote on that idea. In the right corner of the pop-up, it shows a number of how many people have voted on it. Users can also add their own ideas by pressing on the + sign in which they add a name and an explanation. Occasionally, the company empties/clears the word cloud and leaves possible comments on what they are going to work on as well as a thank you note. With this concept two points of attention are:
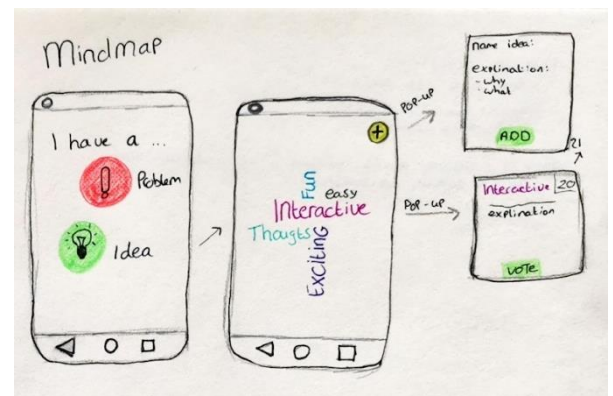
Figure 16: Mindmap paper prototype

- Word cloud, some words bigger than others, may steer people to those specific words, thus steering them into specific ideas. Is that okay or does it need a different approach?
- Can this idea be implemented on a technical basis?

<u>Voting</u>

The voting concept shows two ideas from EatMyRide, preferably as storyboards or pictures where users can vote on which idea they prefer/like best, see the left screen in figure 17. Users can also leave a comment on their reasoning and possible feedback on how to improve the ideas. After voting the user directly sees a result on how users have voted as well as a personal note to thank users for their time, see the right screen in figure 17. This can be repeated occasionally, and users can get pop-ups/notifications to go vote. This system is very short, and users only have to vote, making the response rate very high in comparison to first having to choose a persona.
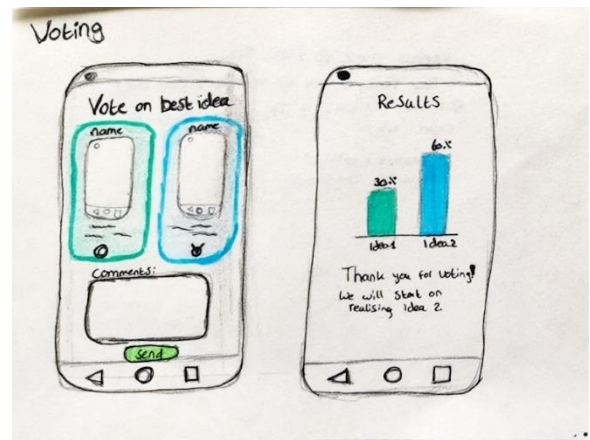
Figure 17: Voting paper prototype

6.3.2 Ideas on experience & interaction

The four concepts mentioned above are ways to gain feedback in a quite general sense. The concepts are not yet specified towards the EatMyRide app and no thought was yet put into how to create an experience for users. To create an experience for users I needed to look at the bigger picture and not only at the concepts above but how the concepts would be implemented into the application, visually as well as the protocol of the experience. This led to three different protocols, see figure 18 – 20, as well as seven different ways to visualize it and create the experience for the users, see figure 21. Each protocol and the different visualizations will be shortly explained separately below.

<u>Protocol 1- Persona-based</u>

The first protocol is persona-based, meaning that depending on the persona users choose different actions will be taken. As can be seen in figure 18, the first step is for users to choose a persona, in this persona the user states their preference towards feedback. Then EatMyRide starts a new Scrum and wants to get feedback. Based on the persona users chose, for example, either like and don't like giving feedback, users that like giving feedback are notified and asked to give feedback. That feedback is then analyzed, sorted, and prioritized by the EatMyRide. Then all users, also users who don't like giving feedback, are asked to vote/give their opinion on the ideas that the EatMyRide have come up with based on the feedback from users. Based on the results from the voting the EatMyRide starts implementing the idea and starts with a new Scrum after implementation.
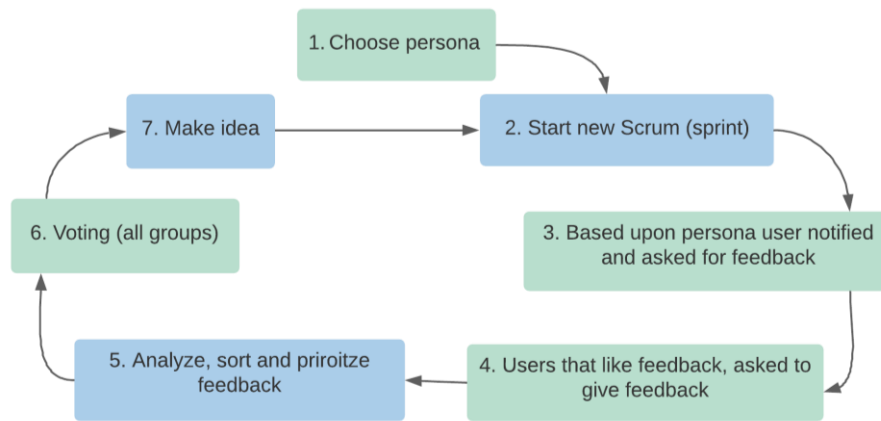
Figure 18: Persona-based protocol[20]

Protocol 2 – Push protocol

This protocol in comparison to the first protocol consists of five simple steps, the first step is to get feedback from users. The second step is to analyze the feedback, based on the analysis of the feedback users are asked to vote or rank the ideas. Based on these results, ideas are developed and an update is given on the new feature. This protocol consists of push feedback, the incentive to give feedback/get feedback lies with the users.
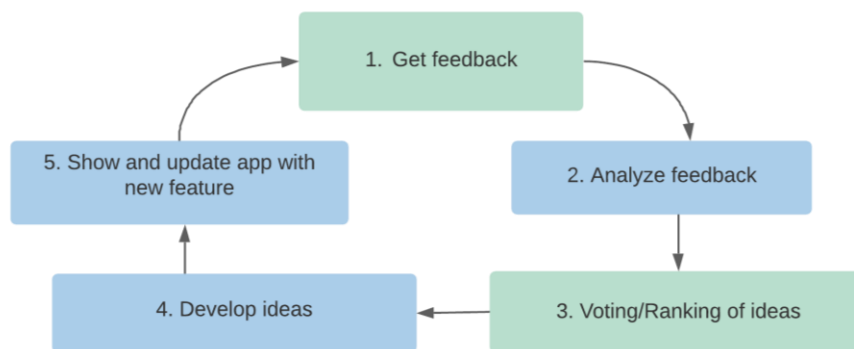
Figure 19: Push protocol[20]

Protocol 3 – Pull protocol

In the third protocol, the first step is to send users and notification for an invite to give feedback. Users can then either give feedback or ignore it. After a while, a second notification is sent to users to ask if they have feedback. The last step of the protocol is analyzing the feedback, see figure 20. This protocol in comparison to protocol 2 is more a pull protocol, in which the incentive lies with the EatMyRide to get feedback.

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[20] Made with https://www.lucidchart.com
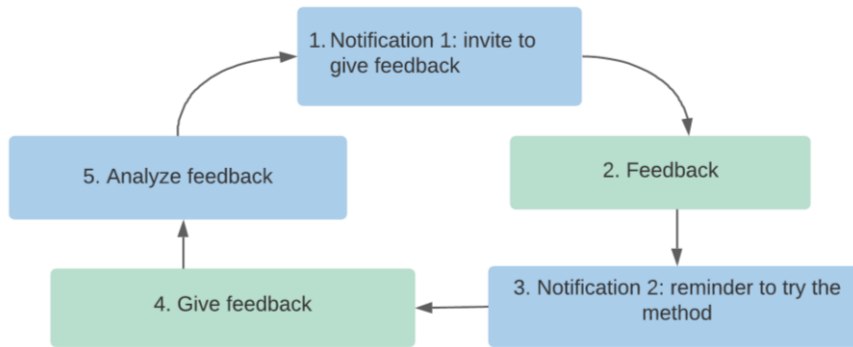
Figure 20: Pull protocol[21]

<u>Visualization ideas</u>

Next to the three different protocols, seven different visualizations were thought out, each is below explained and in figure 21 the different ideas are drawn out.

- An animation of a bike is shown and representing what the bike does references what is done with users' feedback. For example, the wheels of the bicycle are turning meaning that the feedback is being processed. There is now bike can mean that the feedback is already processed and currently worked on.
- Users can see the progress of their feedback and the timeline that the EatMyRide follows by following a road. Users can see the current step but also future steps, this is displayed as signs along the road.
- Next to a following a road visual as explained before, instead of squares/signs with the name of the status it is represented by using icons.
- Icons in the top right of the screen are displayed. For example, the idea and problem icon are displayed and when someone has given an idea the updating icon is displayed.
- Asking for feedback is implemented within the timeline on the plans screen that shows pop-ups/boxes in which users are asked to give feedback, vote, and are updated on their feedback.
- Instead of a road in the top right, a Pacman icon is displayed with three icons indicating the progress/protocol. This can be similar to the first road map idea with signs with text in them stating what the plan is. And when going to the next step the Pacman "eats" the previous sign.
- The last idea is similar to the previous Pacman idea but this time it instead of signs it shows icons.

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[21] Made with https://www.lucidchart.com
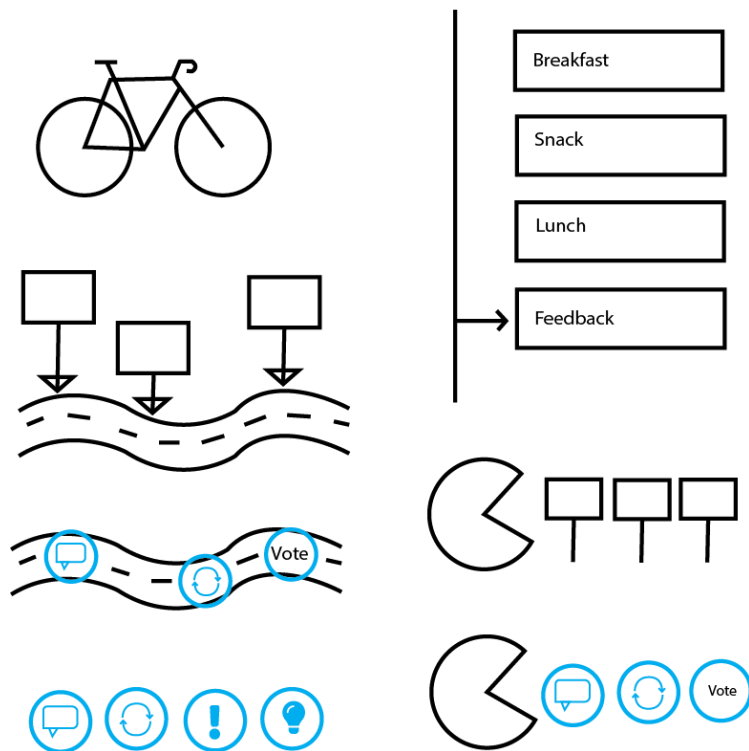
Figure 21: Visualization ideas

6.3.3 Points of attention

In this section, a multitude of points of attention that the prototype should meet are mentioned. These points of attention are split up into three sections, the first section is regarding the general design of the product. The second section is based upon the background research and the last section is based upon the interview with the EatMyRide application in which their specific wishes come to light. These points of attention will be taken into account during the specification and realization of the prototype.

General points of attention during the design:

- A phone has a certain amount of space which is a lot smaller than on a laptop or tablet. Meaning that the prototype should be visible on quite a small screen.
- Avoid asking users for long text input, this is tedious and annoying work for on a phone. Moreover, users can be come easily distracted or lose interest.
- There is a wide variety of age differences, meaning that there is a big difference in how users use their phones.
- The design of the system should be corresponding to the flow and design of the EatMyRide application.

Points of attention based upon the background research:

- The feedback system should be on the same platform as the product itself, in this case, it should be implemented into the application.
- The feedback channels should be reduced to one channel, so users know where to go to give feedback.
- The feedback system should be built into a semi-structured way: have some structure for the developers but keep the freedom for the users to write down their feedback.
- To stimulate creativity, incorporate a creative thinking method and use the colors blue and green.

- To prevent users to feel over asked to give feedback, make it short, personalized, acknowledge the participants and make them aware of what is in it for them.

Points of attention regarding the wish of EatMyRide:

- The feedback should be clear if it is not intuitive it should have an added explanation to make it clear for the users.
- The design and layout should be simple, it should not be too over the top distracting users from their main use of the application.
- The feedback should be scalable according to the growth of the application.

Chapter 7: Online User Survey[22]

To know more about the users of the EatMyRide application and understand their view on giving feedback an online survey was sent out through the EatMyRide. The survey was sent to all users how downloaded the EatMyRide application since the last survey the EatMyRide did, this was approximately 50 users. This was done because EatMyRide does not want to over ask their users. However, unfortunately, after a week of zero responses EatMyRide researched out to friends and acquaintances to fill the survey in, this led to eight responses therefore, the conclusions that could be made were limited.

7.1 Methodology

The online questionnaire is split up into four parts:

1) General user information about them as cyclists
2) Users' applications usage
3) Users' motivation and willingness to give feedback
4) Users' creativity in general and towards giving feedback

The first two parts are important to understand more about the users and see if there are really three different target groups and how to define them more specifically. The third part of the questionnaire focuses on user motivation and willingness to give feedback, in general, but also specifically focussed on the EatMyRide application. The last part is all about creativity, in general, but also specific statements in which it might be concluded that users are or are not creative. For the complete online survey, including the ethical consent at the beginning, see appendix 3.

During the process of making the online survey, multiple hypotheses were set up to test.

1) Users who cycle more often use the app more frequently
2) Frequent users are more likely to give feedback than infrequent users
3) Users who cycle alone are more open to giving feedback
4) Users who easily come up with original ideas have less trouble answering open questions
5) Users who easily come up with original ideas rate their feedback as more creative

Participants

The respondents to the online survey were users of EatMyRide. The EatMyRide sent the survey out to new users, however, this led to no response, so EatMyRide reached out to acquaintances and friends to fill it in.

7.2 Results

In this section the most important and interesting results will be discussed, for the complete results of the online survey see appendix 4.

The first result shown in figure 22, shows the number of times the participants cycle on average per week versus how often the participants use the application. As can be seen, there is a correlation-based upon these answers that the more a person cyclists the more often the application is used. For the participants who cycle 4 or more times the application is used more often in comparison to the participants who cycle less. It can then be said with caution that the first hypothesis is true.

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[22] In collaboration with Lukas Vugts and EatMyRide
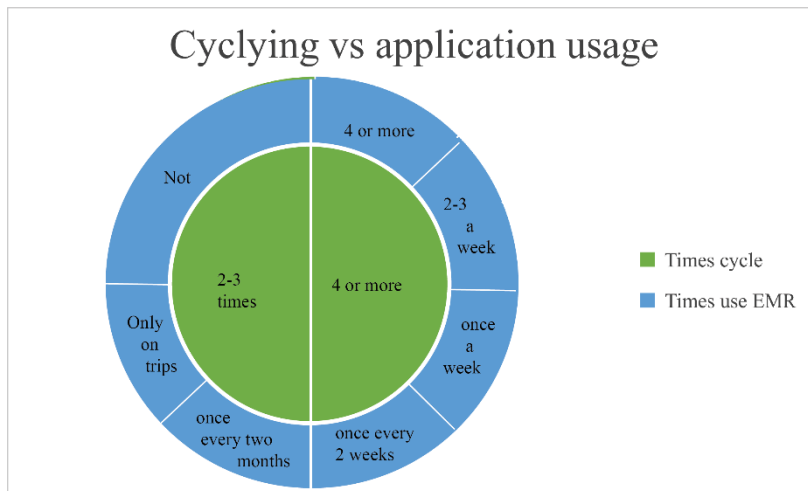
Figure 22: Cycling vs application usage

The second interesting result was the answers to the question on how often users would be willing to give feedback. The result of this question, see figure 23, was that 63 percent would be willing to give feedback on a semi-annual basis, 25 percent would be willing to give feedback weekly and 13 percent would be willing to give feedback monthly. It can be concluded that users can be asked for feedback on a semi-annual basis and even some participants would not mind giving feedback more often.
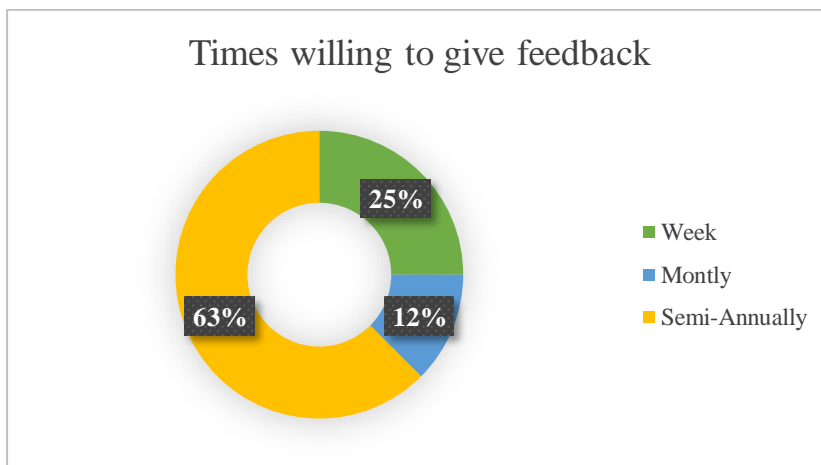
Figure 23: Willingness to give feedback

Next to knowing how often feedback users would be willing to give feedback another factor that was asked and is important to know before going future with the realization of the prototype is how much time users would be willing to invest in giving feedback. This is shown in figure 24, out of the possible answers all going from 0 to a max of 15, all participants would be willing to give feedback between 0.5 and 10 minutes. In which half would be willing to spend between 2-5 minutes.

TIME WILLING TO SPEND ON FEEDBACK

Legend: < 0.5 min, 0.5-2 min, 2-5 min, 5-10 min, 10-15 min, >15 min
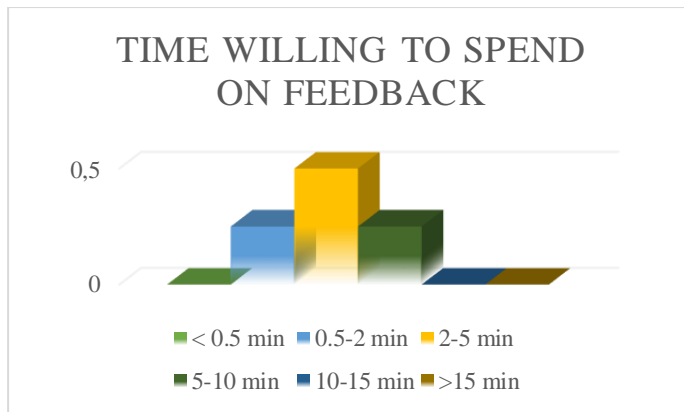
Figure 24: Time willing to spend on giving feedback

These first three results were all based upon general information about the user. The following results will go deeper into the statements upon giving feedback. These statements are in regards to participants' own feedback. The three statements are about the user's need for inspiration from others, if their feedback leads to new features and if before giving feedback they need specific instructions. These three statements led to the results displayed in figure 25. From the results from the first statement can be concluded that overall most users agree that they need inspiration from others when giving feedback. All participants agreed or were neutral on the fact that when they give feedback there feedback can lead to new features. And lastly, the statement if participants need specific instruction before giving feedback the opinion was a bit divided. Most did agree that they did not need instruction while a few disagreed and do prefer to get a form of instruction before giving feedback.

FEEDBACK STATEMENTS

Legend: Strongly disagree, disagree, neutral, agree, strongly agree
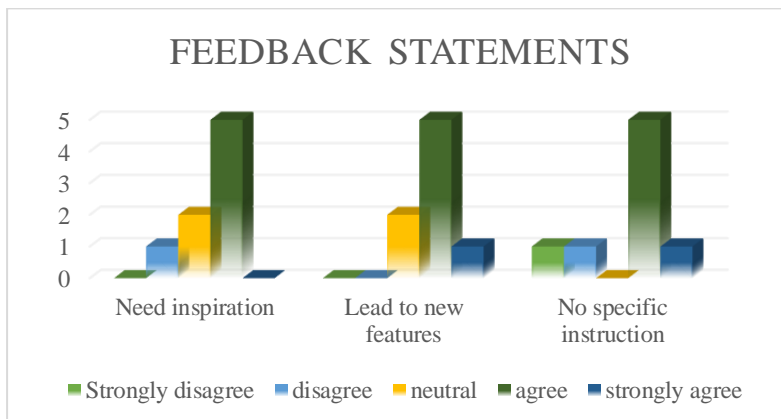
Figure 25: Statements regarding users' own feedback.

7.3 Discussion & Conclusion

All in all, the information gained from the online survey was minimal due to the small response rate, few conclusions and results could be made, and were useful. Only for the first hypothesis, there was enough evidence to conclude that the hypothesis is true. The other four hypotheses could not be answered due to too little prove. Moreover, the first section of questions to better determine the target groups of the EatMyRide did not lead to a better understanding due to the low response rates. In the last section of the survey, creativity, most statements had too varying answers that only the mentioned results above were useful. The results that are going to be used and will be implemented into the feedback system are:

- The feedback can be asked on a semi-annual basis
- The feedback system should not take more than 2-5 minutes on average
- Users of EatMyRide prefer to have some sort of inspiration from others before giving their own feedback.

These three points need to be implemented to create a feedback system fitting to the users of the EatMyRide application.

Chapter 8: Specification

After the ideation phase and coming up with multiple different concepts for the feedback system, the paper prototypes shown in chapter 6.3 were discussed with the client and a short evaluation was performed afterward in which the ideas were revised and improved. Ending the specification with a broader and more specified concept.

8.1 Client concept testing

8.1.1 Method

As mentioned also in chapter 5, for the testing of the concepts, proto monadic testing is applied. This concept testing is done with the client, EatMyRide. First, the client is shown each concept individually and specific questions per concept are asked. After showing all the concepts the participant is asked which one is most favored and why. This is done for the four idea-generating concepts: mind map, lateral thinking, checklist, and voting. For the three protocol concepts and the seven visualizations, I showed them all in a row and afterward asked the client which protocol and visualization were favored and why.

8.1.2 Results

The concept testing led to the following results, for each section (concepts, protocols, and visualizations) the results will be separately summarized.

Concepts

The first concept showed was the checklist, which the client found straight to the point and looked a bit similar to a contact form on websites. He thinks that by implementing the checklist in the application it would lower the threshold for users to report their problem. He said it would work well for reporting a problem, but for reporting an idea or feature request it might be used less often. The advantage of this idea is that it is easy to implement, and users can easily report problems that occurred. However, the client wonders how much and often users would really share their ideas through this concept.

The second concept that was showed was the mind map, the first thought from the client was that it was a creative idea. He also liked the idea of the possibility to vote on ideas because that data can be collected and once the ideas are implemented the users can be notified that the idea they liked is being implemented and can raise the engagement with users. A pro to this concept is that it is very creative, and it will reach a bigger crowd than the checklist. A doubt that the client still has is how the word cloud would work for reporting a problem.

The third concept was the lateral thinking concept, the client liked the idea of using personas. A big pro to the concept is that it makes it more personal to users, and with the correct personas, users will always recognize themselves in one persona. However, there should be a balance to the number of ideas users rate and the number of personas they can choose from without it being overwhelming for users but still being valuable for the company.

The fourth concept, the voting concept, the client found the concept already quite specific and the EatMyRide can validate features. However, when displaying a screen, the question arises which screen should be used, since a feature consists often of more than one screen, which screen should then be chosen. Moreover, the client pointed out that showing the results might also leave a negative effect if the user chooses the less popular idea.

