MASTER'S THESIS 2022

Multiplayer entertainment on short-haul flights

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Multiplayer entertainment on short-haul flights

(A digital product development project focusing on video games as entertainment on short-haul flights)

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June 22, 2022

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Abstract

As technology advances and traditional ways of entertainment now can be found in the palm of one's hand, the consumer expectations are higher than ever. This has created a greater demand by airline passengers for varied entertainment options on their flights.

To keep up with the current demands, the development process aims to create an enticing multiplayer experience for passengers on short-haul flights that they can enjoy at their own leisure. The hope is to bring the future of entertainment from the ground to the skies.

Market and user research was conducted as a foundation of the project. The data and insights were used to understand the needs of the target audience and the digital product requirements. From this, two Hi-Fi prototypes and two functional proof-of-concept prototypes were produced. These were accompanied by a systems diagram to display how important components and features are integrated with each other in the solution.

The two Hi-Fi prototypes were a platform containing a game library and user profile, and well as a quiz game called *Where to Next?*. The two functional proof-of-concepts are, a web-based HTML5 game concept called *Baggage Run*, and a web-based multiplayer showcase of the previously mentioned quiz game.

The goal of the prototypes are to showcase the viability the concepts and can be used as a foundation for further development of a larger entertainment offering onboard short-haul flights. Finally, areas of improvement and additional ideas are suggested.

Keywords: aviation, game, user research, entertainment, digital product development, passenger, multiplayer, design sprint, Hi-Fi prototyping, HTML5, React, Phaser3

Sammanfattning

I takt med att den tekniska utvecklingen går framåt och traditionella underhållningssätt numera kan bäras med i fickan, är konsumenters krav och förväntningar högre än någonsin. Detta har lett till en ökad efterfrågan från flygresenärer på varierade underhållningsmöjligheter ombord flyg.

För att möta upp marknadens ökande krav, har utvecklingsprocessen i detta projekt som mål att skapa en lockande flerspelarupplevelse för passagerare på kortare flygturer som de kan avnjuta efter eget behag. Förhoppningen är att få med sig framtidens underhållning från marken upp bland molnen.

Marknads- och användarundersökningar gjordes som en grund för projektet. Datan och insikterna från dessa undersökningar användes för att förstå behoven hos målgruppen och kraven för den digitala produkten. Med grund i detta skapades två Hi-Fi-prototyper och två funktionella prototyper. Dessa var åtföljda av ett systemdiagram för att visa på hur viktiga komponenter och funktion är integrerade med varandra i den föreslagna lösningen.

De två Hi-Fi-prototyperna är en plattform med ett spelbibliotek och användarprofil, samt ett frågesportsspel vid namn *Where to Next?*. De två funktionella prototyperna är ett webbaserat spelkoncept byggt med HTML5 vid namn *Baggage Run*, samt en webbaserad multispelarprototyp av det tidigare nämnda frågesportsspelet.

Målet med prototyperna är att påvisa genomförbarheten av koncepten och är tänkt att kunna fungera som en grund för fortsatt utveckling av ett större underhållningsutbud på kortare flygturer. Till slut tas även förslag på förbättringar och påbyggnadsidéer upp.

Nyckelord: flyg, spel, användarundersökningar, underhållning, flera spelare, design sprint, Hi-Fi prototyper, HTML5, React, Phaser3

Acknowledgements

As with many other reports and master's theses, we were not alone on this journey. Many kind people and bright minds have given us advice and input throughout the project and we cannot thank them enough. A handful of them are listed below.

We would like to thank Sören Just Pedersen at Tactel for his never failing support and advice. Thank you for believing in us!

A huge thank you also go to Kirsten Rassmus-Gröhn at Lund University for her expertize and support. Thank you for everything!

We would also like thank Johan Liljeros and Emma Gudmunds for their mentorship and great input along the way. We would never have come as far without your time and effort.

Thanks also go to the following people for helping with feedback and suggestions: Amanda Eriksson, Linnéa Gustafsson, Johannes Bastmark, Axel Domell, Madeleine Sidemo, Susanna Berntsson, Nils Olofsson, Tora Andreasson and Ludwig Darle Olsson.

Also, thank You for reading our Master's Thesis report!

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Chapter 1

Introduction

1.1 Preface

As technology advances and traditional ways of entertainment now can be found in the palm of one's hand, the opportunities for in-flight entertainment are virtually boundless.

Customer loyalty to airline companies is heavily based on customer satisfaction. Research shows that customer satisfaction is heavily influenced by the service quality provided by the airlines (Mahmud, Kamaruzaman, and Hadijah 2013). To meet some of these demands, airlines continuously work to innovative their experience (International Air Transport Association 2021).

Customer satisfaction for in-flight entertainment systems have slowly increased over the years and 62% of all passengers are satisfied with the current offering (International Air Transport Association 2019). This is a number which the airline companies hope to increase. However, in-flight entertainment is still one of the largest negative touch points in many geographic regions such as Africa, Asia Pacific, North America and North Asia (International Air Transport Association 2019).

This project hopes to help further increase customer satisfaction within in-flight entertainment. The development process aims to create an enticing multiplayer experience for passengers on short-haul flights that they can enjoy at their own leisure. The hope is to bring the future of entertainment from the ground to the skies.

1.2 Company description

Tactel is a digital interaction studio founded in 1995 with the goal to create a high-quality time in the digital life of people. They do this through design, technology and customer insights. About three fourths of the company work with software engineering while the last 25% work with service-, visual- and interaction design.

Approximately 50% of Tactel's project portfolio is focused on in-flight entertainment systems and other flight-related services. The other half includes areas such as public transport, finance and telecommunications. This is an active effort from the company to "stay grounded", to stay in touch with the trends and innovation that happens in other more rapidly developing market areas.

Since 2015, the company is owned by Panasonic Avionics, a company devoted to redefining the passenger experience on aircraft. The parent company is itself under the Panasonic Connect Co. branch, which in turn is a part of the Panasonic umbrella.