The most favored concepts were the word cloud and the lateral thinking with the rating. This is because he found the checklist too simple and basic and less creative stimulating. And with the voting idea, he saw more problems regarding the visualizations of the ideas than with the lateral thinking concept.

The third protocol was rejected right away because it did not fit with how the users use the application. With the third protocol, users are suddenly asked way more, and that does not fit as well with the EatMyRide. That left protocols 1 and 2, of these two protocols the client found that protocol 1 is more for the long term with the personas while protocol 2 can work for the short term.

Visualization

All shown visualizations were creative according to the client. However, looking at the visualizations concerning the application and the user experience a few of the visualizations fell away. The bike idea and the two road visualizations were not as fitting to the app due to that it felt that it would show a too big diversion from the actual user experience. The three most favored visualizations are the icons in the top right, the Pacman with icons, or the implementation in the timeline. For each of the favored visualizations, the client had some comments. The icons in the top right are calm and, in the background, the question is however to what extent users will notice it. For the Pacman, it needs to be neatly integrated into the flow of the experience, it is always good to work with icons. Implementing in nutrition plan is nice, however can only work if users have already given feedback.

8.1.3 Conclusion

Based on the feedback from the client I will continue to work out the feedback system and even think of the possibility to create a hybrid version, combinations of multiple concepts into one feedback system. Also, further evaluation needs to be done in the summative feedback systems, lateral thinking, and voting, to find out which one would work best. Next to this, I realized that there is a difference between users that already have an idea and users that need to come up with an idea. The second group is tricky because it should not feel like a job for the users to come up with an idea however it should leave users the freedom to do add their idea by looking at ideas from different users/inspirations.

8.2 Protocol idea

After the client concept testing, I put everything into one big protocol, see figure 26. In figure 26, the green boxes represent actions that users need to perform, and the blue boxes represent actions for the EatMyRide. The other color, a combination of green and blue, are implementations that I need to make/the feedback system itself.
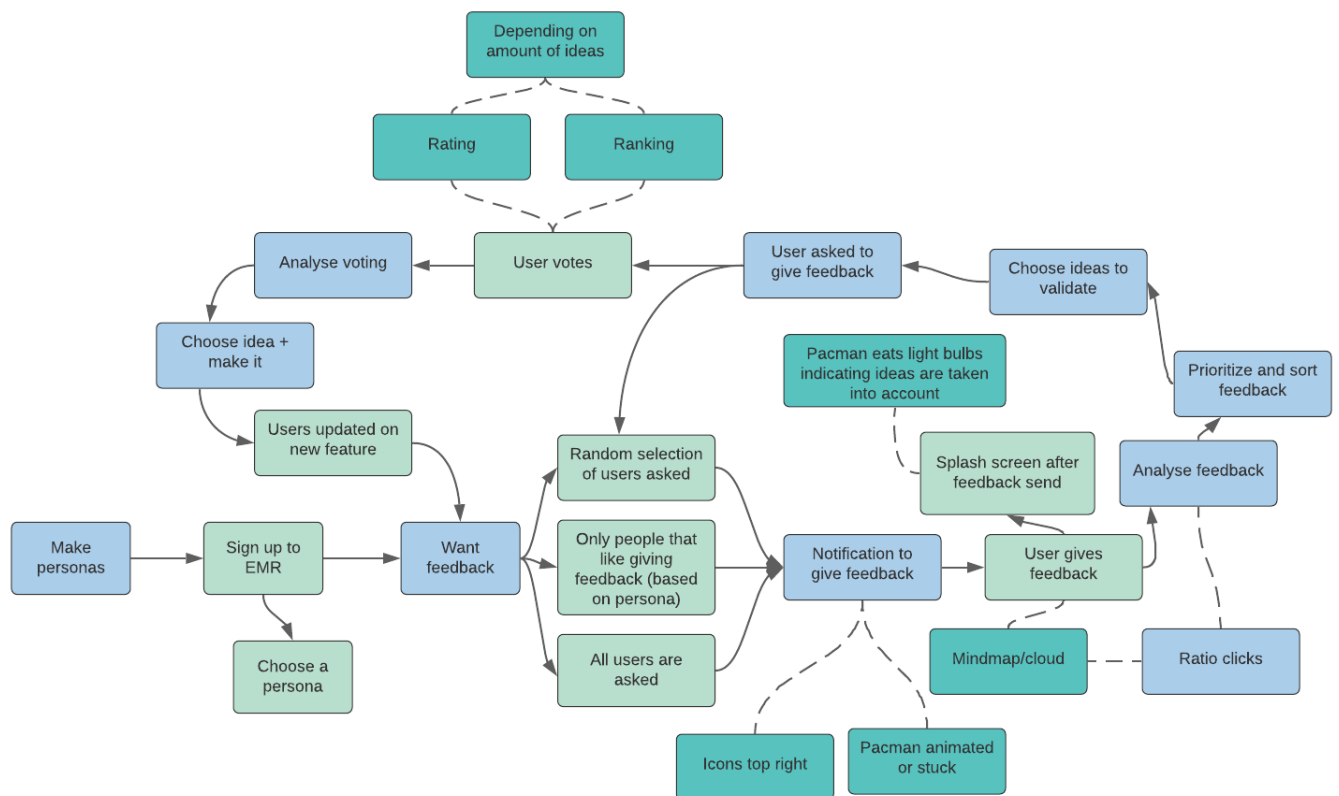
Figure 26: Protocol of the complete feedback system[23]

Points of attention in this protocol:

- Selecting the group that is asked to give feedback
- How are users notified? Small right reminder above the icon in a color? Users press on it once and it goes away?
- What visualization is used in the app itself? Pacman or icons? What kind of icons?

8.3: Evaluation concept

After the concept testing with the EatMyRide and putting everything in one protocol, I evaluated the comments and the concept itself. This led to the conclusion that the concept felt like it was lacking something, so going back to the idea-generating table and broadening to more different creative thinking methods lead to new concepts and new ideas on how to implement them. Table 3 shows an overview of the new ideas.

Name	Explanation
Round Robin	Creates a community of a specific group of users with the same persona for example. Someone from the group has an idea/wish and it goes through the group, each person can add their own ideas to it. Only work on users that want to be involved frequently
Inspiration page	Like a Pinterest page shows all different kinds of pictures, ideas from other users, and maybe even different article links. Users can also upload their own ideas/pictures/inspiration etc. Again, creates a kind of community among users
Word cloud	Renamed the mind map idea from chapter 4 into a word cloud, which displays an overview of different ideas.

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[23] Made with https://www.lucidchart.com

Post-it's	Like word cloud but as post-its on a wall where users can scroll through and add their own ideas very easily. Users can leave a thumbs up per post-it if they like the idea
Bad idea	Come up with only bad ideas. Identifies to the company what users don't want, can analyze needs users otherwise would not be able to articulate.
Wishing	User can add their biggest wish, where there are no boundaries where the wish should comply to. Lots of freedom, how to visualize in a way that fitting with the EMR application?

Table 3: New concepts based on feedback from EatMyRide.

During this idea-generating session, I came to the idea to switch between multiple different creative thinking methods/ideas instead of choosing just one creative thinking method, to further stimulate creativity among users. Based on this decision, the inspiration-page idea was crossed of for it creates more of a community and did not work for the switching. Reviewing the other ideas, Round Robin was also not chosen because in comparison to the other four ideas in which it is a system that users can easily fill in individually the Round Robin did not fit with the other three in this way and might lead to confusion among users. Moreover, it is uncertain how many users would be open to participating in this, for it might too much like "work" instead of just briefly giving your ideas or stating your desires. The last idea that was discarded was the post-it idea, it felt too similar to the word cloud. The decision was then made to go for the word cloud since it is visually more different.

Making the new idea to combine bad idea, word cloud and wishing and changing them through the year. Based on the results from the online survey that users would be willing to give feedback on a semi-annual basis the methods would be rotated every season. Moreover, a way to validate ideas from the EatMyRide themselves will still be implemented.

Instead of voting between two ideas, users will either get a list with ideas that they can rank according to what they like the most or users can rate each idea from the EatMyRide individually from a five-star rating. This way the EatMyRide can get a better picture since most ideas are very different and the voting between two ideas works not as well. The lateral thinking perspective is left out for now but can be used for future research. This decision was made because for validating ideas, it is most useful to get as many responses, by keeping it simple and short users are more likely to respond. For creating personas more research into the target groups needs to be done.

Feedback system concept

The feedback system will be implemented into the application, which consists of four parts: help (FAQ), report a problem, report an idea, vote/give your opinion.

For the help page, an FAQ will be shown similar to the one that is currently on the website of EatMyRide. For the report of a problem the choice, also based on the conclusion from the concept testing with the client, a modified checklist will be used. It is a simple, straightforward way for asking users to report the troubles that they may have run into.

For reporting an idea a there will be rotated between the three different concepts: modified bad idea, wishing, and word cloud. For the modified bad idea, it will not be the same as the true creative thinking method in which users are first asked to give only bad ideas and then analyze why it is a bad idea. In the modified bad idea concept it will show an idea with an explanation and users are then asked to state how the idea is lacking in their user needs, instead of asking what their thoughts are about the idea. It is important for the bad idea that users are aware of the gain of it as well as how to get users to give accumulated criticism. For the word cloud to prevent that users will be steered to

specific words, all the words will be the same size. Due to the limited amount of space on the phone, there will be a maximum number of ideas that can be displayed on the word cloud, or else the words will become too small and unreadable. Moreover, the word cloud must be intuitive to users, and if not an explanation on how it works needs to be added.

To make the complete feedback system consistent with the EatMyRide application the colors blue and green will be the base colors, these colors are the colors from the EatMyRide pallet but also colors that stimulate creativity. All text should be kept as short as possible and for buttons and places where it is possible icons will be added to make it clearer for people what the button exactly does.

Chapter 9: User study[24]

Simultaneously with the realization phase, see chapter 10, a user study was set up. This user study was to find out more about the interaction of users with the EatMyRide application and their experience with the EatMyRide application as well as to test the prototypes and features in it. In this chapter, the complete user study will be shown as well as the results of the user study except for the usability tests, which will be discussed in chapter 10.

9.1 Method

The user study exists out of three parts:

1) Pre-interview
2) 8-day use of application & diary study
3) Post-interview

First, a pre-interview was held with the participants, in this interview, the focus lay on finding out what kind of cyclists they are and how serious they are with their nutrition, see appendix 5 for the complete list of questions. Next to the interview, the purpose, goal, and how the diary study exactly would go was explained.

For the second part of the user study participants were asked to use the EatMyRide application and fill in a diary for eight days. Each day of the diary consisted of four sections. The first section was about general information such as the date, and if they used the app or not. The second section was about their nutrition intake of the day, the third section was about rating their ride, the application, and their nutrition plan. In the last section, users could either fill in a problem or they were asked questions about feedback, such as if they could make a wish what it would be, etc. The rating in the third section was either with an emoticon in the same color, emoticons in different colors, stars, or hearts. Later in the post-interview users will be asked which ones they preferred. For the complete diary, see appendix 6.

The post-interview was divided into three parts, first users were interviewed based on their filled-in diaries to better understand their experience with the EatMyRide application, see appendix 7 for the complete of questions. The other two parts of the post-interview were usability tests of both Lukas Vugts prototype as well as my own. In this section only the results of the first part will be shown, the results of my usability tests are incorporated into chapter 10.

9.2 Participants

In total eight volunteered to participate in the user study. These participants were found through different sports associations in Enschede or acquaintances. Of the eight participants, six are still active at the University of Twente either as a bachelor student, master student, or Ph.D. student and are all between 18-30. The other two participants are working people, between the ages of 30-40. Of all the participants, two are female and the other six participants are male.

9.3 Results

In this section for each part of the user study, the results are shown.

9.3.1 Results pre-interview

In table 4, the results of the type of sporters are shown. As can be seen, four of the eight participants are triathletes, meaning that these participants also run and swim multiple times a week, depending on the level of seriousness. Two participants also participate in ice skating in the winter.

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[24] In collaboration with Lukas Vugts

The type of cyclist, based on the three target groups that the EatMyRide defined as a user, was a bit harder to fill in, mostly because the triathletes are very active sporters but not very active cyclists. For they cycle less and only participate in triathlon competitions. I made the distinction between amateur and fanatic cyclist as followed. A fanatic cyclist cycles 3 or more times a week, every time on average cycles more than 50 km and wants to or is competing.

Nr	Type of cyclist	Distances	Times a week	Compete	Garmin	Strava	Nutrition
1	Fanatic	Weekdays 50-70 km, weekend: 100+	3x	Not yet, wish to do cycling	No, but a Wahoo	Yes	
2	Amateur	200 – 250 km	-	No	No	Yes	Learning no nutrition schedule
3	Amateur	Weekdays 50 km, weekend: 80km	5-8 hours a week	No, used to triathlon	Yes	Yes	Not really into nutrition, just eating a bit more when cycling
4	Fanatic	1x 50, 1x 80-100 1x interval	2-3x	Yes, triathlon	Yes, 8010	Yes	Aware, healthy food, advice from family
5	Amateur	40-60 km, nice weather further	3x	Yes, triathlon	Yes	Yes	Tries to eat what is good, eats more before a ride
6	Amateur	2x < 50 km 3x 50 km	4-5x	Yes, triathlon	Yes	Yes	Aware, different sources but no apps
7	Amateur	2x 30 km, 2x 70-100 km	4x	Yes, time ride (7-20 km) and triathlon	No, but a polar advantage	Yes	Used a calorie counter for 2/3 weeks, tries to eat healthily
8	Amateur	60-150 km	3x	No	Yes	Yes	Aware eats more around a ride

Table 4: Results of pre-interview

9.3.2 Results diary probe combined with post-interview questions

In this section, the five interesting results from the diary probe combined with the results of the post-interview questions related to the experience with the EatMyRide company are shown, for the results from the diary probe see appendix 8 and for the results from the post-interview about the experience with the EatMyRide application see appendix 9.

Overall experience

When it came to the overall experience with the application multiple participants mentioned that they did not feel the added value of using the application or parts of the application. Moreover, multiple participants had problems or hiccups with learning how to use the application and eventually felt that it either did not add anything to them or were of the mind that there are better applications out there to use. Overall, the experiences with the EatMyRide application were for most participants a bit on the disappointing and lacking side, however, it did mean that they had feedback on how to improve it.

Motivation

When participants were asked what motivates them to give feedback or would motivate them to give feedback in the future, it all came down to impact and incentive. Participants would want to know what was done with and what their feedback for an impact has. Time was also a mentioned variable

that would influence people's motivation to give feedback, if giving feedback is easily accessible and done and does not take too much time participants are more likely to give feedback than if it takes too long to find the place to give feedback.

Wish

Participants were also asked after a few days to give their wish on how the EatMyRide application could be improved. This led to the following wishes:

- Receiving suggestions on what you should eat
- An option to copy food from the previous days, since I eat the same breakfast every day
- Adding a barcode scanner, even though it is hard to implement it would make adding products easier.
- An overview of a ride in which the ride and the food at what point is taken is shown. Also receiving more feedback towards the user from the application.
- Would like to have more features but is not sure which ones.
- The possibility to create custom "meals" that can be added through one click. Or the possibility to copy food from previous days
- Would like to receive more background and theory on nutrition and a lowering of the threshold of filling in the nutrition.

For future research, it will be very interesting to find out if answers to the wish question is more creatively stimulating in comparison to a more standardized question such as 'Do you have any feedback on how to improve our application?".

Suggestion response

At one time users were also asked to read an idea from the EatMyRide application. After reading the idea the following question was asked: 'Is this idea lacking in your user needs?'. My hope with asking the question this way users would stand longer still and think more about it before answering the question. Moreover, it stated in a 'negative' way that users are asked how the idea could be further improved instead of asking if they like the idea to get critique on how to improve it. However, either the participants did not read the sentence and only could think "Yes I want this implemented!" or they found the question phrasing complicated to understand. Meaning that my hope was unfortunately unproven in the fact that it did not do what I hoped for, and the question needed to be rephrased.

Continue usage

Out of all eight participants, only one participant would continue using the application, see figure 27. The participant that said yes, would however not pay for the continuity of using the application. Meaning that no participants was satisfied enough continue using the application. Participants gave multiple reasons as to why, such as the high threshold for users and the amount of time and work it took for putting in the nutrition of meals. Moreover, multiple users felt that the application did not give an added value to their nutrition or workouts and decided that the way they currently use their nutrition is fine.
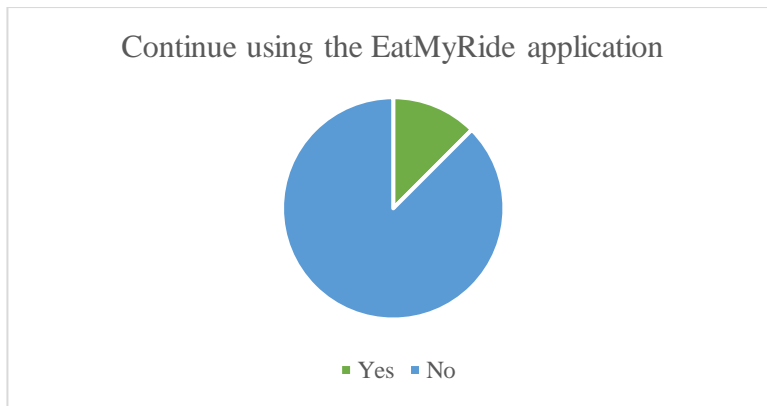
Figure 27: Continue using the EatMyRide application

9.4 Discussion & conclusion

All in all, some interesting things about the usage and experience with the EatMyRide were learned as well as more about the motivation of users to give feedback. However, an important point is that the participants do not correctly represent the users of the EatMyRide. This is mostly since these participants were asked to use the application instead of their own interest in the application. Moreover, half of the participants are also not long-distance cyclists but triathletes that also participate in other sports quite extensively resulting in the problem that the daily nutrition was too low for the time they sported. Next to that, as shown in the previous section all but one would no longer continue using the application, which leads to hypothetical scenarios when testing the prototype in the usability testing.

Chapter 10: Realization

In this chapter, the realization process of the concept is shown. This process exists of a total of four prototypes and three usability tests. After each prototype, a usability test was held with participants from the user study, with the exclusion of the fourth prototype.

10.1 First prototype

The first prototype was made with adobe XD, Adobe After Effects, Illustrator. In Adobe XD, the plugin Icons 4 Design was used for some icons. Adobe Illustrator was used to making vector-based images, for example, the icons and the rating stars in the prototype.

In Adobe XD, the complete prototype was brought together, first a template of the EatMyRide Plan page was built, for the feedback system can be accessed through that page as well as that it is a sort of homepage where notifications can be placed.

After finishing the template each idea: bad idea, word cloud, and wishing were each separately made, as well as the validation ideas ranking and rating. Moreover, multiple things were tried as to where to place the button to go to the feedback page and which icons to use, etc. This led to the following prototype: https://xd.adobe.com/embed/809d7277-0201-497d-965b-349b626a1562-d5ce/?fullscreen. Figures 28, 29, and 30 give an idea as to what the prototype looks like. In figure 28 you can see how it would be implemented into the plans-screen, so in the top right corner, a Pac-man icon would pop-open the four other icons that displayed an exclamation mark (for reporting a problem), question mark (goes to an FQA page), idea bulb (for reporting an idea, goes to word cloud, bad idea and wish) and a checkmark (giving your opinion either by rating or a ranking, e.g. figure 30). Figure 29 shows the word cloud idea and figure 30 shows the page where users can vote by leaving a rating on an idea from EatMyRide and have the possibility to leave a comment. As can be seen, figures 29 and 30 have a different layout. During the design of the report, an idea page was built more like a screen, while the voting/give your opinion page was more created like an overlay screen. This difference and preference of participants are asked in the first usability test.
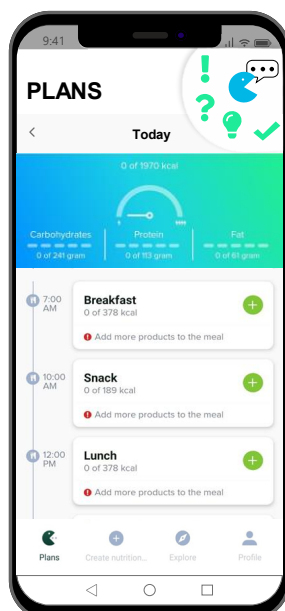

Figure 28: Plans Screen
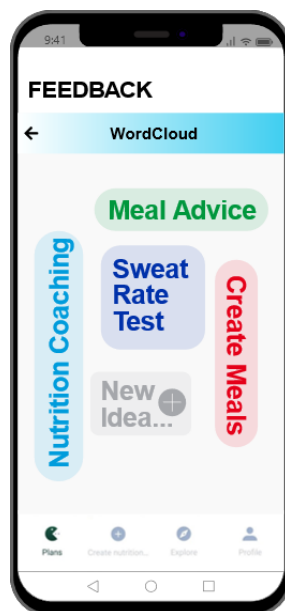
Figure 29: Word cloud screen
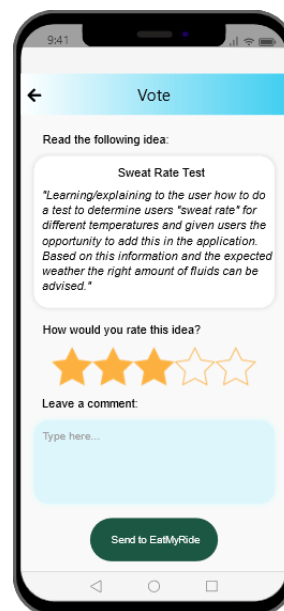
Figure 30: Voting screen

10.2 Usability test round 1

After finishing the first prototype, a clickable prototype made in Adobe XD, the prototype was tested. This was done through a usability test with the first three participants from the user study.

10.2.1 Participants

The first usability test round was held with participants 1, 2, and 3 of the user study. With participants 1 and 2, the usability test was physical while the usability test with participant 3 was held online due to distance. Participants 1 & 2 were between 18-25 years of age while participant 3 was between the ages 30-35. Participant 1 is female and participants 2 & 3 are both males. For a more detailed description see chapter 9.3.1.

10.2.2 Method

The usability test was part of the post-interview of the user study, see chapter 9. The post-interview as mentioned before consists of three sections, in which the first section users are asked about their experience with the EatMyRide application. Afterward, the usability tests were held. In this section I only describe my usability test. The usability test consisted of two parts: first users were given several tasks and asked to think out loud while performing the tasks, afterward users were asked a multitude of questions about the prototype about usability, design, and experience, such as if everything was clear. See appendix 10 for the task list and questions that were asked.

10.2.3. Results

In this section, a summary of the answers from the participants is given.

Participant 1

Table 5 below shows the most interesting results from the usability test with participant 1. The left column points out the parts of the prototype that were unclear, the middle column shows points that the participant was excited about, and the right column shows suggestions for improvement. Next to these results, the participant would use the prototype in fits, approximately once every two months.

Unclear	Good	Suggestions
Icon top right on plan page and checkmark icon.	For giving idea, lightbulb a hunch	Use exclamation mark for giving opinion
Pressing on words in the word cloud	Word cloud idea is nice for other people their ideas are visible and it creates a community	Would keep the navigation bar visible at all times.
Not always clear where to press		Ranking needs an indication for dragging
Unclear where to go to give feedback initially		4 icons feel about much, maybe reduce it.

Table 5: Results usability test round 1 of participant 1

Participant 2

The most interesting results regarding unclearness, things that the participant found good, and suggestions can be seen in table 6. Other input from the participant was that when it came to giving an idea in the word cloud the participant would be too scared to add his own idea because he would not be sure enough about his ideas. Next to that, if the EatMyRide would respond to suggestions users made the participant preferred only receiving positive feedback, such as we are working on implementing your suggestion, and not receive negative feedback. As a personal preference, the participant indicated that he would respond faster if a pop-up was displayed and would approximately use the prototype/feedback system once every two weeks.

Unclear	Good	Suggestions
Went to settings to give feedback	The word cloud because you can see ideas from other people.	An exclamation mark feels more like an opinion than reporting a problem. Set exclamation mark as an opinion and big cross for the problem.
The ranking is unclear that you can drag the ideas.	The possibility to leave a like.	Need an explanation first time for the word cloud
The top-right icon looked like a chat box instead of a feedback icon		Only a like button could lead to biased answers.

Table 6: Results usability test round of participant 2

Participant 3

In the case of participant 3, his motivation to give feedback is dependent upon knowing what the value is of giving his feedback. Moreover, he would probably use the prototype once a month. It became clear from his answers and the interview about his experience with EatMyRide that the participant does not often give feedback unless it is specifically stated to how is information is used. For results about unclearness, good parts, and suggestions on the prototype, see table 7.

Unclear	Good	Suggestions
Meaning of the checkmark	The wishing possibility	Change checkmark into a vote in a box or thumps up/down
Do not understand the relevance of the bad idea	With the voting (rating and ranking) I get an idea on what the company is working on as well as give your opinion.	

Table 7: Results usability test round 1 of participant 3

10.2.4 Conclusion
In conclusion, the top-right icon/button needs refinement so that it is directly clear for users that they can give feedback. Moreover, the other chosen icons need to be looked at as well since some were also unclear and the possibility of combining the problem and help page. Based upon these three participants a pop-up to give feedback, either a rating or give an idea, could be shown more regularly than once per quarter. Also, the bad idea needs to be looked at for its unclearness of the relevance for the user.

10.3 Second prototype
After usability testing round 1, the current idea of multiple different ideas generating possibilities that switch every few months felt too static. It did not feel like one seamless integration, moreover, in comparison with the use of the application and the features they have it felt too much in the way that it would create confusion. Because of this, I went back to the ideation phase in which I did an idea-generating session with an industrial design student to gain a different and new perspective. The first step of the idea-generating session was writing down the criteria of the feedback system. Then personas were created based upon a paper by Almaliki et al.[15]. These personas consisted of different perspectives on how people look towards giving feedback. In short, I defined the personas as followed:

1) Privacy tolerant & Socially Ostentatious: feedback is social & community experience, helps to feel among others.
2) Loyalist: passionate about something (in this case EatMyRide), cannot stand negative reviews about it.
3) Perfectionist: always seeking perfection, will let you know when something is not good enough.

4) Incentive Seeker: want to know what is in it for them, why would they give feedback for free.
5) Impact Seeker: benefits of giving feedback unclear to them as a user.
6) Annoying: Doesn't like feedback and finds it highly annoying.

These personas are general perspectives on how people can feel about giving feedback. Per persona, the problem was stated, and a solution was written down. For example, with the Impact Seeker persona, the problem that occurs is, what is in it for them. A solution would be to show a message in which states what happens with their feedback (beforehand). Next to writing down personas to have a clear idea for the different crowds the feedback system should be building a mind map with all previous mentioned different ways to gather feedback is written down.

After writing this all, the next step was choosing one specific persona, in my case that was Privacy tolerant & Socially Ostentatious. Based upon the chosen persona I started to create an idea fitting that persona. This led to the following idea, a combination of creating a community, using (word) clouds as visualizations, and notifications/pop-ups.

New concept idea

The feedback system starts with a notification, in which the user is asked to suggest the app in one word. At first, the idea was to ask users for a frustration instead of a suggestion, however after re-evaluating asking users for a frustration might come across as too negative. So it was changed to asking users for a suggestion instead. This one word that they send then gets displayed into a word cloud, which they can see and when they press on one of the words it opens a new page. On the page, the problem of the frustration can be added and other users can leave comments (solutions or an added problem or just a regular comment), depending on what type of comment it will differ in color. Solutions will be green comment boxes, problem comments will be red or orange, and regular comments will be blue. This way if users scroll through the comments, they can easily differ what kind of comment they are.

Users can Upvote solutions that they like best, using it as a form rating and validation. On the left of the comments a timeline, similar to the one the EatMyRide Plans screen has, will display an icon per comment that indicates the status of the comment. The state of the comment could be open, worked on, or closed. Closed would mean that the EatMyRide is working on it and trying to implement it, worked on is that they are looking into it, and it is maybe already on the backlog, and open would mean that it is not yet looked at by the EatMyRide. Next to the notification to leave a frustration, every now and then a notification to make a wish will appear, this would be every year or maybe twice a year.

After this idea was created the other five personas were looked at and checked if the idea would also fit their needs. Loyalists would 'defend' the application and would respond to users' frustrations and problems by maybe showing that there is already a solution or even come up with a solution for it, making the idea a new concept fitting to their needs and characteristics. The perfectionist persona is the kind of person that gives for the smallest things feedback is very critical, which can again fit the application in the way that users are asked about suggestions to improve the application. For the incentive seekers, it is important to show them how their feedback gains something, for some a message or an improvement in the application would be enough. However, for some that might not be, for those, in future research it might be interesting to further investigate a point-system with rewards at the end, due to time constraints this will not be achievable in the time scope. To make the idea also fitting with the impact seeker it is important to show these users how this feedback has an impact, one of the ways that it is done is by the timeline with the icons displaying that the EatMyRide application is working on it, etc. Moreover, a message beforehand will also help them understand the importance and impact their feedback has. Lastly, to fit the annoying persona it only asks for one word of feedback, which users can easily and quickly fill in. Based upon the reasons mentioned above

it would seem that the new concept would fit with all personas. Next to gathering formative feedback in the above-mentioned idea, the concept will also still give users the possibility to give their opinion on ideas from the EatMyRide by rating, see figure 30.

<u>Realization of concept</u>

After creating the first concept in adobe XD, I decided that I wanted to create more than only a clickable prototype and started working on creating the prototype with React Native. React Native is an in-class JavaScript library for building user interfaces. With it, you can code a complete application for both iOS as well as Android. However, it took a while before figuring out how to code, this meant that for the usability test round 2 a combination of adobe XD and the React Native application was shown. In the adobe XD part, it displayed how the word cloud would look, a simple mock-up of how it would work, see figure 31 and 32. While the React-native app showed the pop-up for a suggestion in which users could already type their answer if they wanted, see figure 33.

Figure 31: Suggestion cloud
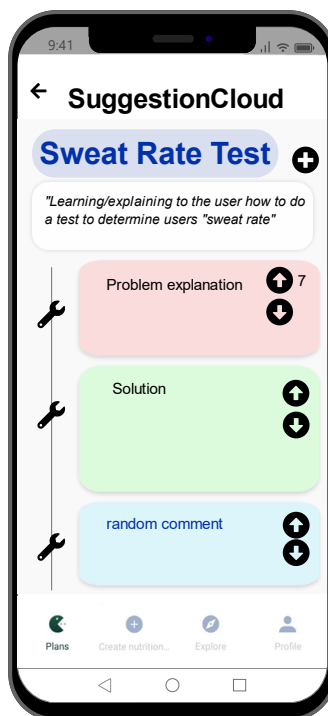
Figure 32: Sweat Rate Test page
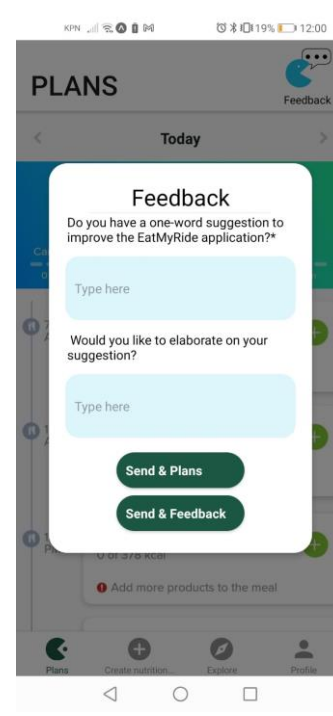
Figure 33: Pop-up for a suggestion

10.4 Usability test round 2

10.4.1 Participants
The second usability test round was held with participants 4 and 5 of the user study. With both participants, the meeting was held physically. Participant 4 was male, participant 5 was female. Both participants are between the ages of 20-25. For a more detailed description see chapter 9.3.1.

10.4.2 Method
The usability test was part of the post-interview of the user study, see chapter 9. Afterward, the usability test was held, the usability test consisted of three sections: first participants were asked to which persona/perspective to give feedback they relate most to. The options/different personas are:

1) Privacy tolerant & Socially Ostentatious: feedback is social & community experience, helps to feel among others.

2) Loyalist: passionate about something (in this case EatMyRide), cannot stand negative reviews about it.
3) Perfectionist: always seeking perfection, will let you know when something is not good enough.
4) Incentive Seeker: want to know what is in it for them, why would they give feedback for free.
5) Impact Seeker: benefits of giving feedback unclear to them as a user.
6) Annoying: Doesn't like feedback and finds it highly annoying.

Secondly, the participants were given several tasks and asked to think out loud while performing the tasks, afterwards, participants were asked a multitude of questions about the prototype about usability, design, and experience. See appendix 10 for the task list and questions that were asked.

10.4.3. Results

In this section, a summary of the answers from the participants is given.

Participant 4

The participant when asked which persona he related the most, mentioned being most relatable to the annoying and incentive seeker personas. He mentioned he only gives feedback if there is something in return, a reward of showing the impact of his feedback. But most often he finds giving feedback annoying and often just dismisses notifications for feedback. Next to knowing the participant's perspective towards feedback his feedback on the prototype can be seen in table 8. Moreover, one question that he mentioned during the usability test and something I regarded as very useful was his question on, if people are interested in a community in which they can comment on each other's problems and suggestions on how to improve the application? He also mentioned that he wouldn't be interested in this, but he would be interested if a community was created on other users' experiences with cycling and tips.

Unclear	Good	Suggestions
One-word suggestion very hard to come up with that covers everything	Preference lies in pop-ups, they are quick, easy, and clear to answer.	Would like to see suggestions
Not completely clear that cloud words are clickable		Would keep all words horizontal
Ask for a community talk about feedback		

Table 8: results usability test round 2 with participant 4

Participant 5

Participant identified herself most in the perfectionist and loyalist personas. She also mentioned that she would fill in the pop-up if she had something to add and the pop-up would not be displayed too often. Also, she would give a rating if she were passionate about the application or the idea but otherwise, she would feel it was too much trouble filling it in.

Unclear	Good	Suggestions
Showing figure 31, created a lot of unclearnesses.	Cloud idea nicely thought out, likes the idea hat you can see per subject stuff.	One-word answer needs to be really creative, rather have few words
She would not fill in comments on other users' ideas.		

Table 9: results usability test round 2 with participant 5

10.4.4. Conclusion

In conclusion, after this round of usability testing the new concept had to be rethought as participant 4 made a good point if there would be a demand for such a big community. However, I do still want to keep the community-like experience in it but must revise how to implement it. Next to that, both said that giving one-word was hard to come up with for it to cover the whole suggestion, so this also has to be re-evaluated on how to make it easier for the users to give their feedback.

10.5 Third prototype

After usability testing round 2 and based upon the conclusions made from the usability test the concept of the community was revised. Instead of the complication of adding comments etc, I went a step back to keep it simpler and clearer. This led to the idea of still having the cloud view of words/suggestions, on which users can press and a pop-up will display the name of the suggestion as well as an explanation. I still leave the possibility for others to leave a comment and instead of upvoting on the different comments within the different ideas, the user can leave for each suggestion a like or dislike. Only the number of likes will be displayed to all and the dislikes will only be send to the EatMyRide, so the person who made the suggestion will not associate giving feedback with a negative experience.

Since the third usability round was rather quickly after the second usability round, I was unable to create the suggestion cloud view and during the usability test round 3 it showed a list instead of a cloud, see figure 34. It displays a list of different ideas and already showed two different icons on the right, these icons will be later changed into a like button and a status button indicating the status of how far along the EatMyRide application is. The pop-up was not changed before usability test three, so it still asks users for one-word suggestions, see figure 35. Lastly, no time was yet had to create the second pop-up asking users to vote/rate ideas from the EatMyRide, so this was shown as an Adobe XD template, see figure 36.
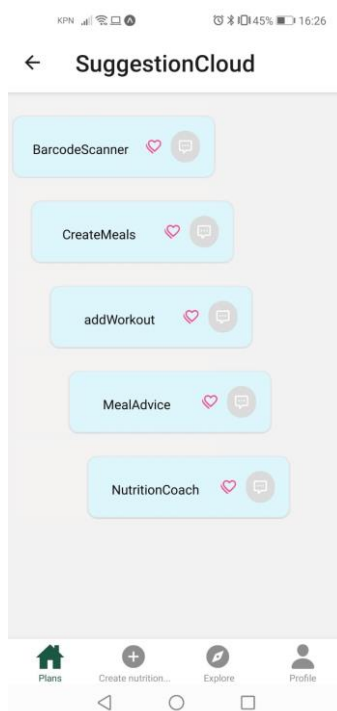

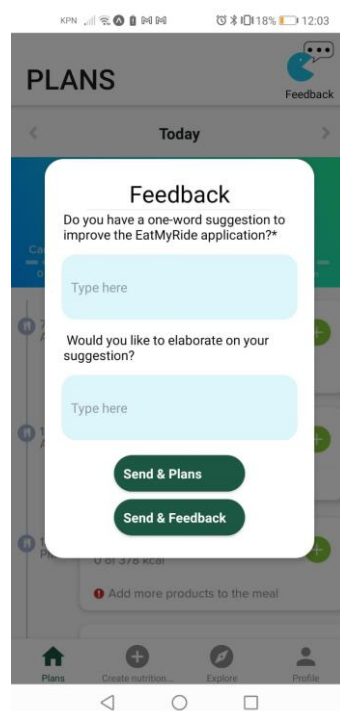**Figure 34: Suggestion cloud view as a list**

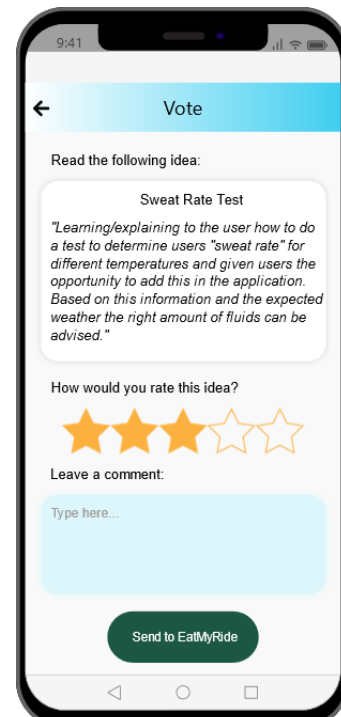**Figure 35: Pop-up for asking for feedback/suggestion**

Figure 36: Pop-up of rating

10.6 Usability test round 3

10.6.1 Participants
The third usability test round was held with participants 6 and 7 of the user study. With both participants, the meeting was held physically. Both participants were male and between the ages of 20-27, and triathletes. For a more detailed description see chapter 9.3.1.

10.6.2 Method
The usability test was part of the post-interview of the user study, see chapter 9. Afterward, the usability test was held, the usability test consisted of three sections: first participants were asked to which persona/perspective to give feedback they relate most to. The options/different personas are:

1) Privacy tolerant & Socially Ostentatious: feedback is social & community experience, helps to feel among others.
2) Loyalist: passionate about something (in this case EatMyRide), cannot stand negative reviews about it.
3) Perfectionist: always seeking perfection, will let you know when something is not good enough.
4) Incentive Seeker: want to know what is in it for them, why would they give feedback for free.
5) Impact Seeker: benefits of giving feedback unclear to them as a user.
6) Annoying: Doesn't like feedback and finds it highly annoying.

Secondly, the participants are given several tasks and asked to think out loud while performing the tasks, afterwards, participants were asked a multitude of questions about the prototype about usability, design, and experience. See appendix 10 for the task list and questions that were asked.

10.6.3. Results
In this section, a summary of the answers from the participants is given.

Participant 6:

The participant when asked to which persona he related indicated impact seeker and a bit of a loyalist. This is because he finds it important that something is done with his feedback and if he truly believes in an application, he would also be very passionate about it. Next to the results already mentioned in table 10 on unclearness, things that were good and suggestions, the participant indicated that he often fills in feedback if he receives a mail and fills pop-ups in half of the time.

Unclear	Good	Suggestions
Wishing a bit double, since you can always add your suggestion	Would respond to the pop-up	Tinder swipe idea when he saw the suggestion cloud/list, swipe left and right if you like the idea or not.
	Would use the feature every now and then to like idea from other users.	Add a top 10 or fewer ideas

Table 10: Results usability test round 3 of participant 6

Participant 7:

Participant 7 indicated to relate the most to impact seeker persona. He does not mind giving feedback as long something is done with it and has an impact. For example, he likes to leave reviews on websites on products when there are not, yet many reviews so other people are advised upon if they should buy the product or not. In general, he also gives relatively often feedback such as reviews and for the university. For the results and input see table 11 with things he found unclear, things he liked, and his suggestions to improve the prototype further.

Unclear	Good	Suggestions
One-word is quite difficult	The cloud is a way of feedback in which I feel involved.	For voting pop-up less text or add bold words so users can easier read through it.
	Feels very useful to know that they are working on it → already a big impact	Pop-ups often inconvenient likes to go back and fill them in on later time.
	Like that I can look at idea from others	
	Very stimulating to know what others think and knowing other people also helping with your feedback.	

Table 11: Results usability test round 3 of participant 7

10.6.4. Conclusion

All in all, the last round of usability testing led to new suggestions on how to further improve the application. Even though I liked the idea of implementing a swipe version, I decided not to go for it because seeing as the average user of the EatMyRide application is around 40, the swiping would not be fitting for that specific age group. Changes that will be made for the final prototype are

- Change the one-word to multiple words
- Add a possibility to check out ratings
- Add a top three of most liked ideas.
- Leave out wishing to the double feeling.

10.7 Fourth prototype

After the third round of usability testing, big steps were taken into finishing the prototype within React Native. However multiple changes were made in the concept itself. Starting with adding the possibility for users to the suggestions from other users as a word cloud view and a list view, see figures 37 and 38. In figure 37 the word cloud view has two colors, like the two colors used for the list view in figure 38. The green words are the top three ideas while the blue ones represent new ideas. Because the cloud view must stay readable it has a maximum of ten ideas. While in the list view the user can scroll down and see all the suggestions, see figure 38. The suggestions that are not in the top three are ordered on newest first. On the left in the Suggestion List-view a timeline is added which is like the EatMyRide timeline on the plans page, to keep it consistent and let similar design choices come back in the feedback feature as well. The top three ideas are added based upon the feedback from usability test round 3 and are determined on the number of likes the suggestions have gotten. In the Suggestion List-view each box has two icons on the right. The first icon shows the number of likes and the second icon indicates the status of EatMyRide. There are in total four different statuses:

- Question mark in grey → No action is taken yet
- Feedback box with an eye in orange → EatMyRide has read the suggestion
- Three lines with a pen in blue → Suggestion is put on the backlog
- Cog in green → EatMyRide working on it.

These statuses give users an idea of how far along the EatMyRide application is with their feedback and shows users the impact their feedback has. Users can add new ideas on both the suggestion cloud as well as the suggestion list view by pressing on the plus in the top right next to or underneath the name suggestion list.

The possibility to easily check out your own suggestions was added as well, see figure 39. On this page is a list with all own ideas, based on the newest first, is displayed. The user can easily edit their idea and see the status of their suggestion.
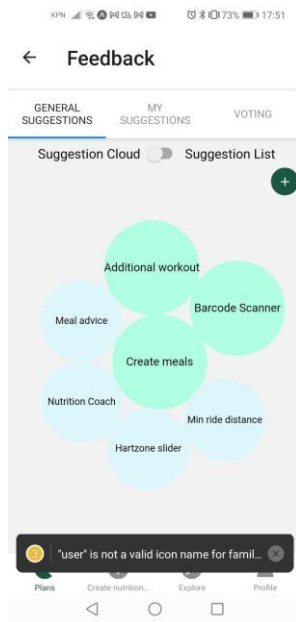
Figure 37: Suggestion cloud view

Figure 38: Suggestion List view
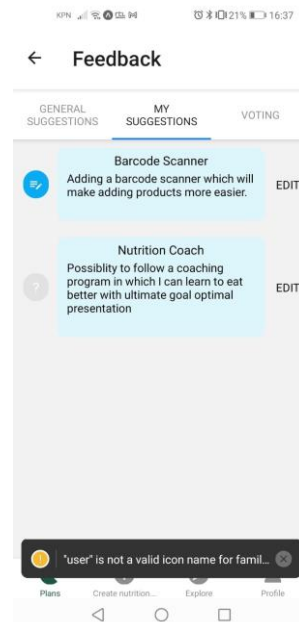
Figure 39: My suggestions page

Lastly, there is a voting page added in which users who press the pop-up to vote away can find the rating of an idea at a later time, see figure 40. Users are asked to read the ideas and then rate them. The phrasing of the question if users have a suggestion to improve the application was changed from one-word into a few words instead, see figure 41. Also, I created the voting pop-up in which users are asked to read the idea and then rate it. The design of the pop-up is like the previous designs of the pop-up. Moreover, the users can add a comment if they want, see figure 42.
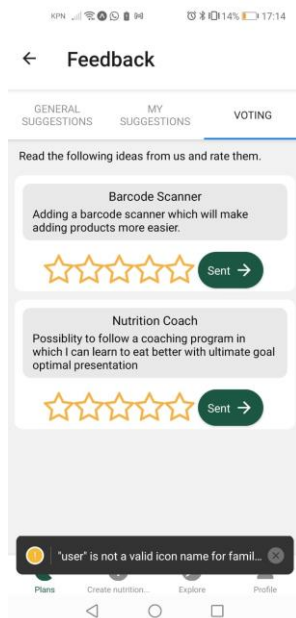
Figure 40: Voting page
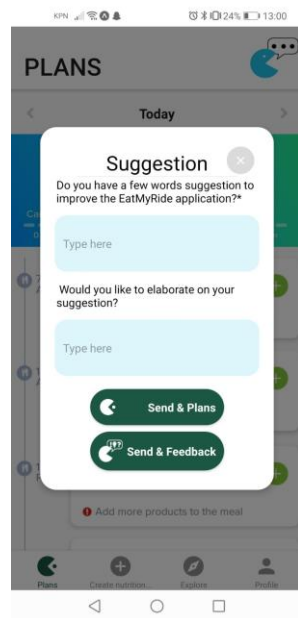
Figure 41: Suggestion pop-up
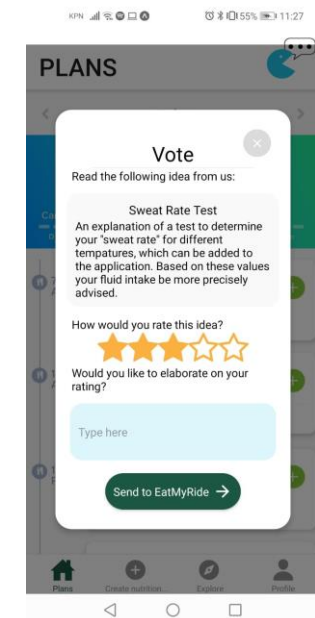
Figure 42: Vote pop-up to rate an idea

Chapter 11: Evaluation

In this chapter, an evaluation is done on the fourth prototype. This evaluation was done with the client as well as the last participant from the user study, both evaluations were done online. For both evaluations first, the prototype is shown and explained followed by multiple questions about the prototype and ends with a system usability scale[25]. For the complete list of questions and the statements that were asked see appendix 11. The results of the questions will be first separately discussed for both the participant and the client and following that a combination of the results from the statements is shown.