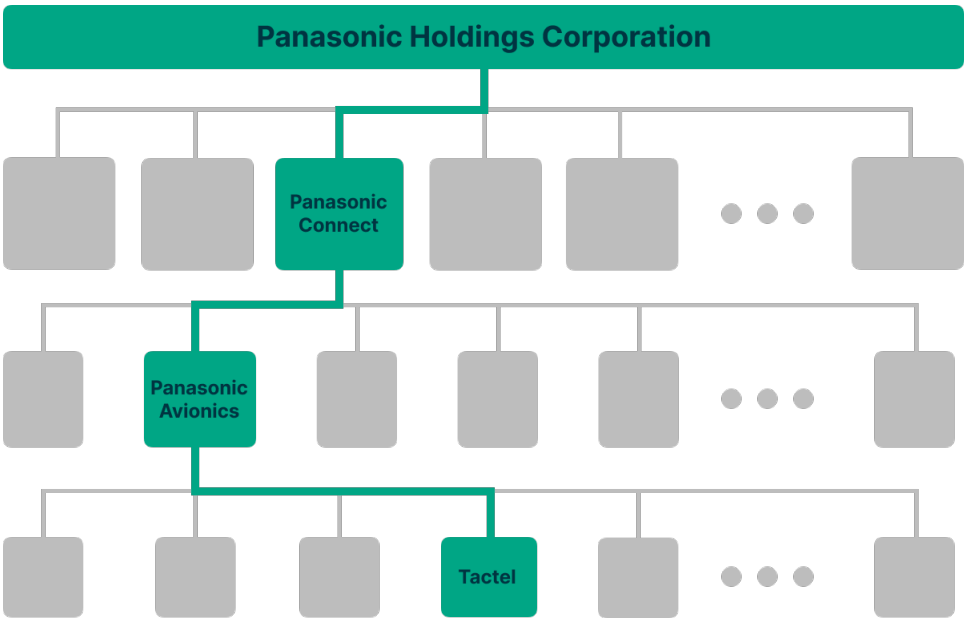


Figure 1.1: Simplification of Panasonic company structure

1.3 Goal and problem discussion

The aim of this project is to explore possibilities within the in-flight entertainment field. Specifically, Tactel has requested for us to investigate and develop the entertainment offering for low-cost carrier (LCC) and short-haul flights. The passengers of these flights do not generally have an individual entertainment system in the seatback in front of them, and instead share over-head monitors with a number of other passengers. The idea is to create a

game suite that adds entertainment value to the passenger, integrating with the resources available on short-haul flights via personal electronic devices.

To accomplish this, several sub-goals were specified for the project. These sub-goals are as follows:

- The project should be tailored for short-haul flights where there is no personal entertainment system built in.
- The developed idea should be engaging to a wide audience and multiple age groups.
- The concept should have a low threshold of entry and be easy for new players to pick up.
- A Hi-Fi prototype of the core components and functions should be created to test and showcase the idea.
- A functional proof-of-concept should be developed to showcase the technical viability of the solution.

1.4 Scope & Delimitation

This project focuses on delivering gaming experiences to passengers on commercial aircraft. The primary attention is toward short-haul flights with duration shorter than five hours, and only on flights that do not have built in entertainment systems in the seats.

The scope is to research, investigate and create a multiplayer gaming experience through currently available technologies. This includes concepts and suggestions for games, but also surrounding systems that deliver this experience to the passenger. The systems created can be used for other means of transportation, i.e. trains. However, this is out of scope.

Since air travel is a global phenomenon there are different cultural and geographical aspects in place. This is however not included in the project scope as it is such a vast and complex topic that would require its own report to fully investigate.

General usability is to be taken into account, however deeper investigation in areas such as *Universal Design* is deemed out of scope due to the complexity of this topic and the limited project timeline.

Instead, a larger emphasis has been the design of core functional aspects of games and how to incorporate these in a larger entertainment system.

Chapter 2

Background

The following chapter aims to present relevant background information on areas touched upon in the report, in order to create a setting and describe the space in which the project exists. Initially, an introduction to the aviation and is presented, as these are the main industries interfaced by the project space. In the 'Technologies' section, a number of technologies that were used are briefly described for the interested reader.

2.1 Aviation industry

The air transportation industry was in its infancy in the early 1900's, but after a number of technological advancements made during the second world war, airplanes could suddenly carry more passengers, fly at greater speeds, and provide better comfort than before. This catapulted the industry into a much stronger position in mid century (Smithsonian n.d.). Since then it has only grown and is now a huge industry with a yearly revenue of around 600 billion USD in the years leading up to COVID-19. Understandably, many airlines want to fight for a share of this huge but highly competitive market (Erick Burgueño Salas 2022a).

During the COVID-19 pandemic, there has been a great decline in revenue as many flights have been cancelled and a general ban on air travel has been adopted by countries all over the world during this time. In order to tackle this, many airlines have used this time to improve their product and service offering, in an attempt to invest their way out of the industry crisis and attract more customers as the travel ban is lifted. The post-pandemic trends that have been seen so far are positive, with steady growth from the decline. It is yet however to early to draw any conclusions as to the future of the industry (Erick Burgueño Salas 2022a)

2.2 Low-cost carriers

In the 2000's, low-cost carriers have been on the rise, steadily growing their market share in relation to the traditional airlines (Erick Burgueño Salas 2022b). These are airlines focusing on affordable, short-haul flights with less luxury in comparison to the full service carriers, competing with very low prices and deals.

The planes used by these airline carriers are usually narrow-bodied planes with a stripped down and simple interior. There are usually not different classes of seats like traditional airlines have, as the interior instead is focused on standardization and fitting as many passengers as possible on the aircraft. As such, entertainment such as screens in the seatback in front of the passenger are rare.

However, in the last decade there has been a shift in the industry from lowest price to best value for the customer. According to recent industry reports, price fluctuation does not significantly influence customer satisfaction. Instead it is the quality of service in relation to price that has been found to be the strongest driver of customer satisfaction. In other words 'best value' (International Air Transport Association 2019).

2.3 In-flight Entertainment

In 1925 the first flight with an in-flight entertainment system (IFE) left the ground, showing a screening of the movie *Lost Worlds*. Since then in-flight entertainment systems have become a standard on most aircrafts. Today, instead of a watching a movie together, passengers are offered their own systems with a wide array of entertainment options, depending on the type of aircraft and airline.

For IFE systems to remain competitive they must improve, develop and increase their entertainment catalogue. It is also one of the areas with most potential for improvement in regards to customer satisfaction (International Air Transport Association 2019). One entertainment category that is currently lacking is video games. In 2020 the global video game market amounted to 155.59 billion$ and some foresee this market grow to 268.81 billion $ USD. (Juniper Research 2021)

Another opportunity for IFE is the rapid growth of personal, portable entertainment systems (e.g. iPads, phones). Capitalizing on this, especially on low-cost carrier flights (LCC) where there are no personal IFE systems is vital to remain competitive and innovative.

2.4 Casual Game Design Theory

As the casual game field has grown and has introduced more users than ever before to games, new theory on how to design casual games have erupted.

The overall flow of the game can be described as the core gameplay loop. When designing the core gameplay loop for a casual game, there are several important factors to take into account. Casual games should follow four key principals:

- Rules and goals must be clear
- Players need to be able to quickly reach proficiency
- Casual gameplay adapts to a player's life and schedule
- Game concepts borrow familiar concepts from other games

Rules and goals are important as they give the game structure and solidity. There is no one way to create the rules, however there are guidelines one should follow. Firstly before creating the rules one must understand how the game works and the experience it gives the player.

When one has defined the aforementioned, rules can be created using the following guidelines (Trefry 2010):

- Be concise and exact
- Be firm
- Can't versus Must
- Instructions are rules too
- Avoid too many special cases
- State the game's goal upfront
- Tell the rules like a story
- Give examples
- Organize play into phases

2.5 Tools For Development

The following section aims to give a brief overview of different technologies used in the project. A majority of the prototyping work was done in a design prototyping tool called Figma. At the later stages of the projects, other tools and technologies were used to make functioning proof of concept prototypes. There are many types of frameworks for this type of development, and these are described below.

2.5.1 Figma

Figma is a design prototyping tool that is especially useful for interaction design. The tool lets the designer create multiple canvases or screens, and then add geometry, text and effects to make it look like a user interface. Actions can also be tied to different components of the design, allowing for a user to be redirected to other screens or have popups appear. This functionality allows for the illusion of a working prototype that can be used for user testing. This concept is usually referred to as 'Hi-Fi prototyping'.

2.5.2 React

React is a open-source Javascript framework used to develop interactive user interfaces for web applications. React is a component based technology, where users create smaller components which in turn will create a complex and scalable UI. React can also power mobile apps through their framework React Native (Meta n.d.).

React was used in this project to create a working prototype users could test and play together as a proof of concept.

2.5.3 Prototyping with Github pages

Github is a tool to collaborate on code, keep track on version history and share code with others. Github offers a way to publish your websites free through Github pages (MDN Web Docs 2022). Github pages allows for static web-hosting. When testing web-applications the prototypes were uploaded to Github pages, so the testers could try out the applications on their own device. This allowed for quick, free deployment.

2.5.4 Phaser3

Phaser3 is a HTML5 framework used to build 2D web-games for PC and mobile devices. Phaser utilizes JavaScript and TypeScript for development. Phaser allows for a fast development phase, where arcade prototypes can be built and tested on several devices. It also allows integration into platforms and offers possibilities to build prototypes into native apps (Davey 2022).

2.5.5 Websockets

Websocket is a communication protocol that enables two way communication between client and host. Allowing client and host to communicate with each other over the same connection. Instead of the client polling the host for information websockets allows for real-time data transfer by holding the connection open (Melnikov and Fette 2011).

To allow for multiple players to connect to and play a multiplayer quiz game, websocket protocols were used in the prototype. This allowed for the server to communicate questions and results to clients, while receiving answers and connecting players to lobbies.

Chapter 3

Methodology

This chapter presents and explains the main methods used during this project. This is an overview of the main frameworks of each method, they are presented; in order of use, how they were used and described more in detail when they are used.

3.1 Design Thinking

There is no unifying agreement on how to precisely define a design process. One definition is design thinking, a process which was used in this project. There are many variations of design thinking depending on field of application and disciplines. It is a way of thinking and tackling a problem. It is a tool, a process, a mindset, a skill and an accumulation of inputs and actions driving the refinement of ideas (Pressman 2018). It is a human-centered approach to innovation that integrates the needs of people, the possibilities of technology and the feasibility from a business perspective (IDEO 2018). Generally, the process of design thinking involves five different techniques or steps. These have many names, but we have chosen the nomenclature from the Interaction Design Foundation that divides the process into the following steps (Interaction Design Foundation 2021):

- Empathize
- Define
- Ideate
- Prototype
- Test

In the following sections, these core process steps will be explained in more detail.

3.1.1 Empathize

The first step in the process aims to gain insight into the problem, context and stakeholders to achieve a deep understanding of all the relevant issues, constraints and possibilities surrounding the problem. This can include, but is not limited to, techniques such as surveying people, interviewing experts, observation and engaging with people. It can also mean an exploration of the physical environment to get a deeper understanding of the issues and surroundings. The theory is that, at the end of this process, the design team should be able to set aside their own assumptions and focus on the actual users, their needs and external data.

3.1.2 Define

In the second process stage, Define, the task is to analyze and summarize the information gathered in the previous step. The goal is to define core problems and needs in a concrete and human-centered way, with a focus on the users and not from the company's perspective. After the core problem is defined, the aim is to break it down into more digestible sub-problems, functions and features. This is to aid the designers in the upcoming Ideation phase.

3.1.3 Ideate

The Ideate stage is where the team starts to generate actual ideas. Even though it is tempting to do before this stage, it is important to be patient. With the data and insights gathered in the Empathize and Define stages, the deeper knowledge of the users that has been gained can be utilized to form a plethora of ideas for solutions to the problems. Some seemingly apparent and grounded, whereas other might appear more crazy and "outside-the-box". There are a great number of ways and techniques to use for idea generation, such as 'Brainstorming' (Interaction Design Foundation n.d.) or 'SCAMPER' (Friis Dam and Yu Siang 2021b). The general theme is to keep an open mind and just generate a big number of concepts. It is important not dismiss any ideas in the early stages and limit creativity. Instead, the ideas should be evaluated at a separate, later stage in the ideation phase.

3.1.4 Prototype

At this stage, the focus is on producing a number of simplified, inexpensive and quick proof-of-concept prototypes. These are made to test whole ideas or smaller features in a product. This highly experimental and volatile phase in the process aims to find actual solutions to ideas and problems found in earlier stages and to dismiss concepts that are not feasible. The different sub-prototypes can then be combined into different more complete prototypes and prepared for the testing stage.

3.1.5 Test

In the last stage of the process, prototypes can be tested internally by the team, externally by stakeholders and users, and be examined through different design frameworks and guidelines. The aim is to identify which ideas or sub-concepts are good and which need to be reworked.