11.1 Evaluation with participant 8

Similar to the previous three usability test rounds, the participant was first asked questions about his experience with the EatMyRide application, see 9.3.2 and appendix 9 for the results. As with the previous start of the usability tests first, the participant was asked to which persona on feedback, he identified most with he identified himself as a privacy tolerant and socially ostentatious and perfectionist. Hypothetically he mentioned he would use the prototype about two or three times a year. What he disliked the most about the prototype were the pop-ups, this is because in general he finds pop-ups very annoying and does not fill them in on the principle that he hopes that companies stop using them. His suggestion is also to leave out the pop-ups and make the feedback feature as attractive as possible. What he was most enthusiastic about was the suggestion list because he liked knowing the status of previously mentioned suggestions and seeing that if his suggestion is worked on that would motivate him to add more suggestions/ideas.

11.2 Evaluation with EatMyRide/client

During the evaluation with the client after showing the prototype, the client's first reaction was that in a general sense it looked nice. However, from a user-interface point of view he had a multitude of small suggestions on how this could be improved:

- Now to switch between SuggestionCould view and SuggestionList there is a switch, would not a radio button work better?
- When seeing the SuggestionList for the first time the colors were very overwhelming, try to use more calm and gentle colors.
- On the pop-up for suggestions there currently two buttons (Submit & plans; Submit & Feedback), why not create one default button and one secondary button. Also, try to change the text because it is unclear what is meant with Submit plans, and with the icons, it feels very overwhelming.
- The colors used; the green and the blue are not precisely right, try to play a bit more with them.
- Play around with the font-weight, what words should be bold, which ones should be light etc.
- For the rating of the ideas-page, see figure 39, is a send button necessary? What about implementing a rating carousel?

By implementing these suggestions, the information transfer to the users will be better. When asked what the client was most enthusiastic about, he mentioned the SuggestionList, because he likes the concept of having other users give likes and seeing other users' suggestions, creating a community.

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[25] https://usabilitygeek.com/how-to-use-the-system-usability-scale-sus-to-evaluate-the-usability-of-your-website/ Last visisted (30/06/2021)

11.3 Result System Usability Scale

Both participant 8, as well as the client, were asked hypothetically to give their responses to the statements, the statements can be found in appendix 11. This led to the following results shown in table 12.

Statement	1	2	3	4	5	6	7	8	9	10	SUS[26]
User	3	5	2	4	2	5	1	4	2	4	80
Client	2	4	3	3	1	3	2	4	1	3	70
Average	*2.5*	*4.5*	*2.5*	*3.5*	*1.5*	*4*	*1.5*	*4*	*1.5*	*3.5*	*75*

Table 12: Results from SUS-Score from participant 8 (user) and client

For interpreting what the SUS score means I used the table shown in figure 43. The average SUS score based upon the two results from the participant and the client led to an average of 75 see table 12. This means that the rating based upon the SUS would be a B, Good. Meaning that there is still room for improvement on the usability of the feedback system however it already got a good score.

Figure 43: Interpretation of SUS-score[27]

11.4 Conclusion

In conclusion, there are still some design suggestions on how to further improve the feedback system on a user interface. Moreover, it can be concluded based upon the results from the SUS that the usability of the feedback system is currently already good but can be further improved to get to an excellent score.

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[26] https://uiuxtrend.com/sus-calculator/ Last visited (30/06/2021)

[27] https://uiuxtrend.com/measuring-system-usability-scale-sus/#interpretation Last visited (30/06/20210

Chapter 12: Final prototype

After the evaluation with the client and participant, a few changes were already implemented leading to the final prototype, which will be described here. Moreover, the suggestions that were not implemented are also mentioned here for future improvements. Next to this the protocol and a database as a start for the backlog are mentioned and described.

12.1 Feedback system

After the evaluation small changes were made which led to the following final prototype that can be seen in figures 44 to 51. Each figure, the final changes to the prototype will be mentioned. In figure 44 and 43, the top right + button that was in the previous prototype was removed and on the MySuggestions page, a possibility to add a suggestion is created, see figure 47. The name of the page is also changed from general suggestions to community suggestions to make it directly clear to users opening the feedback feature that the suggestions are from other users.

Multiple changes were made to the SuggestionList. Firstly, the status icon was put underneath the name of the suggestion instead of next to the like button and all suggestion icons are put into the same color. Secondly, a small explanation is added behind the status icon so users can easily read what the icon means. The choice was made to keep all the status icons in the same color to keep the layout calm and not too busy and overwhelming. As mentioned earlier users can press on the different boxes with separate ideas, when they do a pop-up appears. An example of this pop-up is shown in figure 46, in the example, the name and an explanation of the idea are shown. Next to the name of the suggestion two buttons, a like and dislike button are displayed as well as the possibility to leave a comment. Currently, in this version, the buttons do not work but for future implementation, these will have to be made working as well as that the comments need to be further worked out. As of now users can only type in an input and nothing is done with it.

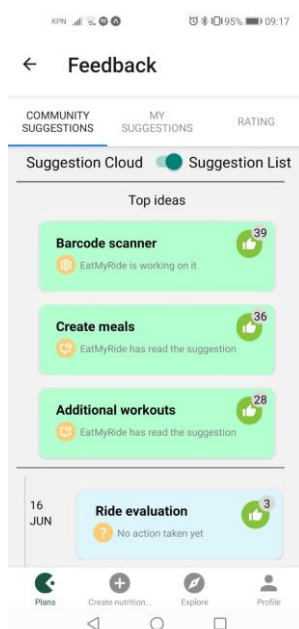**Figure 44: Suggestion cloud final prototype**
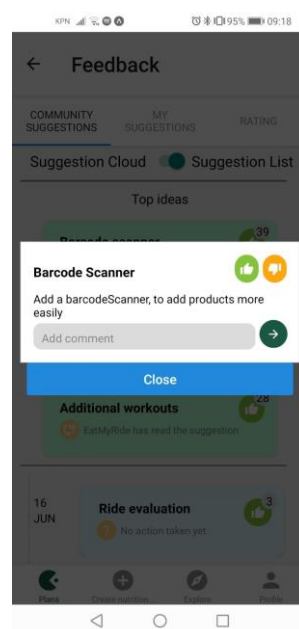
Figure 45: Suggestion List final prototype

Figure 46: Example of pop-up explanation of a suggestion
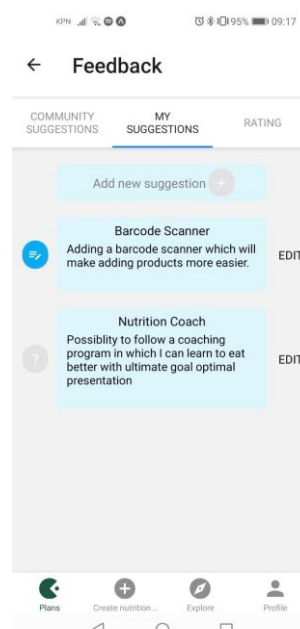
Figure 47: My Suggestions page

Where the name of the suggestions was changed from general to the community, so was the name of Voting changed into Rating, see figure 48. This was done because the users are asked to rate each idea individually, users are not asked to vote between options A and B. Also, on the Rating page, two things were changed and added: the phrasing at the top for asking users to give their opinion and when users press the Send button, a pop-up will appear to notify users that their rating is sent, see figure 49. Seeing as that the name from voting was changed into rating the pop-up created called voting was also changed into Rate, see figure 50. Other than that, the pop-up has stayed the same, with an idea, users being asked for their star rating followed by the possibility to leave a comment. The only changes made to the suggestion pop, shown in figure 51, was the phrasing of the first question, the phasing in the previous prototype was quite vague and unclear so it was changed into the following question: "Do you have a suggestion to improve the EatMyRide application?".
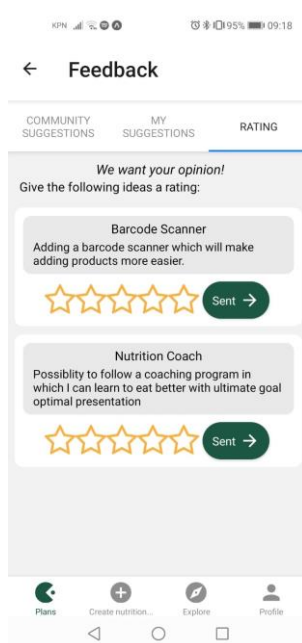
Figure 48: Rating page
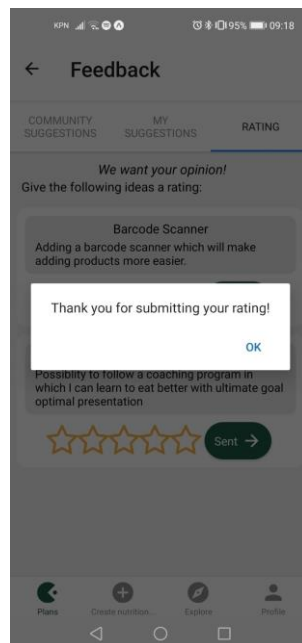
Figure 49: Acknowledgement pop-up
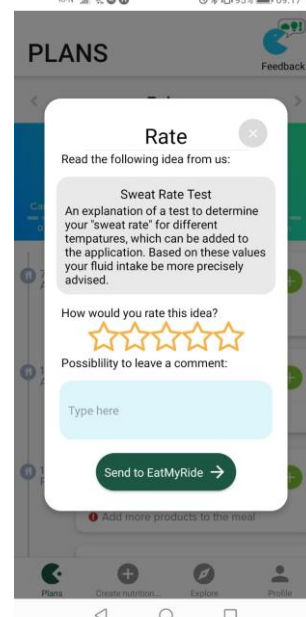
Figure 50: Rating pop-up
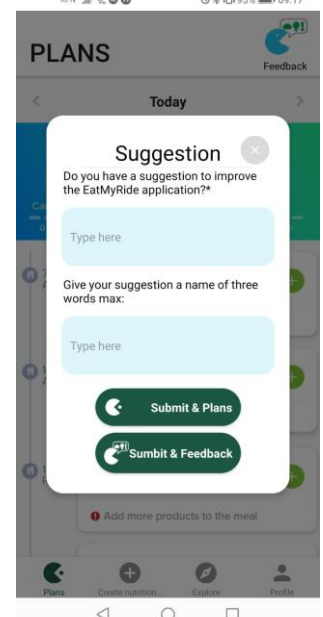
Figure 51: Suggestion pop-up

12.2 Protocol

In figure 52 it shows the protocol fitting to the feedback system for the EatMyRide. In this, it shows that every three months a pop-up, either a suggestion or rate, can send users can either respond or ignore the pop-up. If users give a suggestion, the suggestion is first checked by the EatMyRide on duplicates. If it was not a duplicate the suggestion appears in the application on the community suggestions pages both cloud and list. Users can then like and dislike the suggestions. If the idea is liked 5 times, the EatMyRide reads the suggestion in-depth, if the idea is liked 15 times the idea is put on the backlog and if the idea is liked 30 times the suggestion is going to be worked on. The 5, 15, and 30 likes are a guess and can be later altered to the wishes of the EatMyRide application. The status of the idea will be changed on the status page and users can continue liking the idea. If 30 likes are given the ideas are going to be worked on, in which alterations can be made and to validate the suggestion the last time the idea can be validated.

For validating ideas either a user can give a rating by responding to the pop-up or going to the rating page within the feedback feature. When users give the rating, this is put into a table and after x amount of time, can be a week can be 2 weeks, the ratings are checked and EatMyRide decides if they want to implement and develop the idea or if they want to discard the idea. After the idea is implemented, the protocol goes back to the first step, finding new ideas to implement.
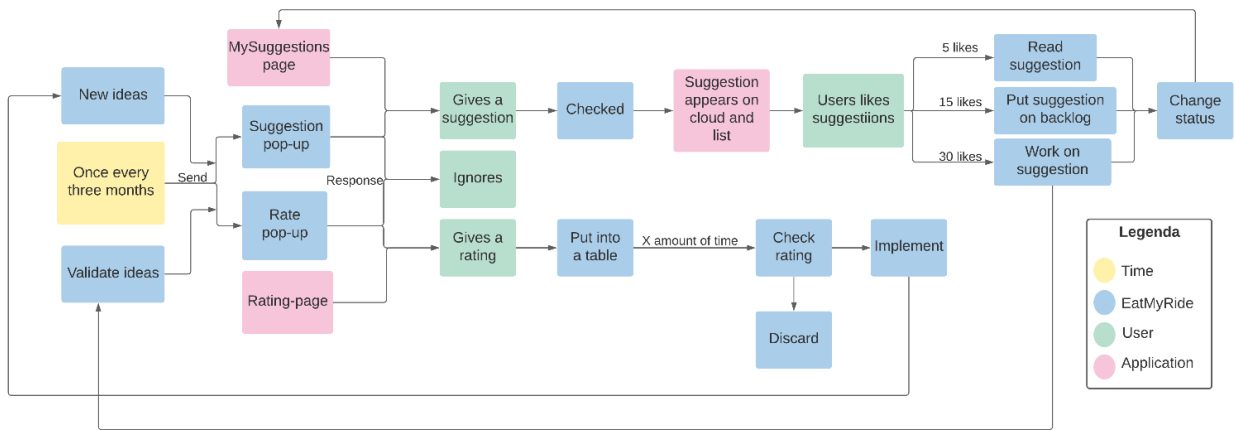
Figure 52: Protocol for using for asking feedback[28]

12.3 Start on database

Due to the complexity of creating a database and a limited amount of time, I was unable to create a working prototype based on a database. This means that the data that is showcased is a standard array implemented into the code. For implantation into an application, these in- and outputs need to be connected to a database with multiple tables. Inputs are, for example, the suggestions users give, when a user likes an idea or when a user rates an idea. All these different inputs need to be collected into a table and in the case of suggestions all answers must be checked for duplicates or similar suggestions. This can either be done by a person or an algorithm can be made that checks this. Also, by collecting the answers from users in a database the output, the list, and word cloud code could be changed from an array to reading the database file, updating itself automatically after the suggestions are checked. A starting point for this database was made see figure 53. In this figure, there are seven tables. The three main tables are user, suggestions, and rating_answer. In the user table, there is main information about the user who sends the suggestion or rating so this person could be later contacted if necessary. In the suggestions table each suggestion is stored with the user id, and a status which is by default: no action is taken yet. In the rating_answer the answers from users on different ideas are stored and can be later on checked.
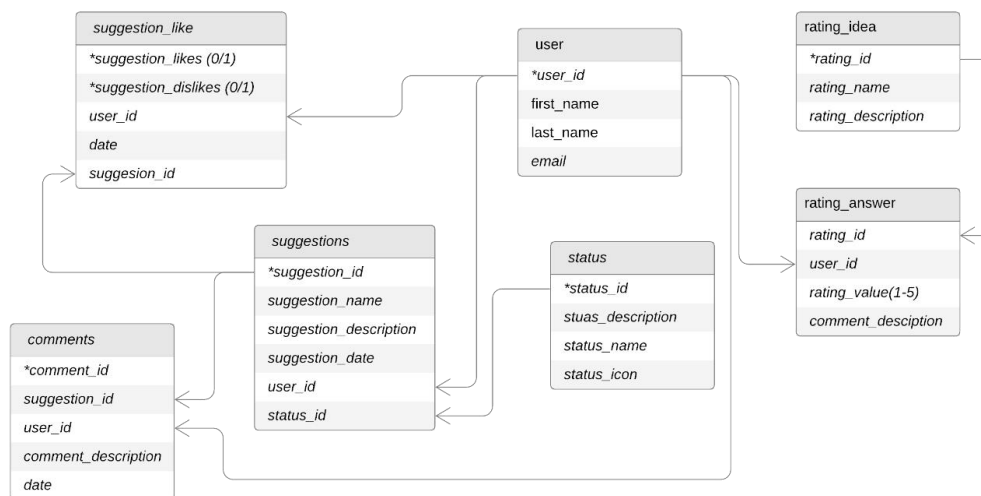
Figure 53: Database for prototype[28]

12.4 Future implementations

For future implementations, the following suggestions and ideas need to be considered and worked out. These suggestions are based upon feedback from all the input from users and clients during usability tests and evaluations and on self-evaluation of the prototype. There are two types of suggestions: design suggestions focussed on the user interface and back-end suggestions focussed on the programming of the feedback system. Each type will be discussed separately.

12.1 Design suggestions
Switch between views

To switch between the suggestion views, cloud, and list, there is currently a rather simple switch. This switch should be created into a more understandable switch by for example creating a switch that has both words inside the switch and by pressing on the name the user goes to that view.

Phrasing

The phrasing of both the question of the suggestion pop-up as well as the phrasing at the beginning of the rating page still needs some tuning to make them even clearer and stronger.

Readability

The Suggestion Cloud-view currently shows the different suggestions in quite a small font which makes it a bit hard to read. To make it easier to read for every user, the words should be made bigger and there should be a margin created around each circle so there is a clearer indication of the different circles.

Buttons

At the end of the suggestion pop-up, there are currently two green buttons. The first one states Submit & Plans, and the second states: Submit & Feedback. These buttons are unclear as to what exactly is meant, and the buttons must be relooked at. An idea for improvement is to create one primary button and add a secondary button that gives users to go to the feedback feature and check out the different

12.2 Back-end suggestions
Pop-up display for suggestion cloud

Similar to the possibility to press on the different suggestions on the suggestionList view that possibility should also be added to the suggestion cloud view. I was unable to do this due to time constraints and my limited experience with the library that I used for creating the cloud view.

Create Like and dislike buttons

The dislike and like button that users see when they press on a suggestion currently is only an icon and nothing happens when is pressed on. For implementation, these icons have to be made into buttons and linked to a table that counts the likes and adds +1 when someone gives a like.

Working database

As mentioned also in section 12.3 for implementation of the feedback system the feedback system has to be linked to the database so the suggestions and ratings are somewhere collected and from that table can easily be called to display on the SuggestionCould and SuggestionList.

Chapter 13: Discussion

In this chapter, the complete project will be discussed. This will include a discussion on the research questions and limitations of this study. And end with future work recommendations for this project but also gives suggestions for future designers wanting to design a feedback system.

13.1 Research questions discussion

The goal of this project was to develop a feedback system that fosters creativity from a user-centered approach for the EatMyRide application. To do this first literature research into creativity and different feedback systems was done. This research resulted in answering the following two research questions:

"What fosters creativity in providing feedback about user's needs?"

"What kind of systems are being used to get feedback from users?"

The first research question about creativity resulted in a clear definition of creativity, multiple environmental changes that can influence creativity, and a table of different creative thinking methods. The answer to the second research question about different feedback systems led to an overview of different systems that are currently used and the limitations of the current feedback systems, which created a set of requirements the feedback system had to meet. These requirements were: minimize feedback channels, use semi-structured feedback, and have the feedback within the same platform. Based upon these findings and requirements, the feedback system was designed to be a built-in feature for the EatMyRide application. By having one central feedback feature users can easily use it to report their feedback. Currently, the feedback system is only for reporting a suggestion because users can be most be stimulated to creative answers. Moreover, in reporting a suggestion users can also add the reason for the suggestion. Moreover, a semi-structure form is used, users must add a name for their suggestion, this way developers easily see what it is about before reading the explanation.

After the background research and answering the first two sub-research questions, I could start with the designing of the feedback system. This was done in multiple phases: ideation, specification, realization, and evaluation. Through these phases the following three sub-research questions were answered:

"How can creativity be incorporated into a user-centered feedback system?"

"How can proposed ideas from EatMyRide be validated by users before technical development?"

"What should be the protocol for asking for feedback about the EatMyRide app?"

The first sub-research question is almost completely answered in the ideation phase. In the ideation phase to foster creativity, the creative thinking methods are adapted and incorporated into the feedback system. This lead to multiple ideas such as incorporating reverse thinking or a word cloud. The two chosen ideas in the ideation phase were: checklist, since it is as simple and clear, the word cloud since it is unique and different in the way it is viewed. In the specification phase two more creative thinking methods: bad ideas and wishing were added but are later during realization removed again. The bad idea component was removed because it caused too much confusion among users and the technique could not be correctly implemented because then it would take longer than the average 2-5 minutes that users would be willing to give feedback. This average is based on the results from the online survey. The wishing can still be implemented for future work, but I left it out because of the usability test with a user in which the user pointed out it would not be necessary since you can add suggestions all year long and it would become too much otherwise. I agreed with his statement and left the wishing out as well, however, this could be easily implemented for future work if EatMyRide does want to add it.

The second sub-research question about validating ideas is the other part of the feedback system. To validate ideas during the ideation phase two different solutions were chosen: voting and later thinking with rating. However, this was later changed to rating, without the lateral thinking part, and ranking.

The decision was made to not add an image or visualization to the rating and ranking because often an idea/feature exists of multiple screens. Moreover, if the feature is not yet developed the image could be misleading and the idea might get biased responses because users rate the idea based upon the image and not the explanation. So, to make sure users only rate based upon the idea itself only an explanation will be given. The other idea was a ranking of different ideas so multiple ideas could be tested. Eventually, I have chosen to only implement the rating since it will individually give each idea more information. The ideas can often differ, and the results are harder to analyze if it is ranked instead of an individual 1–5-star rating.

The last sub-research question, the protocol, can be found in chapter 12. This protocol is based on the different protocols created in the ideation phase, tested in the specification, and refined according to the results from the online survey and input from the user study. This protocol displays the number of times users are asked, the complete process of how the feedback is given, starting with a pop-up asking for a suggestion and ending with what the EatMyRide does with the feedback.

What was most unexpected during this project was how using personas, with each having a different perspective towards giving feedback, made me really design from those perspectives. Also by asking participants from the user study which type they relate most to made me realize even though my focus during the ideation of the concept was focused on creating a feedback system for the privacy tolerant and socially ostentatious the feedback system also worked for the other personas. For each persona was something else they liked and would use. For example, the users from the user study that identified themselves with impact seeker indeed found that seeing the status of their feedback very motivating to give feedback. Using these personas and asking users to identify which one they relate the most from led to surprising answers sometimes, but the most important that always came back was impact. Users want to be aware of what kind of impact their feedback has. Moreover, during the background research, this was also an important factor mentioned to improve response ratings. The visualization of impact status was also based upon existing feedback platforms mentioned in the state-of-the-art.

13.2 Limitations

There are several limitations in this research that need to be addressed. The first and most important limitation is the time of this research. Due to the time constraint and the scope of the graduation project I was unable to answer one of my research questions. Sub-research question 3:

> "What feedback system design is most stimulating creativity while being accepted by users of the EatMyRide application?"

To answer this question it is important to know the definition of creativity and how to test creativity. Based on my background research I felt that my knowledge was too limited on how to properly test answers on creativity and I had not enough time to do this research in the scope of my graduation project. Moreover, the question could also not be answered because the prototype is not tested on users of the EatMyRide.

Another limitation is that all used participants, online survey and user study, do not represent the users of the EatMyRide application correctly. The participants of the user study were users Lukas Vugts and I asked to use the application, 'creating' users. The online survey had a very low response which also could not represent the complete user of EatMyRide correctly.

13.3 Future work

Chapter 12 ends with a list of future implementations for future work these suggestions should be implemented and tested with the EatMyRide users. Next to that, some key elements should be researched:

Firstly, research into how to test creativity and how to test responses from the feedback system on how creative they are should be done. With this research, the created feedback system can be tested if it is indeed more creative stimulating than a standardized feedback system such as email or a feedback form. This could be done with an A/B test, in which users randomly are shown either version A(prototype-feature) or version B (standardized feedback form) to test which performs better[29].

Second, research needs to be done into the motivation and engagement of users and how to better stimulate this. Also, in specific for the EatMyRide company since each product is different in engagement and use. Moreover, it can be tested if this feedback system also heightens engagement into giving feedback among users.