Some are scrapped all together. The importance lies in the User's experience of the product, but perspectives such as technical feasibility can also be required to take into consideration. The testing phase also

3.2 Double Diamond

Double Diamond is a design methodology launched in 2004 by *The Design Council*. The methodology aims to give designers and non-designers a visual, comprehensive and clear description of the design process. The method is split into two diamonds, the first diamond represents exploring the issue and the second diamond represents taking focused action to solve it. Each diamond contains two phases, four in total (Figure 3.1) (Design Council 2015).

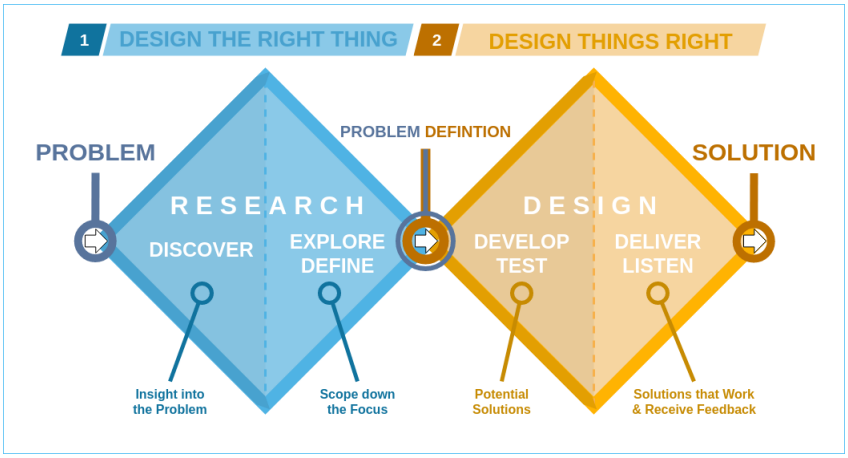


Figure 3.1: Graphical representation of the Double Diamond design process.

The first phase *Discover* helps the user understand what the problem is. In this phase it is recommended to spend time with people affected by the issue you are trying to solve. This phase can also include market research.

The second phase *Define* helps you narrow down the focus. Here you take the insights from the previous phase and define the problem you want to solve. An example of defining a problem could be creating a design brief.

After the problem definition is finished the next phase is *Develop*. Here it is encouraged to find different answers to the problem and seek inspiration from other areas.

In the *Deliver* phase, the user tests out the different solutions created from the development phase and filters out solutions that do not work. The working solutions are then taken to be improved upon (Design Council 2015).

3.3 Design Sprints

Design sprint is a methodology for solving design problems and getting started with the design iteration quickly. The goal is to under a shorter amount of time answer critical questions

through design, prototyping and testing. The methodology was developed by Google, with the goal to expand their User Experience (UX) culture within the company and was created through experimentation involving several different fields. It is heavily influenced by Design Thinking, but also include other areas such as Business Strategy, Psychology and traditional UX practices. The result is a flexible framework where different methods can be assembled to build a kit that works well for the problem at hand. The methodology contains six phases.

- **Understand**
  In the understand phase, the goal is to share knowledge and understand the problem. In this phase one might invite experts to help explain the problem. Possible methods used in this phase can be *'User Journey Mapping'* and *'User Interviews'* among others. Since we had already conducted an extensive user study, we focused on summarizing our previous findings in this stage. We made a User Journey Map to better understand and concretize our problem and needs.

- **Define**
  In the define phase the goal is to analyze the results from the prior phase and establish a direction moving forward. The team tried a framework called *"How Might We"* and *"Affinity Mapping"* (Martin and Hanington 2012) in our define phase. *How Might We* is a framework to help capture the possibility of the design. Instead of framing challenges one should ask *How might we … xyz?*, transforming problems to possibilities (Friis Dam and Yu Siang 2021a).

- **Sketch**
  In the sketch phase the team's goal is to generate multiple ideas. Generally, ideas in this phase can be very free and unhindered. It is desirable to have a wide variety of ideas to draw inspiration from in the later stages. Example methods include *"Crazy 8's"*, which is a fast sketch warmup where each member sketches 8 distinct ideas in 8 minutes. Another method used is *"Solution Sketching"*, where each member takes one idea and focuses on fleshing it out. Each sketch should contain three frames explaining the idea (Google n.d.).

- **Decide**
  In the decide phase the team will discuss the different ideas, sort out the best ones and maybe combine a couple into a bigger concept. One or a few ideas are then chosen for prototyping moving forward.

- **Prototype**
  In prototype phase the team creates a prototype. The prototype should be good enough to generate an authentic reaction in the validation phase. Prototyping was done using Figma, Phaser3 and React.

- **Validate**
  In the validation phase, the prototypes are tested against potential users, experts or other internal or external stakeholders to get feedback on functionality, design and experience. Insights are gathered and fueled into future design sprints, or looped back directly into a rapid sketch-decide-prototype loop for quick iteration.

3.4 Data gathering methods

To get well structured and relevant data for the project, data gathering methods were used. These methods exist to help designers gather relevant data.

3.4.1 Interviews

One of the most traditional ways of gathering information is by interviewing users. It is a great way to gather requirements and getting acquainted with the field.

There are different ways to structure an interview, one could hold an open interview where there is no interview guide. One could also hold a semi-directive interview with contains a rough interview guide. Lastly one could hold a directive interview with a strict interview guide. Which way is decided by the amount of control the one interviewing wants.

To begin with the interviewers must define how they will gather and analyse the data. There are several methods to gather the data a few examples include, taking notes, recording audio or recording video.

When creating questions for the interview guide there are two types of questions one could use, closed and open questions. Closed questions have a predetermined format while open do not.

Some pitfalls to avoid when creating questions are:

- No long questions
- No compound sentences
- No jargon & language interviewee may not understand
- No leading questions
- No unconscious biases

To begin with open interviews are often helpful to help the designer get better acquainted with the field. The information gathered from these interviews can then later be used for more controlled interviews, to gather more targeted information (Magnusson et al. 2009).

3.4.2 Questionnaire

One way to gather data is questionnaires, the data gathered from questionnaires can be compared to the one from directive interviews. Questionnaires are useful in both experimental and explorative user studies.

Chosing the right questions is of high importance and is quite time consuming. After the questionnaire is sent out the questions should not be sent. To make sure the right questions are created there are some points one should follow.

- Give a clear statement of purpose
- Assure anonymity

- Decide on wether phrases will be positive, negative or mixed
- Test questions
- Decide on how the data will be analysed
- Offer short version

After the answers have been collected it is important to analyse the data correctly and represent it well. Some tips one should have in mind are.

- Present results clearly
- Present simple statistics
- When using percentages provide poll size
- Bar graphs show categorical data well

A good questionnaire can gather a lot of information from several demographics. However the data is not objective and might contain social desirability bias (answers are based on how the tester think the questions should answered) (Magnusson et al. 2009).

3.4.3 User tests

Usability test

Usability testing is an evaluative method to observe user interaction and experience while walking through a prototype/product. The test revolves around tasks and scenarios. The user is given tasks to complete, these task should reflect real goals and concrete actions end-users might experience.

Scenarios are created to contextualize the task, giving the user an idea on why and when they might perform these tasks.

Some error that observers and testers should look for are instances where the testers:

- Understand task, but can't complete it within a reasonable time
- Understand goal, but has test several times/ways to achieve it
- Gives up completing the task/process
- Completes a task that was not specified
- Has a positive reaction
- Has negative reaction
- Mentions en error, something they believe is wrong or should work a different way
- Makes a suggestion for the interface or flow

The end result helps designers and developers understand how the user uses the interface, compared to how the interface was designed to be used (Martin and Hanington 2012).

Think-aloud Protocol

Think-aloud protocol is a method often used in conjunction with usability test. During the test the user is asked to verbalize their thoughts while testing a product. Users should articulate what they are feeling, doing and thinking. It gives the designers the opportunity to not only observe how the user is using the product but also the thought process behind decisions.

There are two different ways to conduct these test, *Concurrent* think-aloud and *retroactive* think-aloud.

Concurrent think-aloud is the most common one. Here the user articulates their response while testing the prototype. Depending on the user it is important that the designers remind the participants to articulate their thoughts. Focus is largely on what is happening during testing instead of why.

Retrospective think-aloud encourages the user to complete each task in silence. After a task is finished a discussion regarding the experience is held.

The goal of a think-aloud session is not to evaluate an entire system, instead aspects of the system should be evaluated. One instance of an aspect could be website navigation (Martin and Hanington 2012).

Guerilla Testing

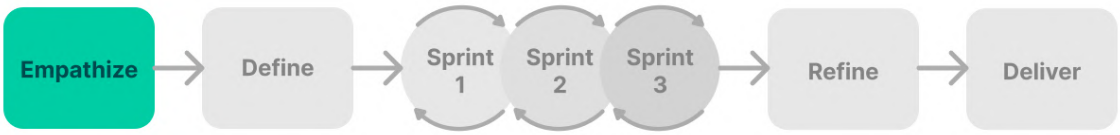
Guerilla testing or hallways usability testing is a method to run rapid and informal usability tests on users (Ligertwood 2020). The test hope to uncover user experience problems and get high-level feedback. The tests can be conducted anywhere and should be around 10 minutes long.

Guerilla testing is a good way to test when you need to test on a limited budget, need to validate early assumptions or work with small iterative changes to the product.

The idea is to test on users in different environments than a test room. An example is to ask people in a coffee-shop if they are willing to spend 10 minutes testing your product. The users don't have to be pre-booked, strangers can be asked directly.

Chapter 4

Empathize



This chapter presents the discovery phase of the project. In this phase user and market research was conducted to better understand the problem area and create a scope.

4.1 Game Market Research

To get a better understanding of the problem a game market research was conducted. This was done to find out if there are any trends within the games market. Also if the trends differ depending on sex, geographic location or other unknown factors. From that information a deeper dive within the mobile games market was also done, as this market is closely related to the task. The market research was conducted by looking at statistics and different trend analysis. This section will introduce the key takeaways from the market research.

When looking at the game market the biggest platform for gaming in the US was mobile gaming at 57 percent. This was followed by game consoles at 47 percent and personal computers at 42 percent (Entertainment Software Association 2021).

Data on the most popular game genres was retrieved from *Statista* (Figure 4.1). Some variation between countries were shown, the most popular game genre for the United Kingdom (UK) and the United States (US) were Puzzles and RPG, same went for Japan and South Korea. However in Japan and South Korea the two categories reach were closer to each other

compared to the UK and US (Facebook 2020).

However the genre with the most downloads in 2020 was hyper casual, being responsible for 30 percent of all mobile game downloads. Seconds largest genre was puzzles which amounted to 15 percent of all game downloads (App Annie 2020). Within the hyper casual market one of the fastest growing groups are female mobile gamers. Female mobile gamers amount to 63% of the mobile gaming population and 60% of them play mobile games daily (Anderton 2020).