Thirdly, research into building persona's can be done. As mentioned previously, by targeting the correct users the feedback will also be more useful and heighten the response rate. By researching how best to create personas and building them upon the user input, the feedback system can build to target the different kinds of users and it can be used to show users to each other what different users want.

Next to suggestions for future work here are a few tips to keep in mind for future designers on how to to create a feedback system. Firstly, know what you want and are looking for. It is important before starting that you as a designer know what kind of feedback you want from users. This can be dependent on the different variables such as the types of feedback there are (problem, suggestion, bug) and how specific or general you want feedback. For very specific feedback a different design is needed than for general feedback. Secondly, think about it from a user perspective and think about how you can show the impact their feedback has. Often users are looking for what is in it for them to give feedback, state this clearly, how precisely is up to you. Maybe even educate your users on what you are looking for in the feedback and how they should write. Make the feedback system if possible personalized so users will feel appreciated and thanked for their effort. Lastly, involve your users in the designing process, either these can be real users or if that is not possible, create personas so you know for whom you are creating it. Based on this you can target their specific needs and wishes of what the feedback system should look like.

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[29] https://www.optimizely.com/optimization-glossary/ab-testing/ Last visited (28/06/2021)

Chapter 14: Conclusion

Starting, EatMyRide was searching for a way to make their application more user-centered. They wanted to achieve this through a feedback system that was creativity stimulating. This led to the following research question:

> "How to develop a feedback system that fosters creativity giving an insight into users' needs from a user-centered approach for the EatMyRide app?"

During the research phase, multiple ideas and points of attention were found to consider before creating a feedback system, such as educating the audience and the importance of showing users the impact of their feedback. Next to literature research, a state-of-the-art review was done on how different companies collect feedback and what kind of different platforms are already out there used by companies to collect feedback. A search was also done into an application relatable to EatMyRide.

With these findings, I started the ideation phase. I did this by coming up with ideas for a feedback system and focus on how it could foster creativity. I did this by implementing creative thinking methods into the feedback system to stimulate creativity. The chosen concepts were adaptations of the mind map and checklist creative stimulating methods. During the ideation, I also started thinking of how the feedback system could create an experience and came up with multiple visualizations and protocols so that the feedback system can be better integrated with the EatMyRide application.

With paper prototypes of the concepts, the visualizations, and protocols a concept testing was done with EatMyRide to gain insight into their preferences and ideas regarding the feedback system. Based upon the input from EatMyRide the concept was re-evaluated which led to a new idea and points of attention for the realization of the concept. Also, an online survey and a user study were done to gain insight into the users of the EatMyRIde and learn about their wishes and needs for the feedback system. The online survey led to the conclusions on how long and how often users would be willing to give feedback. The user study gave a better understanding of the interaction between the user and the EatMyRide application.

During the realization, the feedback system was realized into a real product. First, the prototype was purely front-end, created with Adobe XD. Later, the prototype was built with a back end in React Native. In total four iterations were made before coming to the final prototype. After each iteration of the prototype, a usability test was held with multiple users from the user study, based upon the feedback from those users and my own evaluation the prototype was refined. After the fourth iteration of the prototype, an evaluation was held with the client as well as one final user from the user study. This resulted in some final changes to the fourth iteration that led to the final prototype.

The final prototype is a combination of users being able to add their suggestions on how to improve the application, EatMyRide being able to validate their ideas by asking the user to rate it, and a community experience between users on how they experience the EatMyRide application. The feedback system has implemented an important factor for users: knowing the impact of their feedback.

Concluding, this research shows how a feedback system, that fosters creativity, was developed from a user-centered approach. By implementing a creative thinking method, it fosters creativity and by involving users at multiple different times of process the system is created to the wishes and needs of the users from the EatMyRide application.

Appendix 1: Information brochure & Consent forms

Information Brochure
How to develop the EatMyRide app in a user-centered approach?
Developing a feedback system to provide new insights on future developments,

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Graduation project for Creative Technology in collaboration with EatMyRide

Background

Nutrition is a vital part of the cycling experience, even for amateur riders. EatMyRide is a mobile application that gives personal and professional nutrition advice to endurance athletes. The application can be used on a Garmin cycling computer or smartwatch and can provide notifications during the sports activity, to make sure the user eats the right food at the right time.

To further develop the application and provide the functionalities that cyclists need, EatMyRide wants to redesign using user-centered design. That is where I, as a creative technologist, come in. This is part of my bachelor graduation project and my goal is to develop a tool that allows EatMyRide to align the development with the user's needs.

This brochure will explain the project's procedures and answer frequent questions.

Participant Types

Amateur riders
These are cyclists that train 1-2 times a week with around 50km per ride. Affinity with EatMyRide or another nutrition app is not required.

Fanatic riders
These are cyclists who train or want to train 3-5 times a week with around 200km weekly basis. Affinity with EatMyRide or other nutrition apps is not required.

Professionals from TeamDSM
TeamDSM is a professional cycling team based in Deventer. Participants from the team will be the coach, nutritionist, and cyclists, which likely will be contacted through online means.

Research Types Plan

Type 1: Questionnaire
An online questionnaire will be sent via email for you to fill in. Here you will be presented with questions regarding giving feedback. There might also be concepts and features for the EatMyRide app, and you will be asked for input on these. Also, there will be some questions about your needs as a cyclist.

Type 2: Interview
During the interviews, the researcher will ask you to do certain tasks and observe how you handle them. These tasks may include interacting with the application, filling out a diary or taking pictures

of, for example, your sports nutrition. Additional questions might be asked on why you do certain things. The goal of this research is to gain as much insight and understanding of cyclists as possible.

Type 3: Observational research
During the observational research the researcher will follow along with a training. The researcher won't interfere with the training itself but will ask you questions about it before and/or after the training, like research type 2 above.

Type 4: Evaluation user-test
During these tests, you will be asked to interact with a (finished) prototype and perform certain tasks, to evaluate the usability of the application. The researcher will note your responses and might ask additional questions along with your actions.

Participation Information
Participation is completely voluntary and you can decline or withdraw from the research at any time. The maximum duration of participating will be one hour, unless indicated differently. You will be asked to sign a consent form to use your data and participation in the study. There are no costs connected to participation and in case you're asked to download the EatMyRide application, this will come with a premium membership, free of charge.

GDPR
What data will be collected?
Depending on each type of research a different kind of data will be collected. See the table to see per type what kind of data will be collected.

Type 1	Answers to questionnaire
Type 2	Answers to questions, written notes, if online a recording of the interview (with permission of participant)
Type 3	Written notes of the observation, pictures (with permission of participant)
Type 4	Written notes, answers to questions, recording of user test (with permission of participant)

Table 3:

How will the data be stored?
Data will be securely stored according to the GDPR guidelines with correct encryption in place and will be anonymized as early as possible. Data is stored for as long as deemed fitting for the research, according to VSNU guidelines.

How will the data be used?
Your data will only be used for this research and will help to develop a tool for EatMyRide. The results will be anonymized for use in this graduation project. EatMyRide will have access to the raw data of the survey, however, these results will be completely anonymous. To make the data anonymized the recordings of interviews will be transcribed and the recordings of the user test will be analyzed and annotated, extracting the features and observations, then the original recordings will be deleted. EatMyRide will only have access to the anonymized results.

Who has access to the data?
Only those involved in the research and future research will have access to the data and will not be disclosed to third parties. These persons include researchers and employees and, upon request, these

names will be disclosed. No personal information will be shared with EatMyRide, but the anonymized results.

Can I have my data deleted?
In case you decided to withdraw from the research, all identifiable data collected up to that point will be deleted. At any given time, you can request your personal data to be deleted.

COVID-19
In case of in-person contact, everything will be done to adhere to the current COVID-19 regulations. Most contact will take place online, outside, or in a well-ventilated room. The researcher will keep 1.5 meters distance and a face mask at all times. You have the right to withdraw from the research at any time, also when you feel unsafe due to COVID-19.

Debrief
After the research is over, you will be debriefed and if you have any additional questions, I will try my best to answer them. Please contact the secretary of the Ethics Committee via *ethicscommittee-cis@utwente.nl* for independent advice, in case of resting questions or any complaints.

Informed Consent for Research
'I hereby declare that I have been informed in a manner which is clear to me about the nature and method of the research as described in the information brochure **'How to develop the EatMyRide app in a user-centered approach?'** My questions have been answered to my satisfaction and I agree with my own free will to participate in this research. I reserve the right to withdraw this consent without the need to give any reason and I am aware that I may withdraw from this research at any time. If my results are to be used in scientific publications, to be used by EatMyRide, or made public in any other manner, they will be completely anonymous. My personal data will not be disclosed to third parties without my expressed permission. If I request further information about the research, now or in the future, I may contact Rochelle Spaargaren, *r.spaargaren@student.utwente.nl,* or Lukas Vugts, *l.g.l.vugts@student.utwente.nl.*

If you have any complaints regarding this research, please direct them to the secretary of the Ethics Committee of the Faculty of Electrical Engineering, Mathematics and Computer Science at the University of Twente, email: ethicscommittee-cis@utwente.nl.

Signed in duplicate:

....
Name

....
Signature

I have provided explanatory notes about the research. I declare myself willing to answer to the best of my ability any questions which may still arise about the research.'

....
Researcher

....
Signature

Informed Consent for Online Research

'I hereby declare that I have been informed in a manner which is clear to me about the nature and method of the research as described in the information brochure **'How to develop the EatMyRide app in a user-centered approach?'** My questions have been answered to my satisfaction and I agree with my own free will to participate in this research. I reserve the right to withdraw this consent without the need to give any reason and I am aware that I may withdraw from this research at any time. If my results are to be used in scientific publications, to be used by EatMyRide, or made public in any other manner, they will be completely anonymous. My personal data will not be disclosed to third parties without my expressed permission. If I request further information about the research, now or in the future, I may contact Rochelle Spaargaren, *r.spaargaren@student.utwente.nl,* or Lukas Vugts, *l.g.l.vugts@student.utwente.nl.*

If you have any complaints regarding this research, please direct them to the secretary of the Ethics Committee of the Faculty of Electrical Engineering, Mathematics and Computer Science at the University of Twente, email: ethicscommittee-cis@utwente.nl.

For an online survey consent form the following information will be added to confirm the consent of the participant:

By continuing to the next page indicates that:
- You have read and understood the above information
- You understand that EatMyRide will have access to your anonymized raw data
- You voluntarily agree to participate
- You are at least 18 years of age

If you do not wish to participate in the research study, please decline participation by closing this browser window.

For an online interview the following question will be asked to confirm the consent of the participant:

Before starting the interview and recording the researcher will ask the participant if he/she consents to the here above-stated consent. If the participant does, the recording will start and the question will be repeated so that there is proof of evidence.

Appendix 2: Client interview questions

Target groups

You identified three target groups: amateur, fanatic and professional

1) How did you determine the target groups?
2) How are the different target groups currently used?
3) How strict are you in using the target groups?

Feedback

4) Why is feedback important for you?
5) How was the choice made for a feedback system?
6) What is your preference for the kind of feedback?
   a. Specific feedback (a button does not work) or broader feedback (features)
   b. Feedback on functionality/features? Or problems?
   c. Do you wish for a division in the kind of feedback per user group?
7) What questioning is used to ask for feedback (Present and future)?
   a. Rating
   b. Open questions
   c. Closed questions
   d. Statements agree/disagree
8) How do you want to have the feedback system implemented?/Where should users give their feedback?
   a. As a popup/notification or as an implemented feature or both?
   b. Push/pull feedback? Who takes the initiative to give feedback (user or company)?
   c. Differs the questions depending on the kind of feedback?
   d. Differs the questions depending on the target group?
9) What happens currently with the received feedback (the process of analyzing feedback)?
10) How is the feedback analyzed and is the feedback used?
11) How do you analyze the feedback?
12) And how would you want to analyze the feedback in the future? (per group or development)
13) Currently, how are new ideas validated? And are the new ideas self-conceived or are they originating from the feedback from users?
14) How do you want to validate new ideas in the future?
   a. By the EatMyRide company
   b. By users
   c. Machine learning
15) Have you thought about implementing contextual data when users give feedback?
16) What are your expectations of us and the feedback system we are making?
17) What should the focus of the feedback system be on? General feedback on feature requests and problems or experience feedback during the application?

Motivation of users

18) How are you keeping/getting users motivated to give feedback?
19) Are users kept informed about what happens with their feedback? Why/How?
20) Could feedback from user A be seen by other users? As a form of inspiration?
21) Feedback is a two-way street, what are users given in return for giving feedback (reward)?
22) Compliments, coaching, free premium, new features, etc
23) What form of reward would you be interested to use more often in the future, to get users motivated?

Creativity

24) Why is fostering creativity among users during/when giving feedback important?
25) Are you using different creative thinking methods for coming up with new features/ideas for the application? How is creativity used in the development of the application?

Appendix 3: Online user survey

Introduction

Dear sir/madam, in collaboration between EatMyRide and the University of Twente, we need your feedback to further improve and develop the app! This survey is meant to get a better idea about you as a user and what you think about giving feedback. Completing this survey only takes 10 minutes. The survey consists of three parts, about you as a cyclist, your experience with the EatMyRide app, and finally about giving feedback. Participation in this research is completely voluntary and you can decide to stop at any moment.

Ethics

Before starting with the survey, please read the following information carefully.

"I hereby declare that I have been informed in a manner which is clear to me about the nature and method of the research. I agree with my own free will to participate in this research. I reserve the right to withdraw this consent without the need to give any reason and I am aware that I may withdraw from this research at any time. If my results are to be used in scientific publications, to be used by EatMyRide, or made public in any other manner, they will be completely anonymous. My data will not be disclosed to third parties without my expressed permission."

If you request further information about the research, now or in the future, you may contact Rochelle Spaargaren, r.spaargaren@student.utwente.nl, or Lukas Vugts, l.g.l.vugts@student.utwente.nl.

I declare the following:

- I have read and understood the above information
- I am at least 18 years of age
- I understand that EatMyRide will have access to my anonymized answers
- I voluntarily agree to participate

1. Do you accept the conditions stated above? (in case you wish not to participate, please close this survey)

    a) Yes
    b) No (if no survey submit page)

Information about you as a cyclist

2. On average, how often do you cycle? (select one answer)

    a) 4 or more times per week
    b) 2 - 3 times per week
    c) Once a week
    d) Once a month
    e) Other...

3. With whom do you cycle, both now and pre-covid? (select one or more answers)

    a) Alone
    b) Friends
    c) Colleagues
    d) Club
    e) Team

f) Other…

4. Have you ever joined a cycling race or are you planning to in the future? (select one answer)

   a) Yes
   b) No

5. What races have you participated in or want to participate in in the future? (select one or more answers)

   a) Races longer than 3 hours, such as cyclos/GranFondos races
   b) Races shorter than 3 hours, such as team competitions
   c) Tours
   d) Multiday races
   e) Other…

Information about the EatMyRide app

The following questions are about your use and experience with the EatMyRide app.

6. Why did you download the EatMyRide app? (open question)

7. Which version of the EatMyRide app do you have? (select one answer)

   a) Premium version
   b) Free version

8. How often do you use the EatMyRide app? (select one answer)

   a) 2 - 3 times per week
   b) Once per week
   c) Once per two weeks
   d) Once per month
   e) Once per two months
   f) Other…

9. How would you describe your current experience with the EatMyRide app? (open question)

Giving feedback

We would like to know how you feel about giving feedback, to improve the EatMyRide app in the future. An example of feedback is to ask you about new functionality or asking how you liked your nutrition advice.

10. What would motivate you to give feedback in the future? (select one or more answers)

   a) An app that is better suited to the user
   b) Informing other people about my experiences with the app
   c) Showing appreciation to developers for a specific feature
   d) Free premium subscription
   e) Other...

11. Indicate to what extent you agree with the following statements: (select one answer in each row) (strongly disagree - disagree - neutral - agree - strongly agree)

   • I like giving feedback
   • I would like to be rewarded for giving feedback

- When I give feedback, something must be done with it
- I would like to receive updates regarding my feedback

12. At what moment would you be most motivated to give feedback about the EatMyRide application? (select one or more answers)

a) Before the start of a ride
b) During a ride
c) During the break of a ride
d) Shortly after a ride
e) An hour or longer after a ride
f) Other...

13. How often would you be willing to give feedback about the EatMyRide app? (select one answer)

a) Weekly
b) Monthly
c) Semi-annually
d) Annually
e) Never
f) Other...

14. How much time are you willing to spend on giving feedback about the EatMyRide app?

a) 0 - 30 seconds
b) 0.5 - 2 minutes
c) 2 - 5 minutes
d) 5 - 10 minutes
e) 10 - 15 minutes
f) More than minutes

15. Do you currently have any feedback or additions to the EatMyRide app? (select one answer)

a) Yes, namely...
b) No, currently not

Inspiration & Creativity

16. When giving feedback (in the future), for example about an idea for a new functionality, what would inspire you to do so? (Select one or more answers)

a) A frustration in the app
b) Functionality in another app
c) Something missing that a dietitian can offer
d) Other…

17. Please indicate to what extent you agree with the following statements: (select one answer in each row) (Strongly disagree - disagree - neutral - agree - strongly disagree)

- I think I am creative
- I am critical
- I am quickly satisfied

18. Please indicate to what extent you agree with the following statements: (select one answer in each row) (Strongly disagree - disagree - neutral - agree - strongly disagree)

Regarding feedback, I...

- Easily come up with original ideas
- Give feedback that could lead to new features
- Need inspiration from others
- Find giving feedback easily, without specific instructions
- Would describe my feedback as creative

Appendix 4: Results online user survey

1. Do you accept the conditions stated above?

*Single choice, answers **8x**, unanswered **0x***

Answer Choices	Responses	Ratio
● Yes	8	100 %
● No	0	0 %
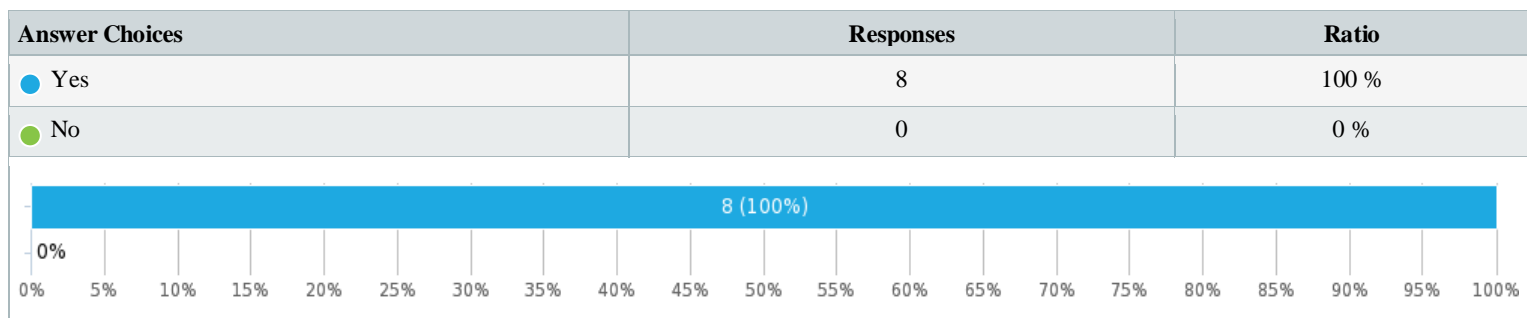
2. On average, how often do you cycle?

*Single choice, answers **8x**, unanswered **0x***

Answer Choices	Responses	Ratio
● 4 or more times per week	4	50 %
● 2 - 3 times per week	4	50 %
● Once a week	0	0 %
● Once a month	0	0 %
● Other...	0	0 %
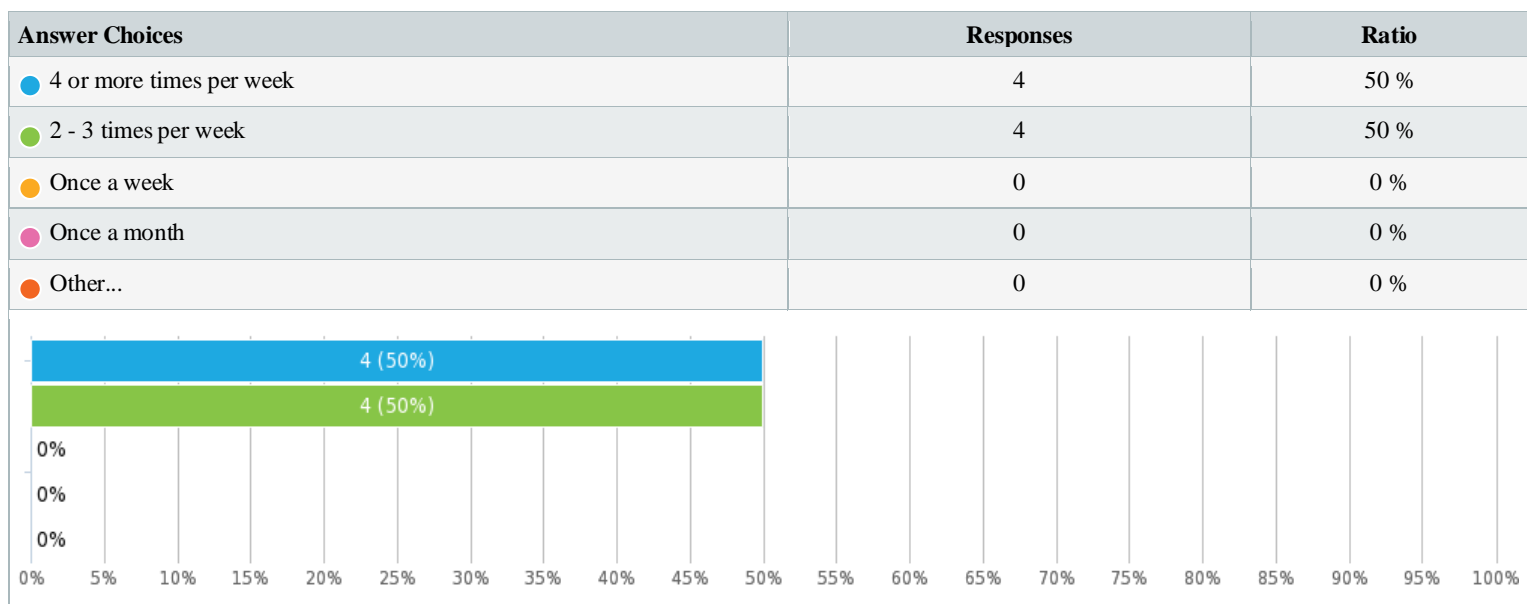
3. With whom do you cycle, both now and pre-covid?