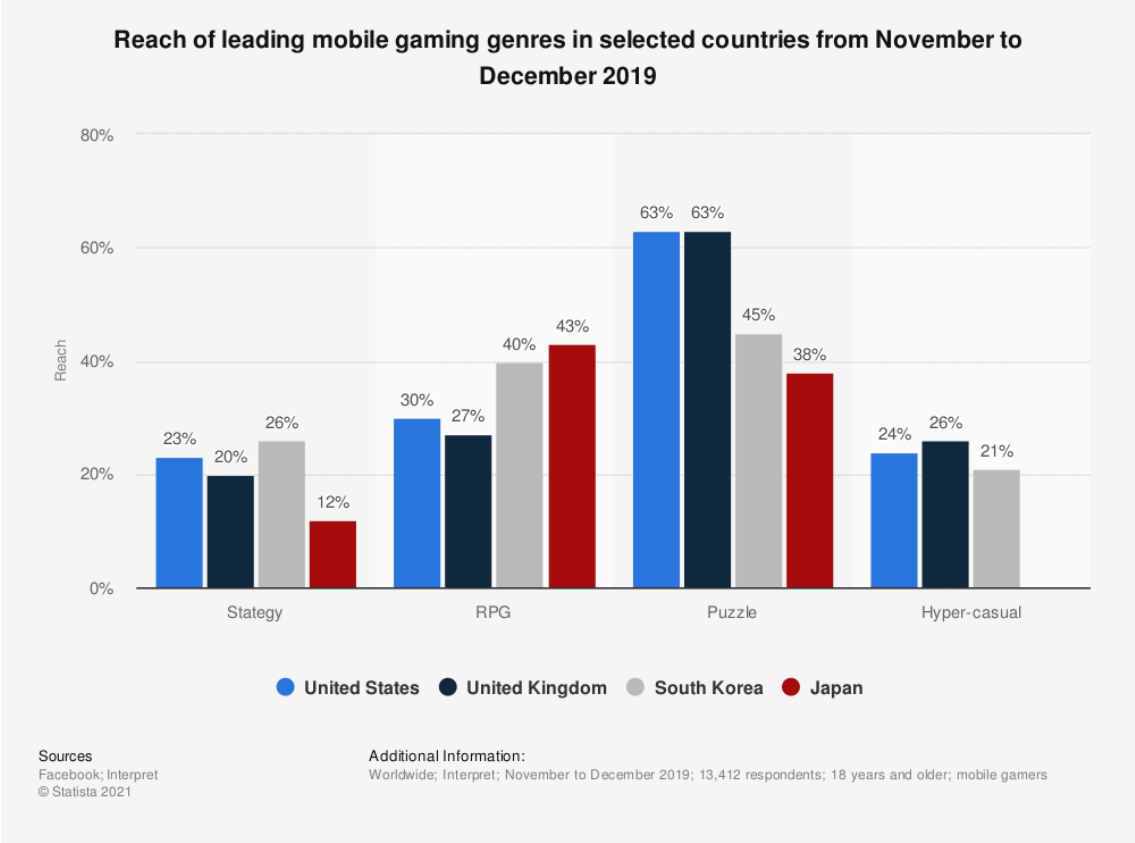


Figure 4.1: Plot of most popular game genres aggregated by Statista.

A study done by Facebook Gaming together with FacebookIQ was used to understand the mobile market better. The survey was done on 13,412 mobile gamers across 11 countries. From this surveyed it was determined that the main reason users play mobile games are as follows (Facebook Gaming n.d.):

- To relieve stress
- Pass the time
- To immerse themselves in another character or world
- Express something unique about themselves
- To connect with people they already know
- Be dazzled by something unique

- To connect with a subject they're passionate about outside gaming

Furthermore in this survey it was was also shown that people will play a larger amount of genres in the future. 24 percent of US players said that they will continue on with the same genre and only 10 percent of Japanese players said the same. While the rest were interested in testing new genres.

The research also showed that most new mobile gamers older than 18 who are open to gaming as a social activity preferred to play as a team against other players (Figure 4.2) (Facebook Gaming 2021).

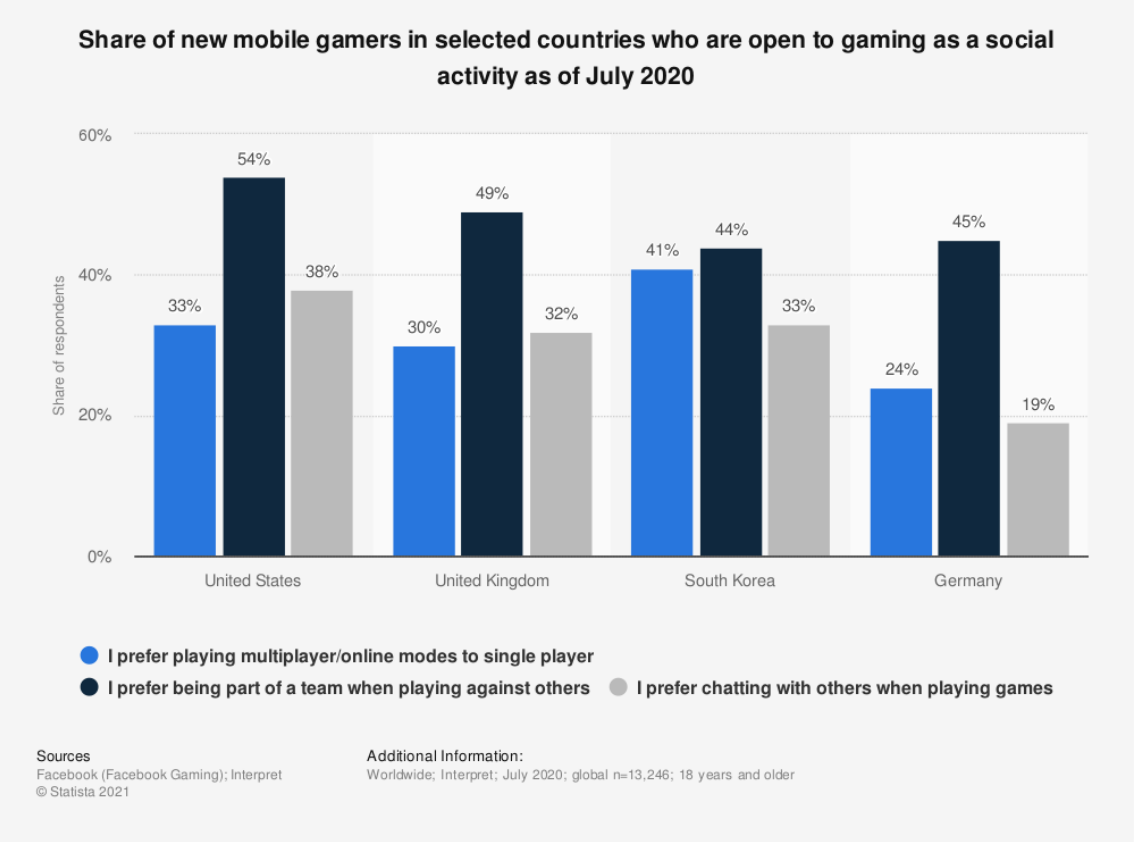


Figure 4.2: Statistics regarding preference of multiplayer experience.

4.2 Aviation Market Research

As the project goal was directed towards gaming on board an aircraft, a better understanding of the aviation industry was necessary. It was therefore decided to investigate industry trends, competition and the user journey of a typical flight.

4.2.1 Trends

Last decade there has been a shift in the industry from lowest price to best value for the customer. Price fluctuation does not significantly influence customer satisfaction. Quality of

service is instead a more important factor in this, and the carriers need to focus on providing best value for money (Mahmud, Kamaruzaman, and Hadijah 2013). One way this can be done is through entertainment packages.

From a meeting with industry experts from Panasonic Avionics, insights regarding how different low-cost carriers operate was brought up. In contrast to the previously unified image of LCC segment, they are in fact a very diverse area in the industry, with different carriers operating with vastly different strategies. As such, there is a spectrum of carriers in terms of price, level of comfort, in-flight entertainment and many other aspects. An in-flight gaming experience for short-haul flights therefore needs to cater to a multiple different types of LCC airlines in regards to customizability, or be designed with a focus on only certain segments of the low cost carrier area.