*Multiple choice, answers **8x**, unanswered **0x***

Answer Choices	Responses	Ratio
● Alone	6	75 %
● Friends	7	87.5 %
● Colleagues	2	25 %
● Club	6	75 %
● Team	2	25 %
● Other...	1	12.5 %
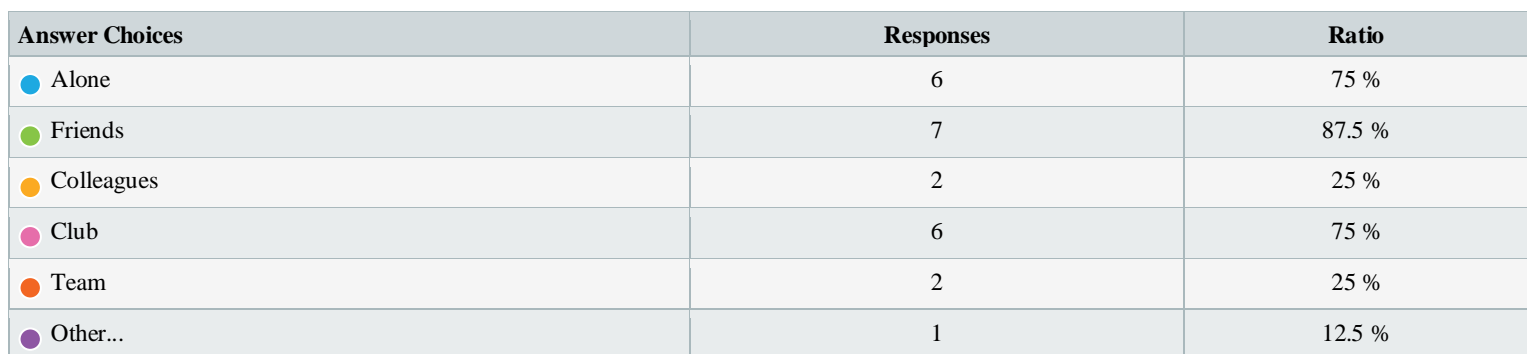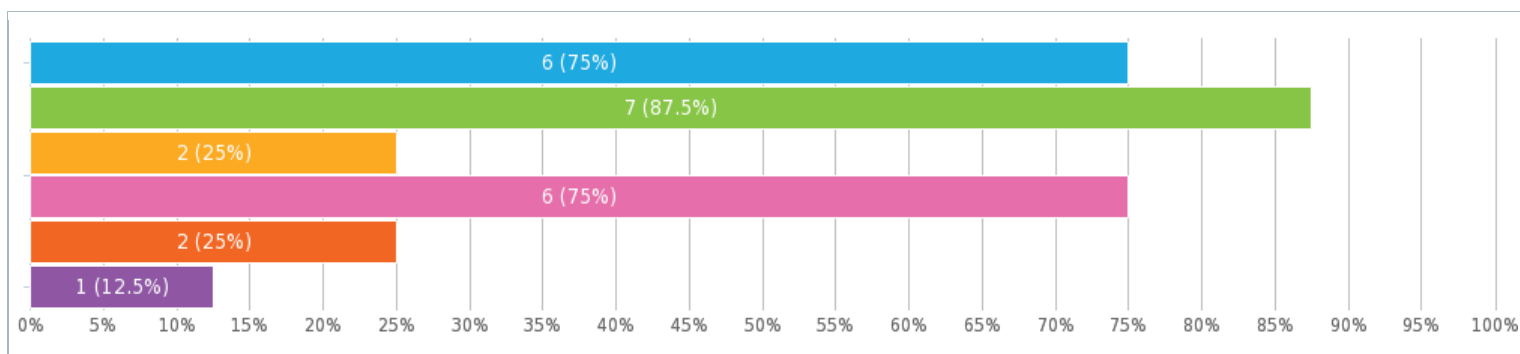
● Partner

4. Have you ever joined a cycling race or are you planning to in the future?

*Single choice, answers **8x**, unanswered **0x***

Answer Choices	Responses	Ratio
● Yes	7	87.5 %
● No	1	12.5 %
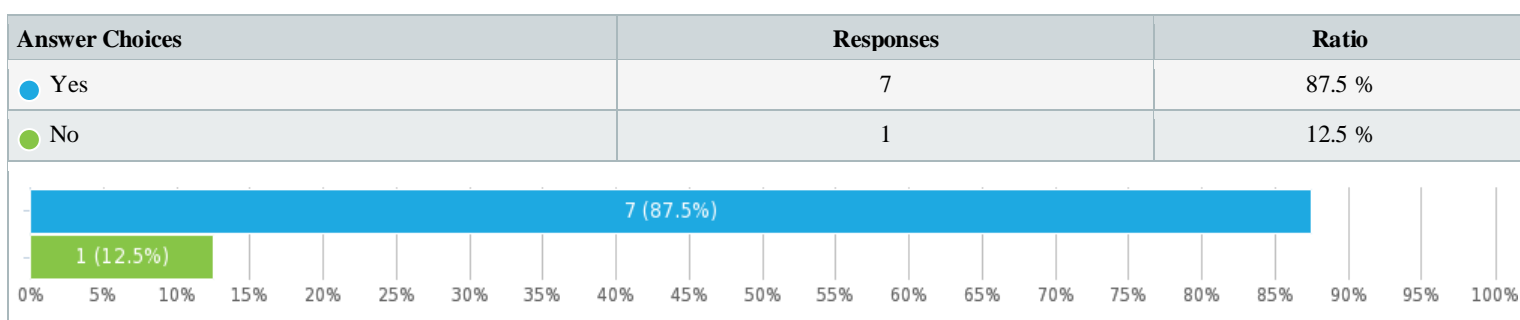
5. What races have you participated in or want to participate in in the future?

*Multiple choice, answers **7x**, unanswered **1x***

Answer Choices	Responses	Ratio
● Races longer than 3 hours, such as cyclos/GranFondos races	5	71.4 %
● Races shorter than 3 hours, such as team competitions	4	57.1 %
● Tours	1	14.3 %
● Multiday races	4	57.1 %
● Other...	0	0 %
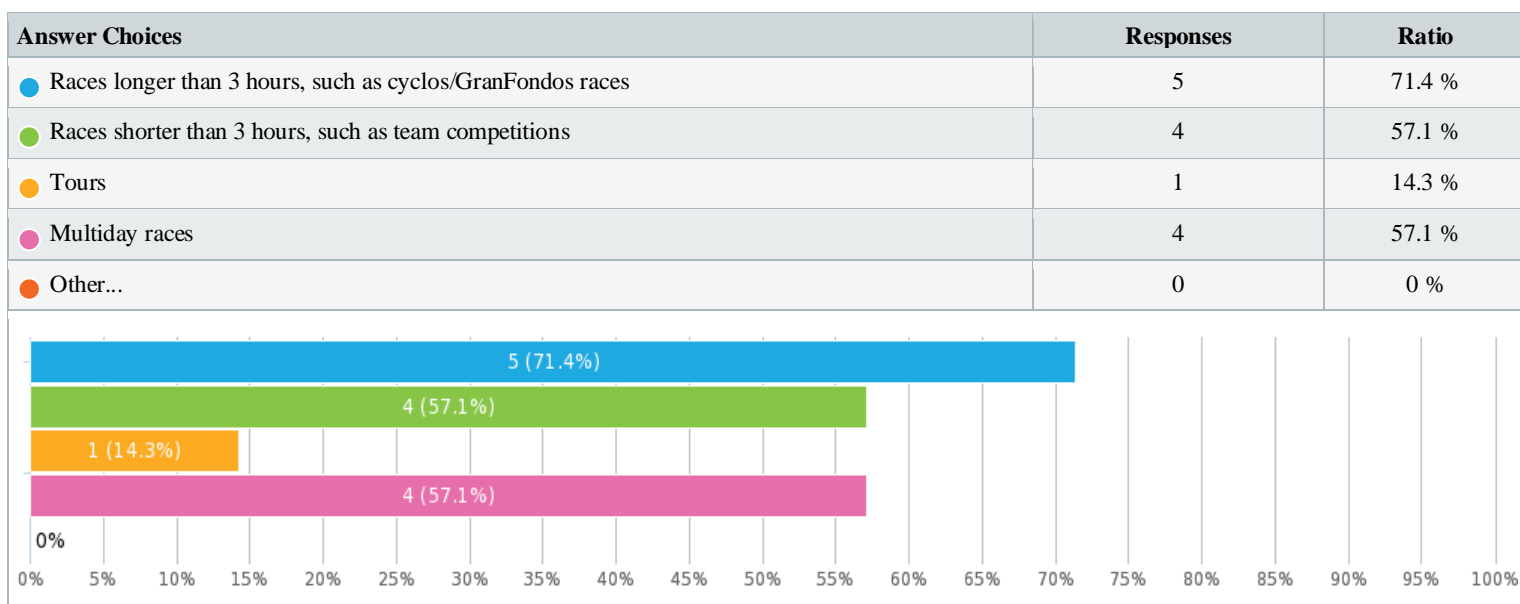
6. Why did you download the EatMyRide app?

*Text answer, answers **8x**, unanswered **0x***

● Optimization of nutrition to improve my presentation,
● Want more insight into how much I need to eat, interested
● To get more info about using a food plan
● I want to get guidance in my planning for eating and drinking while cycling but also before

- Interest in food and cycling
- Curiosity and get better insights on what to eat and drink
- Via owner
- Personal connection with the owner

7. Which version of the EatMyRide app do you have?

*Single choice, answers **8x**, unanswered **0x***

Answer Choices	Responses	Ratio
● Premium version	7	87.5 %
● Free version	1	12.5 %

7 (87.5%)	
1 (12.5%)	

0% 5% 10% 15% 20% 25% 30% 35% 40% 45% 50% 55% 60% 65% 70% 75% 80% 85% 90% 95% 100%

8. How often do you use the EatMyRide app?

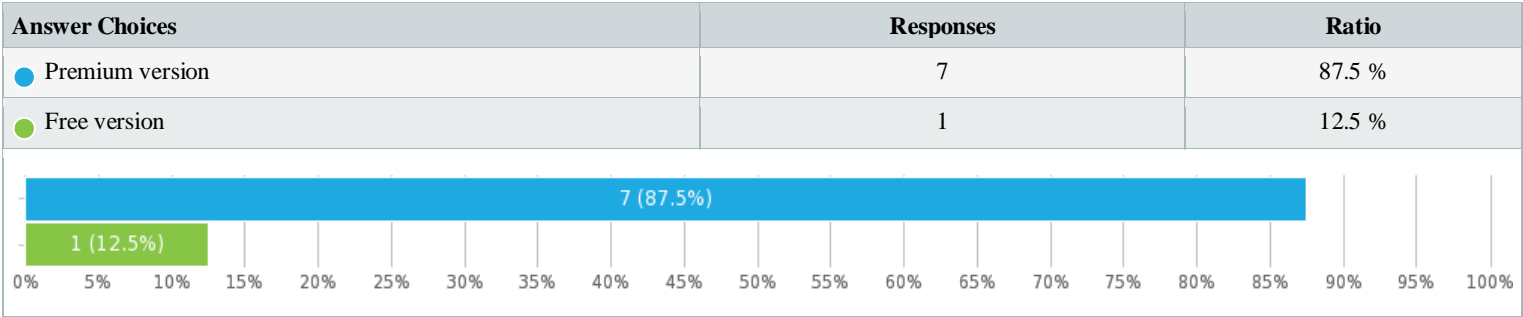*Single choice, answers **8x**, unanswered **0x***

Answer Choices	Responses	Ratio
● 2 - 3 times per week	1	12.5 %
● Once per week	1	12.5 %
● Once per two weeks	1	12.5 %
● Once per month	0	0 %
● Once per two months	1	12.5 %
● Other...	4	50 %

1 (12.5%)
1 (12.5%)
1 (12.5%)
0%
1 (12.5%)
4 (50%)

0% 5% 10% 15% 20% 25% 30% 35% 40% 45% 50% 55% 60% 65% 70% 75% 80% 85% 90% 95% 100%
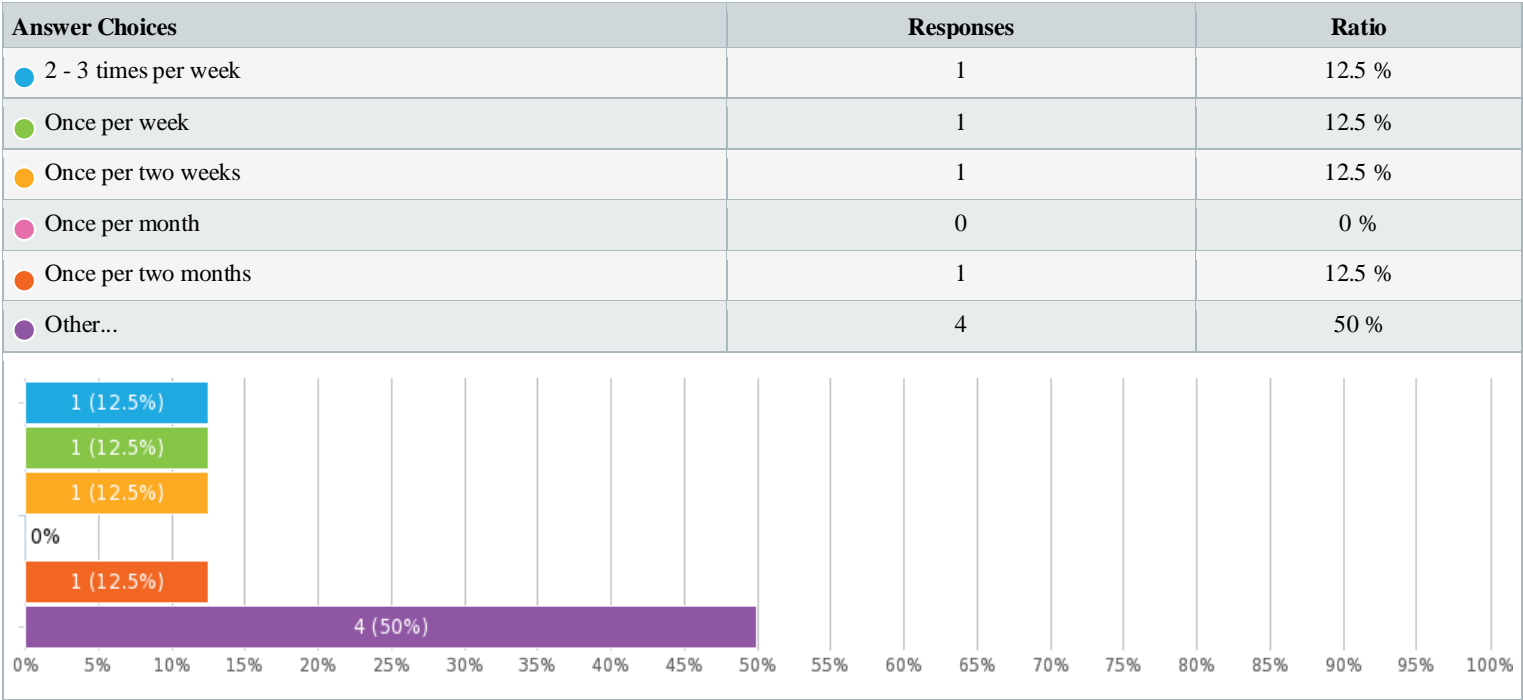
- nearly every day
- Only on trips
- Don't know. Just downloaded it
- Not yet

9. How would you describe your current experience with the EatMyRide app?

*Text answer, answers **8x**, unanswered **0x***

- Good but enough room for improvements
- It is getting better and more applicable
- I'm still exploring the app
- great, but still some user experience tooling to be added
- Interesting

- App interface looks great. Useful integration with strava/komoot/garmin. It is a bit difficult (time consuming) to fill in the nutrition plan
- .
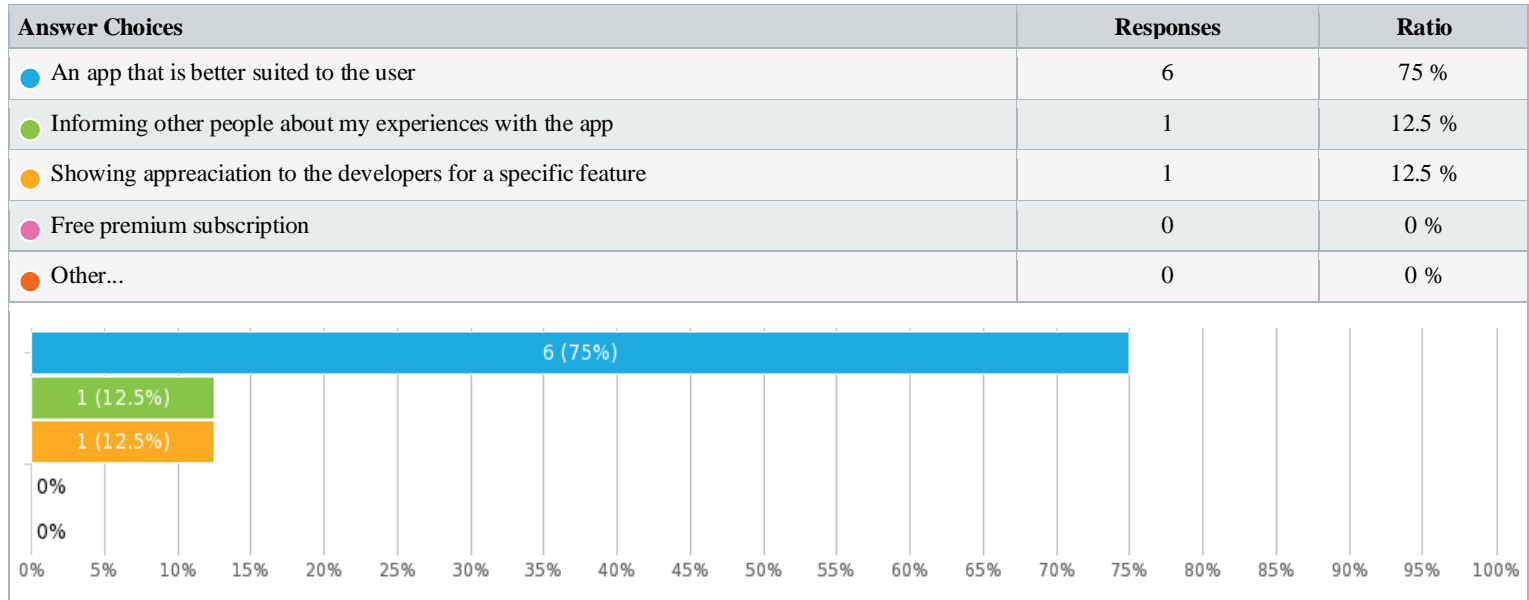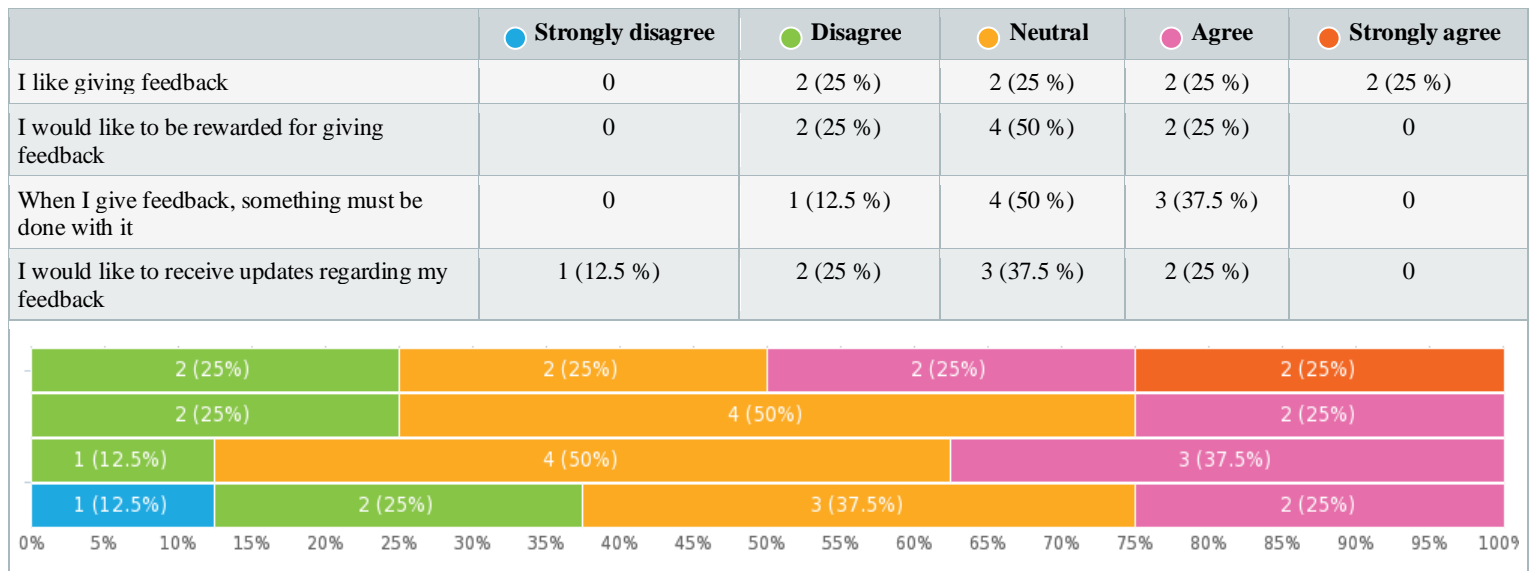- Used it only once

10. What would motivate you to give feedback in the future?

Multiple choice, answers 8x, unanswered 0x

Answer Choices	Responses	Ratio
● An app that is better suited to the user	6	75 %
● Informing other people about my experiences with the app	1	12.5 %
● Showing appreaciation to the developers for a specific feature	1	12.5 %
● Free premium subscription	0	0 %
● Other...	0	0 %

11. Indicate to what extent you agree with the following statements:

Matrix of single choices, answers 8x, unanswered 0x

|	● Strongly disagree	● Disagree	● Neutral	● Agree	● Strongly agree
I like giving feedback	0	2 (25 %)	2 (25 %)	2 (25 %)	2 (25 %)
I would like to be rewarded for giving feedback	0	2 (25 %)	4 (50 %)	2 (25 %)	0
When I give feedback, something must be done with it	0	1 (12.5 %)	4 (50 %)	3 (37.5 %)	0
I would like to receive updates regarding my feedback	1 (12.5 %)	2 (25 %)	3 (37.5 %)	2 (25 %)	0

12. At what moment would you be most motivated to give feedback about the EatMyRide application?

Multiple choice, answers 8x, unanswered 0x

Answer Choices	Responses	Ratio
● Before the start of a ride	1	12.5 %
● During a ride	1	12.5 %

● During the break of a ride	0	0 %
● Shortly after a ride	3	37.5 %
● An hour or longer after a ride	5	62.5 %
● Other...	0	0 %
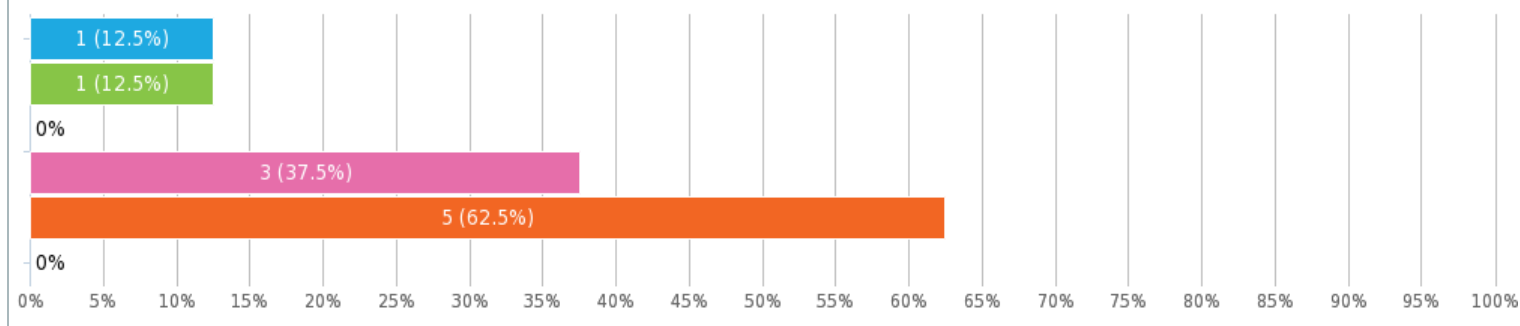
13. How often would you be willing to give feedback about the EatMyRide app?
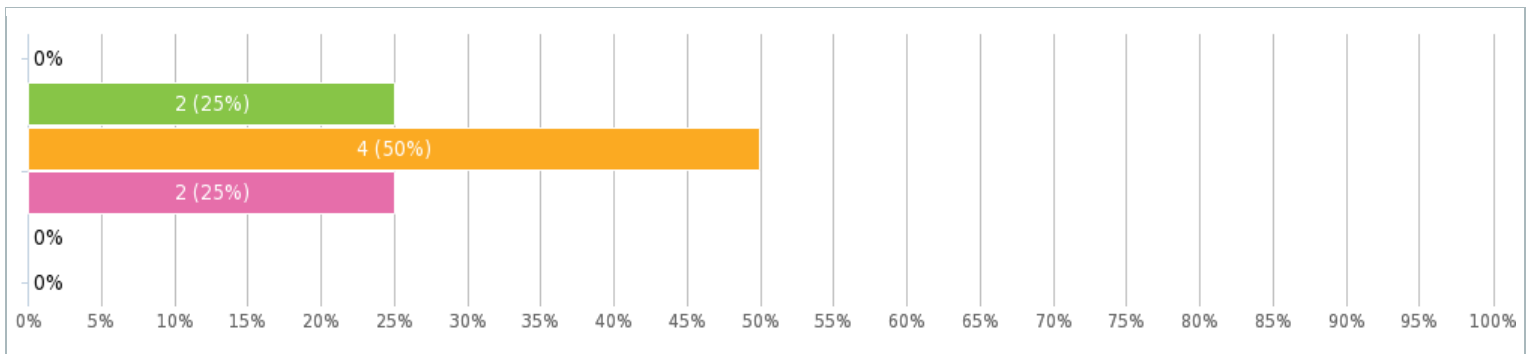
Single choice, answers 8x, unanswered 0x

Answer Choices	Responses	Ratio
● Weekly	2	25 %
● Monthly	1	12.5 %
● Semi-annually	5	62.5 %
● Annually	0	0 %
● Never	0	0 %
● Other...	0	0 %
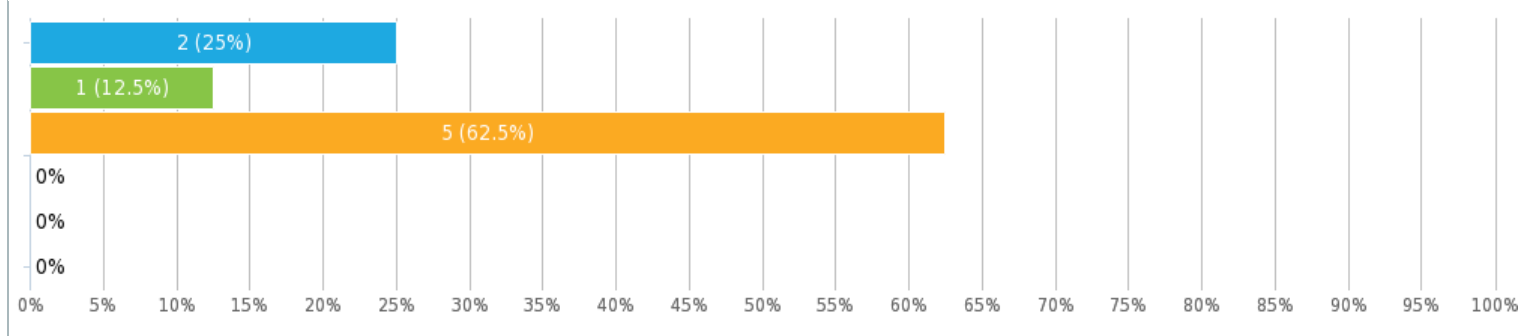
14. How much time are you willing to spend on giving feedback about the EatMyRide app?