4.2.2 Competitors

Competitor analysis was limited to IFE systems that could be used on personal devices. IFE systems that required a seatback screen were not looked into. IFE systems that can be used with both seatback and personal device were included. Information available online was limited therefore only one competitor was analyzed.

Singapore Airlines

Singapore Airlines IFE *KrisWorld* is now accessible through personal devices, through their digital content portal. Travelers connect to this portal by connecting to the plane wifi and then entering a specific web-address. The website can only be accessed while connected to their WiFi.

This portal contains features such as.

- Web-based-gaming
- Food menus
- Information regarding arrival, for smoother arrival process
- Options to join loyalty programs
- Wi-Fi data plans, for access to regular internet connection
- Magazines

By downloading their app, users can browse their offerings before arriving at the airport. Users who register can even tailor their experience, by adding movies to a favorites list, creating music lists and other functions. For each dollar spent shopping through their store, frequent flier miles are earned (Singapore Airlines n.d.).

4.2.3 User journey mapping

A User journey map was made to better understand the process and experience of flying. An initial one was made based on information and practise shared by Panasonic Avionics, as they had already done much research in the field.

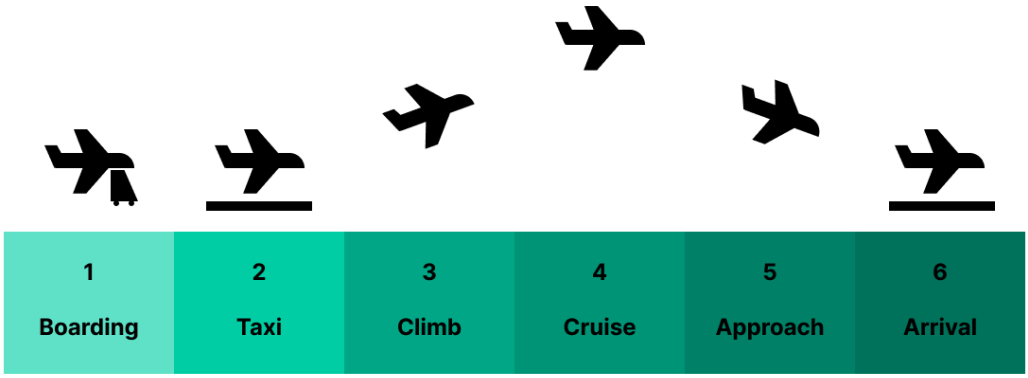


Figure 4.3: The user journey map of a flight

They divide the journey into six parts, mainly based on the state of the aircraft and what information is delivered to the passengers (See figure 4.3):

- **Boarding**
  The aircraft stands still and passengers get on, find their seats, stow away their carry-on luggage and sits down. During this stage, personnel welcome the passengers and guides them to their seats if necessary. On the over-head screens, important information about the flight and/or destination is usually displayed.
- **Taxi**
  During the taxi stage, the aircraft is still on the ground, but has started moving. Safety information is shared by personnel and displayed on the over-head screens and broadcast in the loudspeaker system. The passengers are to fasten their seat belts, stow away loose items and turn electronic devices to flight mode.
- **Climb**
  When the plane has left the ground as is gaining altitude, the flight has reached the climb stage. Information about meals and services is usually promoted if the flight is not too short. Passengers are still buckled in and some turbulence is usually experienced.
- **Cruise**
  The cruise phase occupies the majority of the trip. At this point, the seat belt sign has turned off and passengers can enjoy the most comfortable part of the trip at their own leisure. Promotional content about entertainment offering, selected movie packages and shopping opportunities is usually shown on the over-head screens and broadcast in the loudspeaker system. The focus of the passengers is to lean back and relax.

- **Approach**
  When the aircraft is starting its decent and approaches the airport, the next phase is started. Passengers once again need to buckle their seat belts, stow away loose items and turn their devices to airplane mode. Main content is about immigration, customs and cabin preparation, but it could also be information about the destination depending on the flight.
- **Arrival**
  When the plane is yet again on the ground, the Arrival phase has begun. The personnel is usually welcoming the passengers to the destination and content about the arrival gate and airport procedures is shown on the over-head display and broadcast in the loudspeaker system.

Through the user journey map, it was identified that the Climb and Cruise stages of the flight were the most appropriate touch points for our entertainment solution. The cruise phase is quite natural, as passengers usually actively seek entertainment, relaxation and way to pass the time at this stage. The climb phase was identified through the more in-depth user interviews, where some passengers scared of flying expressed their wishes for distractions during take-off, as this was one of the more unnerving parts of the flight for them.

4.3 User Survey

To complement and add to the data gathered in the market research phase, user surveys were conducted. This aided in getting a better understanding of the end users and insights of potential needs and wishes regarding gaming on Short Haul flights.

4.3.1 Preparation

The form was created using Google forms (See appendices). To get a better understanding of the end user and market, the form wished to seek an answer to the following metrics:

- Game genre segmented by age group
- Game genre segmented by gender
- Gaming habits segmented by age group
- Motivators to test out gaming for non-gamers
- Willingness to test IFE games on LCC
- Current use cases of IFE by passengers
- How users would like to interact with each other
- Other social functions which would motivate users e.g. leaderboards
- Purposes of playing a game on a flight

Age segmentation was done so the group could get a better understanding on how different age groups with different flight experiences would interact with games on flights. Gender

segmentation was also analysed to get a better understanding of one of the larger mobile gaming groups found in the market research, female mobile gamers.

The form went through two iterations of testing on selected target groups before being finalized and sent out. To get a larger amount of data with a higher range the form was spread through several channels. This includes different social media channels and personal contacts.

4.3.2 Survey Data

Data was gathered, analysed and then plotted to get a better understanding of the results (See figure 4.4 and 4.5).