Single choice, answers 8x, unanswered 0x

Answer Choices	Responses	Ratio
● 0 - 30 seconds	0	0 %
● 0.5 - 2 minutes	2	25 %
● 2 - 5 minutes	4	50 %
● 5 - 10 minutes	2	25 %
● 10 - 15 minutes	0	0 %
● More than 15 minutes	0	0 %

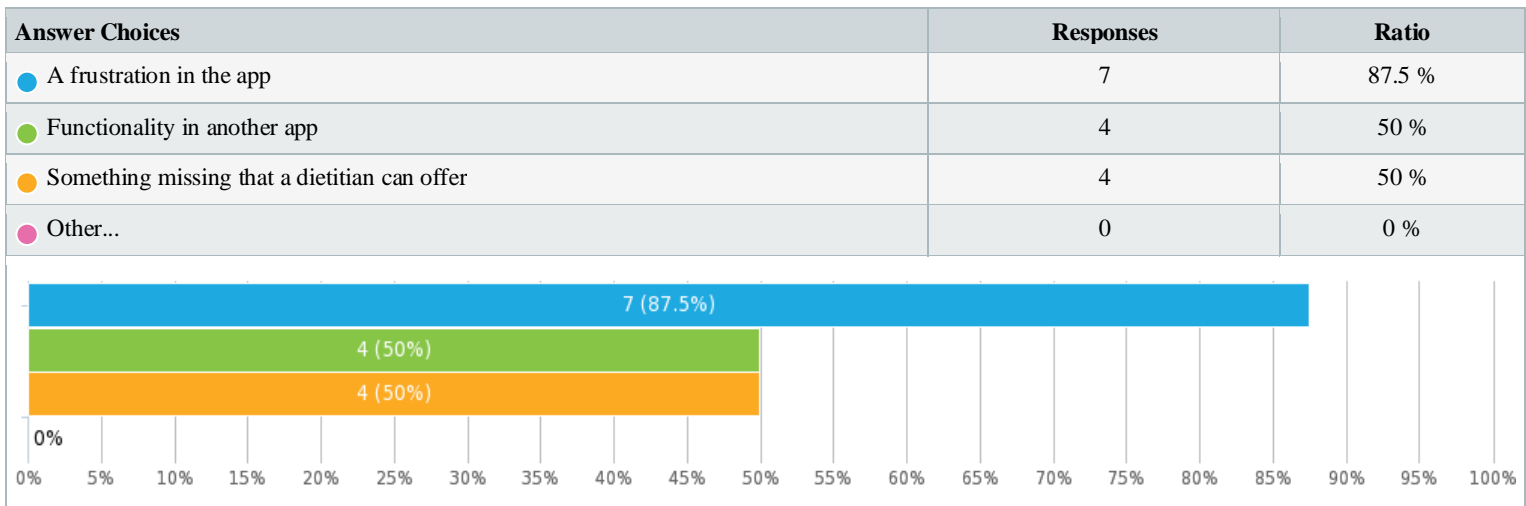**15. Do you currently have any feedback or additions to the EatMyRide app?**

Single choice, answers 8x, unanswered 0x

Answer Choices	Responses	Ratio
● Yes, namely	1	12.5 %
● No, currently not	7	87.5 %
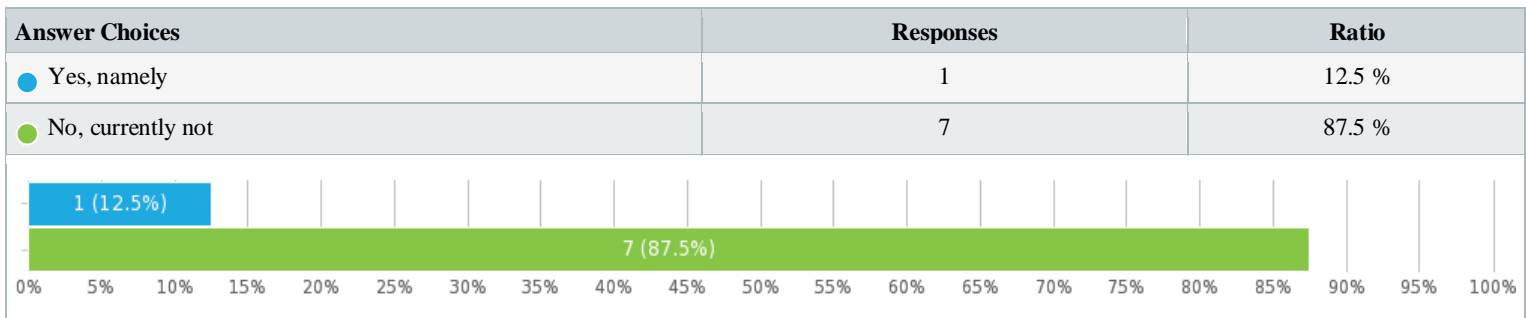
● A computer version would be nice. and several other which are already discussed

16. When giving feedback (in the future), for example about an idea for a new functionality, what would inspire you to do so?
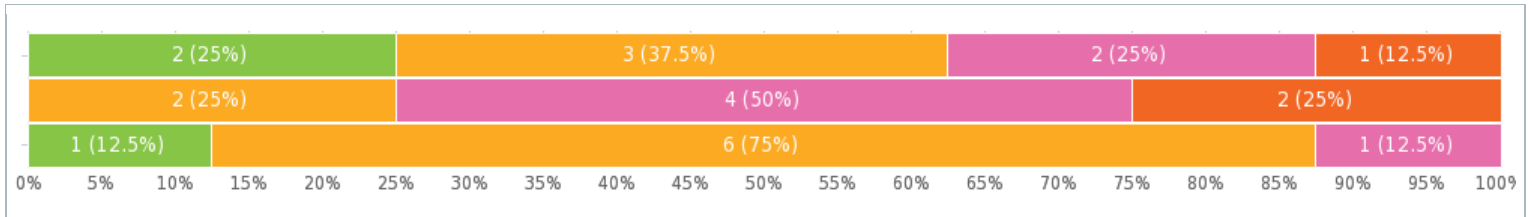
Multiple choice, answers 8x, unanswered 0x

Answer Choices	Responses	Ratio
● A frustration in the app	7	87.5 %
● Functionality in another app	4	50 %
● Something missing that a dietitian can offer	4	50 %
● Other...	0	0 %

17. Please indicate to what extent you agree with the following statements:

Matrix of single choices, answers 8x, unanswered 0x

	● Strongly disagree	● Disagree	● Neutral	● Agree	● Strongly Agree
I think I am creative	0	2 (25 %)	3 (37.5 %)	2 (25 %)	1 (12.5 %)
I am critical	0	0	2 (25 %)	4 (50 %)	2 (25 %)
I am quickly satisfied	0	1 (12.5 %)	6 (75 %)	1 (12.5 %)	0

2 (25%)	3 (37.5%)	2 (25%)		1 (12.5%)
2 (25%)	4 (50%)		2 (25%)	
1 (12.5%)	6 (75%)			1 (12.5%)

18. Please indicate to what extent you agree with the following statements:

*Matrix of single choices, answers **8x**, unanswered **0x***

	● Strongly disagree	● Disagree	● Neutral	● Agree	● Strongly agree
easily come up with original ideas	0	2 (25 %)	2 (25 %)	3 (37.5 %)	1 (12.5 %)
give feedback that could lead to new features	0	0	2 (25 %)	5 (62.5 %)	1 (12.5 %)
need inspiration from others	0	1 (12.5 %)	2 (25 %)	5 (62.5 %)	0
find giving feedback easy, without specific instructions	1 (12.5 %)	1 (12.5 %)	0	5 (62.5 %)	1 (12.5 %)
would describe my feedback as creative	0	2 (25 %)	5 (62.5 %)	0	1 (12.5 %)

2 (25%)	2 (25%)	3 (37.5%)		1 (12.5%)
2 (25%)	5 (62.5%)			1 (12.5%)
1 (12.5%)	2 (25%)	5 (62.5%)		
1 (12.5%)	1 (12.5%)	5 (62.5%)		1 (12.5%)
2 (25%)	5 (62.5%)			1 (12.5%)
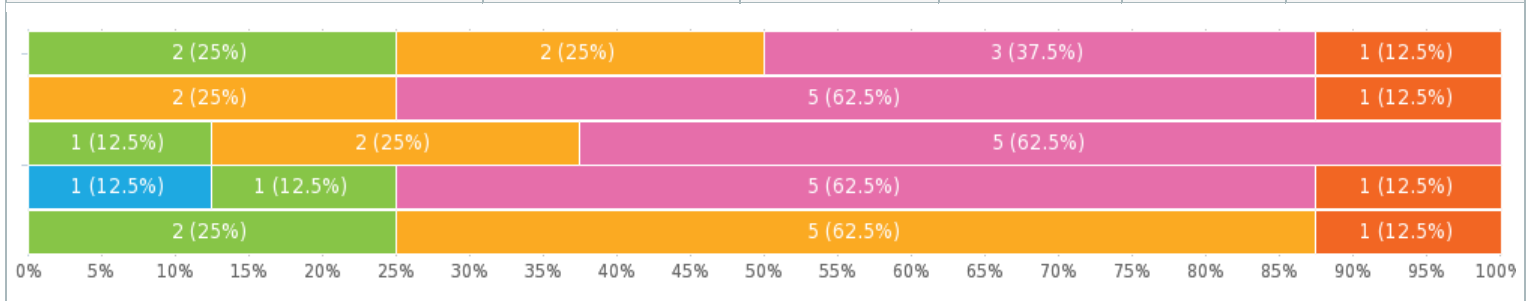
Appendix 5: Pre-interview questions

First of all, again thank you so much for your interest in our user study! (followed by a short introduction about ourselves (Lukas and I) and a short explanation of the graduation project).

Name:

Email:

Sport background:

- You are a cyclist/triathlete, how did you start cycling?
- How often do you cycle? And what distances?
- Do you also participate in any competitions?
- Do you work toward a goal?
- Are you using a bicycle computer/wearable such as Garmin?
- Do you use any other applications such as Strava or others?

Sport nutritions:

- Do you take your nutrition into account before/during cycling?
- Do you use an application to keep track of your nutrition?

Expectation

The user study will last eight days. In the span of those eight days, you are asked to use the application and you do not have to take special actions. We ask you to fill in a diary every day with a couple of questions about the experience with the application. I will send this diary after the meeting. After the eight days, we like to have a short (+/- one hour) interview in which we show our prototypes and ask for your feedback.

If you have any questions at any time, feel free to call, mail, or app us!

Appendix 6: Diary probe

Day 1

General
Date:_____
Did you use the application?   ○ Yes ○ No
Did you ride today?   ○ Yes ○ No
What type of ride?
○ General ○ Endurance ○ Recovery ○ Interval ○ Race

Performance
Distance of your ride: _____
Training time: _____

Today's performance
Kcal:_____   Protein: _____
Carbohydrates:_____   Fat: _____

Your experience
How do you feel about today's ride?

Could you explain why?_____

How do you feel about your nutrition plan?

Could you explain why?_____

How do you feel about the EatMyRide app?

Could you explain why?_____
_____

App usage
When did you use the app during the day?
Could you indicate it below?

Morning

Afternoon

Evening

Other
What is your first impression after using the EatMyRide app today?
_____
_____
_____

Did any problems occur throughout the day?
Could you explain what happened? _____
_____
_____
_____

Day 2

General
Date:_____
Did you use the application?   ○ Yes ○ No
Did you ride today?   ○ Yes ○ No
What type of ride?
○ General ○ Endurance ○ Recovery ○ Interval ○ Race

Performance
Distance of your ride: _____
Training time: _____

Today's performance
Kcal:_____   Protein: _____
Carbohydrates:_____   Fat: _____

Your experience
How do you feel about today's ride?

Could you explain why?_____

How do you feel about your nutrition plan?

Could you explain why?_____

How do you feel about the EatMyRide app?

Could you explain why?_____
_____

App usage
When did you use the app during the day?
Could you indicate it below?

Morning

Afternoon

Evening

Feedback
Did any problems occur throughout the day?
Could you explain what happened? _____
_____
_____

What would motivate you to give feedback in the future?
Could you give an example? _____
_____
_____
_____

01   ABOUT YOUR RIDE

Day 3

General

Date: _____
Did you use the application? ○ Yes ○ No
Did you ride today? ○ Yes ○ No
What type of ride?
○ General ○ Endurance ○ Recovery ○ Interval ○ Race

Performance

Distance of your ride: _____
Training time: _____

Today's performance
Kcal: _____ Protein: _____
Carbohydrates: _____ Fat: _____

Your experience

How do you feel about today's ride?

□ □ □ □ □
Could you explain why? _____

How do you feel about your nutrition plan?

□ □ □ □ □
Could you explain why? _____

How do you feel about the EatMyRide app?

□ □ □ □ □
Could you explain why? _____

App usage

When did you use the app during the day?
Could you indicate it below?

Morning _____

Afternoon _____

Evening _____

Feedback

If you could wish for anything to improve the application, what would it be?
Could you explain why? _____
_____
_____

If you would like to add a sketch, please do so by adding it as attachment.

Day 4

General

Date: _____
Did you use the application? ○ Yes ○ No
Did you ride today? ○ Yes ○ No
What type of ride?
○ General ○ Endurance ○ Recovery ○ Interval ○ Race

Performance

Distance of your ride: _____
Training time: _____

Today's performance
Kcal: _____ Protein: _____
Carbohydrates: _____ Fat: _____

Your experience

How do you feel about today's ride?

□ □ □ □ □
Could you explain why? _____

How do you feel about your nutrition plan?

□ □ □ □ □
Could you explain why? _____

How do you feel about the EatMyRide app?

□ □ □ □ □
Could you explain why? _____

App usage

When did you use the app during the day?
Could you indicate it below?

Morning _____

Afternoon _____

Evening _____

Other

Did any problems occur throughout the day?
Could you explain what happened? _____
_____
_____

Day 5

General

Date: _____
Did you use the application?   ○ Yes ○ No
Did you ride today?   ○ Yes ○ No
What type of ride?
○ General ○ Endurance ○ Recovery ○ Interval ○ Race

Performance

Distance of your ride: _____
Training time: _____

Today's performance
Kcal: _____   Protein: _____
Carbohydrates: _____   Fat: _____

Your experience

How would you rate today's ride?
⭐⭐⭐⭐⭐
□ □ □ □ □
Could you explain why? _____

How would you rate your nutrition plan?
⭐⭐⭐⭐⭐
□ □ □ □ □
Could you explain why? _____

How would you rate your overall experience?
⭐⭐⭐⭐⭐
□ □ □ □ □
Could you explain why? _____

App usage

When did you use the app during the day?
Could you indicate it below?

Morning	
Afternoon	
Evening	

Other

Did any problems occur throughout the day?
Could you explain what happened? _____
_____
_____
_____

Day 6

General

Date: _____
Did you use the application?   ○ Yes ○ No
Did you ride today?   ○ Yes ○ No
What type of ride?
○ General ○ Endurance ○ Recovery ○ Interval ○ Race

Performance

Distance of your ride: _____
Training time: _____

Today's performance
Kcal: _____   Protein: _____
Carbohydrates: _____   Fat: _____

Your experience

How would you rate today's ride?
⭐⭐⭐⭐⭐
□ □ □ □ □
Could you explain why? _____

How would you rate your nutrition plan?
⭐⭐⭐⭐⭐
□ □ □ □ □
Could you explain why? _____

How would you rate your overall experience?
⭐⭐⭐⭐⭐
□ □ □ □ □
Could you explain why? _____

App usage

When did you use the app during the day?
Could you indicate it below?

Morning	
Afternoon	
Evening	

Feedback

EatMyRide has the following idea:
"**Create meals**: The user can easily add meals/
recipes which can be later on reused. The user
can then add a meal instead of all the individual
ingredients."

Is this idea lacking in your user needs?
Could you explain why/how? _____
_____
_____
_____

Day 7

General

Date:_____
Did you use the application?   ○ Yes ○ No
Did you ride today?   ○ Yes ○ No
What type of ride?
○ General ○ Endurance ○ Recovery ○ Interval ○ Race

Performance

Distance of your ride: _____
Training time: _____

Today's performance
Kcal:_____   Protein: _____
Carbohydrates:_____   Fat: _____

Your experience

How would you rate today's ride?
♥ ♥ ♥ ♥ ♥
□ □ □ □ □
*Could you explain why?*_____

How would you rate your nutrition plan?
♥ ♥ ♥ ♥ ♥
□ □ □ □ □
*Could you explain why?*_____

How would you rate your overall experience?
♥ ♥ ♥ ♥ ♥
□ □ □ □ □
*Could you explain why?*_____

App usage

When did you use the app during the day?
Could you indicate it below?

Morning

Afternoon

Evening

Other

Did any problems occur throughout the day?
Could you explain what happened? _____

Day 8

General

Date:_____
Did you use the application?   ○ Yes ○ No
Did you ride today?   ○ Yes ○ No
What type of ride?
○ General ○ Endurance ○ Recovery ○ Interval ○ Race

Performance

Distance of your ride: _____
Training time: _____

Today's performance
Kcal:_____   Protein: _____
Carbohydrates:_____   Fat: _____

Your experience

How would you rate today's ride?
♥ ♥ ♥ ♥ ♥
□ □ □ □ □
*Could you explain why?*_____

How would you rate your nutrition plan?
♥ ♥ ♥ ♥ ♥
□ □ □ □ □
*Could you explain why?*_____

How would you rate your overall experience?
♥ ♥ ♥ ♥ ♥
□ □ □ □ □
*Could you explain why?*_____

App usage

When did you use the app during the day?
Could you indicate it below?

Morning

Afternoon

Evening

Feedback

Did any problems occur throughout the day?
Could you explain what happened? _____

How did you experience the past 8 days?

Do you wish to continue using
the EatMyRide application?   ○ Yes ○ No
Could you explain why? _____

Appendix 7: Post-interview: Questions

Experience with EatMyRide (based upon diary probe)

1. What was your experience with the EatMyRide application?
    a. What were things that you did not like/ liked less?
    b. What were things you found good about the EatMyRide application?
2. When did you use the application?
    a. When did you plan your rides?
    b. How did you plan your rides?
    c. Where the type of rides clear?
3. What was your experience with filling in the diary every day?
    a. Did you notice the four different icons that were used for rating your experience?
    b. Of those four icons which one do you prefer most? Why?
    c. Where all icons clear?
    d. Did you feel forced to explain each rating?
    e. Where their things missing in the diary?

In case if participants did not fill in parts of the diary probe they were asked during the interview:

4. What would motivate you to give feedback?
5. If you could make a wish to improve the EatMyRide application, what would it be? Why?
6. What were your thoughts on the phrasing of the question when asked about your opinion of the Create Meals idea?

The last question, based upon their answer to the question if they would continue using the application a follow-up question was asked to better understand why and what needed to change in the application for the participants to keep using it:

7. You indicate that you would/wouldn't continue using the app because [insert reason]. Would you continue using the application if [solution to the possible problem]?
    a. Why?

Appendix 8: Results Diary probe

Participant 1

Cycled 3 times in the 8 days with differentiating distances → 110 km, 121 km, 91 km. Endurance type.

First impression: Good, only filling in the personal values is difficult and placing of the buttons is not always consistent.

Problems that occurred:

- If you want to add your lunch for example then it says 'done', and then it says 'nutrition after sporting' so I click the cross on the right button because I thought I added it. But then it is gone because you need to click after 'done' also on save on the next screen.
- Saving the food you want to add goes sometimes wrong
- Forgot to fill in the total day

Motivation to give feedback: x

Wish: x

Feedback on suggestion: x

Experience past 8 days: Fine, it is not completely in my system to fill in my eating habits. So I did forget sometimes. But it was nice to have some general insight.

Continue using: No, because the adviced food is for me to little with a to different time schedule. And I do forget often to fill in the values.

Rating of experience:

	R		NP		EMR	
Day 1	4		2	I think the app says you need to eat too little	3	Easy to use. But sometimes filling in the values is difficult
Day 2						
Day 3						
Day 4						
Day 5						
Day 6						
Day 7	3	Really hard wind and rain	2	With this weather, this is too little food for the ride. And you drink not 500 ml water at once but in sipps	4	The app gives a good view that I eat too little kcal. I was not aware of this.
Day 8	4	Nice weather but a lot of wind.	1	With this kind of wind, you want to eat a lot more than 2 bars. And also I do not get the big time in between. Normally I eat every +- hour something	2	I think the layout of the app is really nice but the at and drinking advice can be optimized.

Average time use of application:

Morning	Afternoon	Evening	Not	Morning & evening
1 day	1 day		5 day	1 day

Participant 2

Cycled 4 times in the 8 days with differentiating distances → 152 km, 91 km, 52 km, 63 km. Endurance, general and recovery type.

First impression: It's handy. But it could be difficult if it turns out to be a longer day in the saddle than planned before. I noticed as well that I usually take enough food with me. So, right now I don't see the benefits of using the EatMyRide app.

Problems that occurred:

- While riding I can't see when to eat. I have to stop and look at my mobile phone. I don't have a Garmin or smartwatch.

Motivation to give feedback: x

Wish: x

Feedback on suggestion: I think it is a good idea. But I would rather like that the app gives some suggestions on what to eat. However, I would like a function like that. But I would prefer something that gives me ideas about what to make instead of the opposite.

Experience past 8 days: It was a nice experience. I noticed that y natural timing to eat on the bike is quite similar to what the app says. I changed the order in what I eat. I always begin with cookies but with the app, I learned that I should save the cookies for later.

Continue using: No, because while riding I can't see when I have to eat. And I'm afraid that I'm going to lose my own feeling when to eat while using the app. Maybe use t when I'm in doubt how much food I need to bring with me, but this won't be for every ride.

Rating of experience:

	R		NP		EMR	
Day 1	5	It was a really nice ride. With good legs	4	I planned to ride 125 km. So I needed some more food at the end	3	It gave me a good direction to time my food. But I can't see it while cycling.
Day 2						
Day 3						
Day 4						
Day 5	4	It began really nice, but after a while, it started to rain	3	I thought I would ride 75 km, so my plan was not quite good. But i did bring something more to eat with me	4	
Day 6	4	It was nice. I rode with a friend. We talked a lot but in the end it was a little bit cold	5	I took enough with me. I knew I had to eat at a certain point. But I thought I could skip the last one because I was almost home. But 5	5	Nice ride, with a good nutrition plan

				minutes later, I felt I had to eat. Nutrition plan was quite good			
Day 7	3	I was a bit tired because I didn't sleep so much. I went from Ensched to my hometown. It was a lazy ride.	3	I forgot the app, but I took the right stuff with me	3	It was okay. It rained a lot but I managed to avoid the rain so that amde my ride a lot better.
Day 8						

Average time use of application:

Morning	Afternoon	Evening	Not	Morning & evening
2 day	1 day		5 days	

Participant 3

Due to not cycling any distances above 50 kilometers, the application was not properly tested and thus the diary probe was not filled in. However, as with participant 5 later on, the participant did look in the application in depth that the feedback was very helpful and the prototype was still tested.

Participant 4

Cycled 3 times in the 8 days with differentiating distances → 45 km, 64 km, km, km.
General and interval type.

First impression: That it was not that useful

Problems that occurred:

- In order to save my diet/food, I needed to click the 'save' button, but I didn't see it first, since you needed to scroll down a bit, was frustrating.
- No worked better this time

Motivation to give feedback: x

Wish: Adding new meals should be made easier

Feedback on suggestion: Yes I feel like it now takes quite some effort to fill in all meals, this would make it easier.

Experience past 8 days: I did not find the app too useful, for a longer ride it can help, but I already knew how to adapt your diet when doing a long ride. Furthermore, it is mainly focused on cycling, while I also practice running and swimming. So I am already used to sporting often and my 'standard' diet is already adapted for this.

Continue using: Yes, I would maybe occasionally use, but not really intensive, I would not pay for it.

Rating of experience:

	R		NP		EMR	
Day 1	3	Okay weather but no sun yet	3	Was not really a plan	2	Was not fully use to the app yet
Day 2	4	Aloha training was fun	4	Got now some useful information	3	Already a bit better, but still annoying to fill in everything you eat
Day 3						

Day 4	4	Very nice weather and ride with colleagues	3	Didn't have time to really use it/adapt my day nutrition to it	3	
Day 5						
Day 6						
Day 7						
Day 8						

Average time use of application:

Morning	Afternoon	Evening	Not	Morning & evening
2 (before ride)		1 (just before dinner/ride)		

Participant 5

With participant 5 problems occurred during the use of the application, due to this she could not test the application properly and thus did not fill in the diary. However, she did look through the app, etc. So she was asked for a post-interview to discuss the feedback that she had for the EatMyRIde and get her opinion on the prototype.

Participant 6

Cycled 4 times in the 8 days with differentiating distances → 74 km, 64 km, 52 km, 80 km. Endurance and interval type.

First impression: Not straightforward. If I 'plan' my food intake, the app tells me whether it is too little or too much, but doesn't give any reasons.

Problems that occurred:

- some products I use are not in the standard list of the app. At some point, the app forgot all the things I already filled in for the day.
- Planning the ride and planning your food intake takes some time because it is not straightforward.
- When planning a ride, the app crashes, if I restart the app, the ride is planned and everything is back to normal.
- Couldn't find gnocchi.

Motivation to give feedback: I would like more feedback from the app. The app gives me suggestions of KCAl etc but doesn't take my personal situation into account. For each ride/meal, I would like to have the possibility to give feedback on whether the app's suggestions were good so that the app can improve itself.

Wish: Would be nice to be able to use the app online or on my computer in case of problems with phone.

Feedback on suggestion: This would be nice, filling in all parts of your dinner is quite tedious, so it would be much better if you can reuse meals you already filled in before. Or even better would be if you could just select recipes from a website.

Experience past 8 days: Not very good, many hiccups in the app, things that don't work the way I would want them to work.

Continue using the app: No, because the only use for the app is to how much calories are in some common foods.

Rating of experience:

	R		NP		EMR	
Day 1						
Day 2	4	It was a normal ride	1	The app suggested I eat 18 grams of carbohydrates per hour, this is much less than needed	2	The suggestions were not good.
Day 3	5	It went well (did not use app) due to the dying of phone.				
Day 4						
Day 5						
Day 6	4		4	It says I need to eat 18 grams of carbohydrates per hour while I would argue I don't need to eat for a 1.30.	2	
Day 7	2	Inteval session, quite though	3		2	
Day 8						

Average time use of application:

Morning	Evening	Morning &Evening	Not	Morning & afternoon & evening
	1	2 days	2 days	3 day

Participant 7

Cycled 5 times in the 8 days with differing distances → 38 km, 90 km, 22km, 31 and 55 km. Endurance and interval type. Of these rides, three were under 50 km so couldn't really be implemented into the nutrition planning.

First impression: a lot of work to put in the food that I ate.

Problems that occurred:

- app crashed a few times just after making the nutrition plan. Portions are sometimes way off, which makes putting the kcal very time-consuming.
- the food that I wanted to get on the ride was unavailable due to shops being closed.

Motivation to give feedback: personalized rewards or giveaways.

Wish: Create custom "Meals" that you can add in one click. Or the ability to copy day eating plans. I eat the same breakfast and lunch every day.

Feedback on suggestion: I would like to copy full days or weeks. The food is still very repetitive.

Experience past 8 days: For the app not very well. Otherwise very okay.

Continue using the app: No, because the app takes too much time to do always. You can just check what you need to eat for different rides and then apply that later. Safes time to train.

Rating of experience:

	R		NP		EMR	
Day 1	5	Was a nice easy ride, good weather	5	It consisted of icecream	2	Ride to short for EMR, MTB takes longer
Day 2	4	Nice intervals, but went a bit deep	2	Not enough energy at end of the ride	2	Ride too short to use EMR
Day 3	4	Swim training	4		2	
Day 4	5	Nice easy ride, good talk	3	Had none, short ride	2	Was not very useful
Day 5		Went running and swimming				
Day 6		Went running				
Day 7	3	Easy ride before dinner	4	I was hungry as it was before dinner	4	Good
Day 8	4	Very nice hilly Mtb	4	Good, but did not uphold it as both shops were closed		Decent

Average time use of application:

Morning	Afternoon	Evening	Not	Morning & evening
1 day	1 day		2 days	4 days

Participant 8

Went on two rides in the 8 days – one just above 50 km and one of 130 km.

First impression:

Motivation to give feedback: x

Problems occurred:

- Tried to create a quick nutrition plan, but took too long in my opinion. So I gave up and jumped on my bike. Was not planning on eating much during the ride anyway.

Wish: x

Feedback on suggestion: x

Experience past 8 days: x

Continue using: No, because the app usage wasn't intuitive in my opinion. I found it not easy enough to create a nutrition plan. Also, I expected to report my ride and my food intake during the ride afterward, not beforehand. All in all, I found it too much of a hassle. Likely my busy schedule during the test period was also an important factor.

Rating of experience:

	R		NP		EMR	
Day 1						
Day 2					3	Interesting information about nutrition under the explore page. Connection Strava not working
Day 3	4	Not too fas because limited time did some intervals	2		2	Strava connection doesn't seem to work. Tried to create a quick

					nutrition plan but took too long so gave up and jumped on my bike
Day 4					
Day 5					
Day 6	4		1		2	
Day 7					
Day 8					

<u>Average time use of application</u>:

Morning	Afternoon	Evening	Not	Morning & evening
	1	1	6 days	

Appendix 9: Results post-interview: EMR Experience

Experience with EatMyRide application:

Nr	Whole experience	Cons	Pros	Use app	Ride types
1	beautifully made, nice buttons and buildup logical.	slider button of heart rate zones hard to get the specific number. Done and save button unclear sometimes and not always consistent. My opinion too little food during a long ride. Don't drink complete bidon at once time but take sips. Would like to know more about what the nutrition plan is build upon.	Liked the discovery page, discovered I eat too little during the day.		Makes routes with Strava. Rittypes were unclear to me what they meant. Unsure if a tour through the application is really necessariy.
2	useful but didn't see the added value of using the app. Learned the most about the build-up of food.	Couldn't see when to take the food due to not having a Garmin. No indication of what to eat, putting everything in the app took a really long time. Would want an indication of what to eat	Planning the ride was very easy, could be done on the KM accurately.		Ride types were clear when I plan to cycle no specific route only an idea of where I want to go
3	Initially it didn't suit me for I didn't make rides above 50 km. Didn't see the point of the application in first instance. Takes a lot of work but then it is useful.	A lot of things needed to be learned and I didn't know what to expect, it took a while to find my way aoround the app.		Used app during evenings as a diary instead of planning. Hardest part was putting in all the data everytime.	Rittypes are kind of clear.
4	Didn't feel the added value of adding my nutrition in the application. Ideal application is that you could fill in your standard diet and deviate from that. Because I'm not that professional I'm not interested	Save and done button mistake and lost everything. Can't add my other workouts, do swim and run also quite a bit.	If you work systematically to become better then I would consider using the application.	Differentiating in how to plan ride and when. Makes a route before riding but sometimes deviates from that route.	
5	Overall unclear and didn't use the app after day 1. Felt like the app didn't work on phone	Unclear what the goal of the app is, nutrition planning or ride nutrition? Would like a clear home screen with rides. Needs tutorial, linking with Strava and Garmin didn't work		Normally plans routes an hour before	
6	Not so great, wouldn't use it again. Many hiccups in the app, things that don't work the way I would want them to work	Took too much time to fill in, missed feedback how kcal was determined. Also took a long time as many of my products weren't in the app. Also copying would be nice	It does what it has to but not really beneficial for me	Mostly the evening before, fill in the app three times per day during meals	Only did endurance and interval, don't know what the others mean. Would like to have an explanation
7	Not so good, used other nutrition apps begore but EMR was disappointing.	The app is meant for fast riders, MTB is difficult to put in the app. The app crashed a lot, not motivated to fill in again. Switching between apps also reset the		Mostly during breakfast, otherwise during diner	Endurance and general is unclear, would be interesting to show what changes when

	progress. Found on the last days that he could copy nutrition, an explanation would have been nice...				changing the ride type
8	In essence, the idea is nice, however the execution was difficult. Took a lot of time to fill in all products, threshold was too high.	Took too much time to fill in, would like the app to tell me what to eat and not the other way around	Liked the discover page with background information, like the theory behind EatMyRide	Mostly in the evening, not implemented in daily routine. During the weekend before a long ride in the morning	Does have an idea of ride types however, doesn't know whether the app makers have the same idea

Experience Diary probe:

Nr	Filling in diary	Rating	Preferred rating choice	Motivation	Wish	Suggestion
1	saving diary problem occurred. Liked the different questions and different icons.	Answer to rate nutrition: maybe giving a suggestion to eat something else but shouldn't become too much of a nutrition app instead of a cycling application.	Prefer emoticons with different colors or stars as they are more general	If I could easily give it in the app then I would give feedback if something is not right. Would look at settings because it doesn't fit anywhere else.	an option to add copy the food of yesterday since breakfast is the same each day. Would simplify ease of use. You want to cycle not spend too much time on the application. Would want to change the times to eat.	Think I thought longer about answering this question.
2	Nice, never done before, but it's nice to fill in what your likes and dislikes are.	Filling in a rating often would answer. Would give feedback faster if the ride didn't go so well than if it went well.	Stars (easy and fast), nice if I could expand/comment. Liked the idea of five choices, no preference for emotions. Emoticons were clear on first glance	If I would notice that I get something out of it.	Getting suggestions for what you should eat, for example, breakfast or dinner. Giving in indication foto for example. Rather learn from the application and getting specific suggestions.	Looking at the question phrasing was clear for me. wouldn't stand still to think longer about this idea. With this question I looker faster what could be improved
3	Two questions a bit unclear, can't remember which ones.		Colored emojis. just rating the ride, not really specific if a 'feeling' needs to be added.	For a reward that benefits me	Adding a barcode scanner even though it is a hard one to implement. Make it easier to add food or complete meals.	Idea is so obvious that it really needs to be implemented and it is such a big thing and useful thing.
4	Was clear what you meant but filling in pdf is a bit of a hassle that the sentence doesn't align correctly.	Rating would lose interest after one week of filling it in. Could imagine that some people would want to fill it in every day. Moreover dislikes pop-ups work contra-productive with him.	Emoticons same color the preferred choice since it is most clear and calm. Angry emoticon looks really angry.	-	-	Thought directly yes I want that. Difficult question, was more yes I want that too.
5	Personally would be too much of a hassle to do everytime.	Rating is simple, emotion could add experience depending on ride type	Would prefer stars, (neutral) smileys could also work	Accessibility, somewhere in the app I can leave my message.	Overview of a ride, map of ride and where food was taken. Overview of food of whole day as	Think its a good functionality, adjusting amounts

	Rates is easy but typing takes too much time			Depending on the kind of feedback I would like to have a follow-up. Always clicks away '5-star app store rating'	well. Also more feedback towards the user	
6	Fine, not that much time and questions were easy	Would use it to rate nutrition	Neutral smileys are the nicest, emotional not necessary for me	I would like more feedback from the app. The app gives me suggestions of kcal etc, but doesn't take my personal situation into account. For each ride/meal, I would like to have the possibility to give feedback on whether the app's suggestions were good so that the app can improve itself. -> As long as it doesn't take that much time, 3 min instead of 30. And if I know that my feedback is being used by the company. Rates Picknick with the idea that it's used. Direct feedback but not direct results	Would like to have more features, but don't know which ones exactly. Perhaps a more elaborate planning feature. When doing races of 10 hours I would need a very detailed planning	I couldn't use the app today because my phone died. It would be nice if I would be able to use the app online or on my computer.
7	Only missing other sports possibilities	Already rating my rides in the polar app, how heavy the ride was, easy-hard. The wattage changes accordingly	Prefers smileys, colors makes it too intense	A thank you or getting points as a reward. Only review when something is really bad/good. Or personalized rewards	Create custom "meals" that you can add in one click. Or the ability to copy day eating plans. I eat the same breakfast and lunch every day.	I would like to copy full days or weeks. The food is still very repetitive.
8	Was alright, sometimes skipped days and filled in afterward. Short but sweet	Would like to use if using the app more often	1-5 stars is preferred, smileys could work but still prefer stars	Easiness and improving customer experience. Likes the power a customer has when leaving a negative review to show the negative side of a brand. Reads reviews before buying things	Would like to have more theory, more background on nutrition. Also lowering the threshold to fill in nutrition, fixing long search times	Sounds nice, must be accessible and not confusing. As long as you don't have to fill in everything

Continue using:

Nr	Continue usage	Reason why:
1	No	Wouldn't want to lose my own feeling of when I should eat. Don't want to become too dependent on devices telling me when to eat.
2	No	It takes a lot of time to fill in all your food and sometimes not motivated. If the app more for nutrition app, I would use a different one instead of this one.
3	No	Feels completely pointless because doesn't ride that long and is already a bit aware of his nutrition.
4	Yes (no)	However wouldn't want to pay for it so no, no added value for me. have grown since I started cycling, already have a basic knowledge.
5	No	The app didn't work
6	No	The only use for the app is to know how many calories are in some common foods.
7	No	Isn't beneficial for me, I mostly eat the same so my nutrition is not that exciting. Once I know what to eat I can do without the app, recommending food during a ride or recipes would be nice. Or recommendation where I can buy
8	No	App usage wasn't intuitive in my opinion. I found it not easy enough to create a nutrition plan. Also, I expected to report my ride and my food intake during the ride afterward, not beforehand. All in all, I found it too much of a hassle. Likely my busy schedule during the test period was also an important factor.

Appendix 10: Post-Interview: Questions

Usability test round 1:

Tasklist:

While carrying out the tasks, please think out loud.

Task 1: You have a wish for the EatMyRide application, please find the place where you can fill it in.

Task 2: Please go back to the Plans-page

Task 3: You want to give your opinion on one idea of the EMR (Rating), find it, and fill in your rate.

Task 4: You want to add your own idea as feedback for the EatMyRide by filling it in the Word cloud.

Questions

1) How easy or difficult was it to find everything?
2) Where there any uncertainties?
3) What did you think of the interface?
4) Is it clear how the word cloud works?
5) Is it clear how the wishing works?
6) Is it clear how the rating works?

Go back to the selection screens, and look at the last options (Bad idea and Ranking)

7) Is it clear how the bad idea works?
8) Is it clear how the ranking works?
9) What are your thoughts on the design and layout of the feedback system? Is it consistent with the design of the EatMyRide application?

Imagine that you are using the application, and one of the three idea-generating systems (word cloud, wishing, or bad idea) is offered through a notification to give feedback.

10) Would you use the product? Would you fill it in?
    a. Why?
11) How often would you use the product?
    a. Never, almost never (1 a year), rarely (2 a year), occasionally (once every three months), often (once a month), regularly (once a week)
12) How was your experience with the product?
13) If you could change anything about the product, what would it be? Why?
14) Which part of the product are you most enthusiastic about? Why?

Usability test round 2:

Personas:

Show/explain personas.

1. Privacy tolerant & Socially Ostentatious: feedback is social & community experience, helps to feel among others.
2. Loyalist: passionate about something (in this case EatMyRide), can't stand negative reviews about it.
3. Perfectionist: always seeking perfection, will let you know when something is not good enough.
4. Incentive Seeker: want to know what is in it for them, why would they give feedback for free.
5. Impact Seeker: benefits of giving feedback unclear to them as users.
6. Annoying: Doesn't like feedback and finds it highly annoying.

- Which one suits you most? (can choose multiple)

Task 1: Look around specifically the feedback parts.

- Would you respond/fill in the pop-up?
- Are all the buttons clear?

Show suggestion cloud on Adobe XD

- Is it clear that you can press on the different words?
- Is it clear that the different colors represent different things?
- Is the timeline on the left clear what that could mean with the icons?
- What do you think the top-right icon in each comment box means?

General questions

1. What are your thoughts about the design and layout of the feedback system/prototype?
2. Does the feedback system/prototype fit with the application itself? Flow and design?

Imagine that you are using the application for 3 to 4 months.

3. Would you use the prototype? And why?
4. How often would you use the prototype?
    a. Never
    b. Almost never (once a year)
    c. Rarely (2x times a year)
    d. Occasionally (once per quartile)
    e. Regular (once month)
    f. Often (once a week)
5. What was your experience with the prototype?
6. If you could change anything about the prototype what would it be? Why?
7. What part of the prototype are you most enthusiastic about? Why?

Usability test round 3:

Personas:

Show/explain personas.

1. Privacy tolerant & Socially Ostentatious: feedback is social & community experience, helps to feel among others.
2. Loyalist: passionate about something (in this case EatMyRide), can't stand negative reviews about it.
3. Perfectionist: always seeking perfection, will let you know when something is not good enough.
4. Incentive Seeker: want to know what is in it for them, why would they give feedback for free.
5. Impact Seeker: benefits of giving feedback unclear to them as users.
6. Annoying: Doesn't like feedback and finds it highly annoying.
- Which one suits you most? (can choose multiple)
- How often do you give feedback in general?

Show the React Native app/prototype

Task 1: Look around specifically the feedback parts.

- Would you respond/fill in the pop-up?
- Are all the buttons clear?

-   Is it clear that you can press on the different words?
-   Is it clear that you can like and dislike ideas?
-   Is it clear that the ideas from different users?
-   Is the phrasing in the pop-up clear?

Show the adobe XD vote pop-up:

-   Is the pop-up clear?

General questions

1. What are your thoughts about the design and layout of the feedback system/prototype?
2. Does the feedback system/prototype fit with the application itself? Flow and design?

Imagine that you are using the application for 3 to 4 months.

3. Would you use the prototype? And why?
4. How often would you use the prototype?
    a. Never
    b. Almost never (once a year)
    c. Rarely (2x times a year)
    d. Occasionally (once per quartile)
    e. Regular (once month)
    f. Often (once a week)
5. What was your experience with the prototype?
6. If you could change anything about the prototype what would it be? Why?
7. What part of the prototype are you most enthusiastic about? Why?

Appendix 11: Evaluation questions

Participant questions

<u>Personas:</u>

Show/explain personas.

1. Privacy tolerant & Socially Ostentatious: feedback is social & community experience, helps to feel among others.
2. Loyalist: passionate about something (in this case EatMyRide), can't stand negative reviews about it.
3. Perfectionist: always seeking perfection, will let you know when something is not good enough.
4. Incentive Seeker: want to know what is in it for them, why would they give feedback for free.
5. Impact Seeker: benefits of giving feedback unclear to them as users.
6. Annoying: Doesn't like feedback and finds it highly annoying.
-   Which one suits you most? (can choose multiple)

<u>Show final prototype</u>

<u>Questions</u>

1. How often would you use the prototype?
    a. Never
    b. Almost never (once a year)
    c. Rarely (2x times a year)
    d. Occasionally (once per quartile)
    e. Regular (once month)
    f. Often (once a week)
2. If you could change anything about the prototype what would it be? Why?
3. What part of the prototype are you most enthusiastic about? Why?

Client questions

Show final prototype, walk through it, and answer possible questions

<u>Questions:</u>

1. What is your first reaction?
2. If you could change anything about the prototype what would it be? Why?
3. What part of the prototype are you most enthusiastic about? Why?

Statements

Please indicate to what extent you agree with the following statements: (select one answer in each row) (Strongly disagree (5) – disagree (4) – neutral (3) – agree (2) - strongly agree(1))

1. I think that I would like to use the prototype frequently
2. I found the prototype unnecessarily complex
3. I thought the prototype was easy to use.
4. I think that I would need the support of a technical person to be able to use this prototype.
5. I found the various functions in this prototype were well integrated.
6. I thought there was too much inconsistency in the prototype.
7. I would imagine that most people would learn to use this prototype very quickly.
8. I found using the prototype very cumbersome to use.
9. I felt very confident using the prototype

10. I needed to learn a lot of things before I could get going with this prototype.

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