The data shows that the largest categories across genders are as follows:

- Quiz/Trivia
- Arcade
- Casual

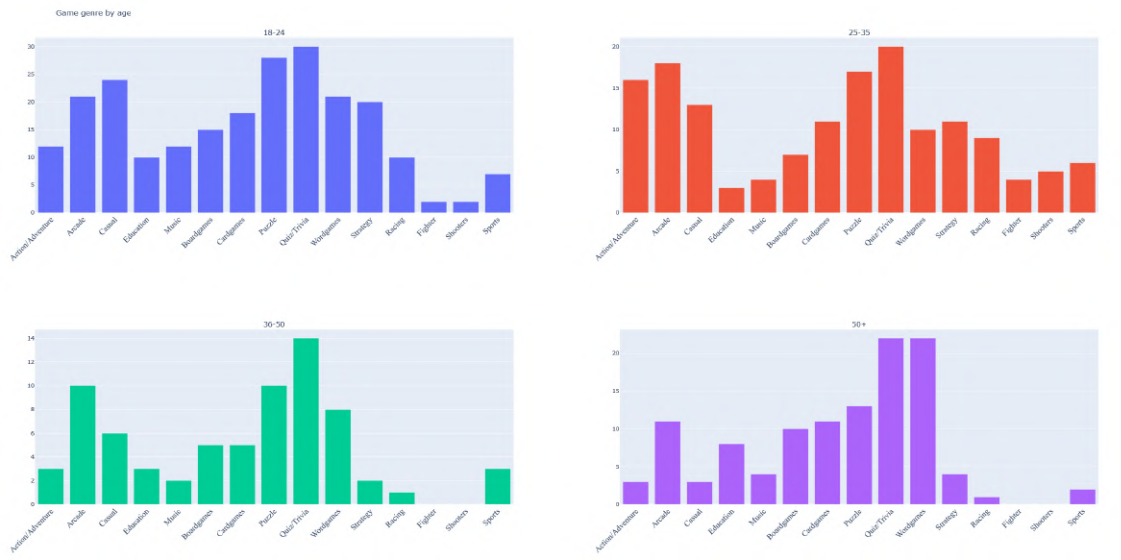


Figure 4.4: Survey data for game genre segmented by age groups

It was observed that the results were not affected by segmentation of gender, top genres from the survey were the same for both genders. Because of this the data was instead aggregated as the segmentation did not yield any extra information. From the data it was observed that the most popular game genres were quiz/trivia, then puzzle and lastly a tie between arcade and word-games. Other genres that could be investigated are strategy, board games and casual gaming as they were also popular amongst users who answered survey (See figure 4.5). From segmentation by age the game genres puzzle and quiz/trivia were popular across all age groups, however the strategy genre was more with younger age group than older age groups (See figure 4.4).

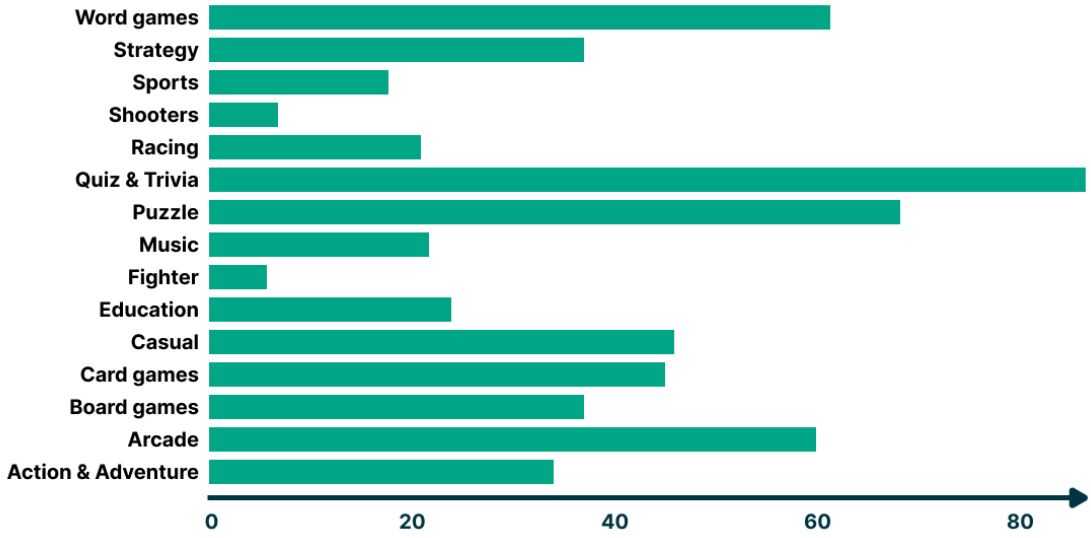


Figure 4.5: Survey data for game genre

The result also showed a moderate amount of willingness to test in-flight entertainment (IFE) games on short-haul flights (See figure 4.6). When answering questions regarding on how the users wished to play, the data shows that users like to decide themselves when they want to play (See figure 4.7b) and preferably with friends and family or would like to play alone (See figure 4.7a).

From the data it was shown that to increase willingness to play the game it was important that the game was designed in such a way that it followed certain criteria.

- The game should have clear rules and be easy to understand
- The game should not require to much focus
- The game should not require to much time and allow for shorter play-times

Except for the above criteria, players would also feel more enticed to play if there were other benefits to playing except passing time. Some of the more sought after features was the ability to gain something from playing. Either by learning something new from the game, like information or facts about the destination or the opportunity to earn loyalty points or store credits from playing the game.

Most participants answered that they did not have or did not notice an overhead screen during their latest short-haul flights. Most also answered that they did not notice any form of in-flight entertainment, during their latest trip.

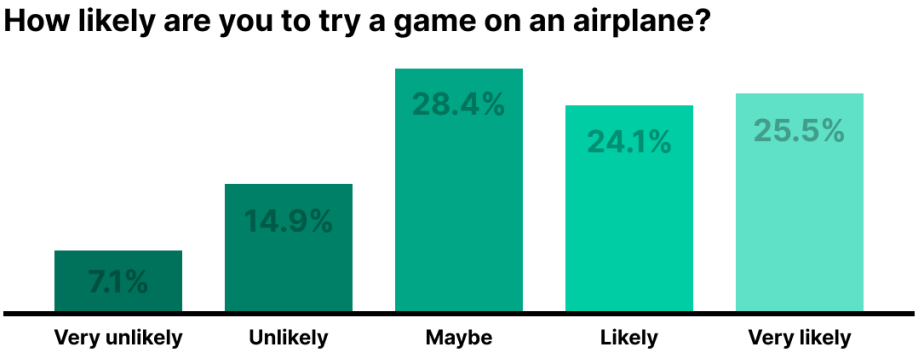
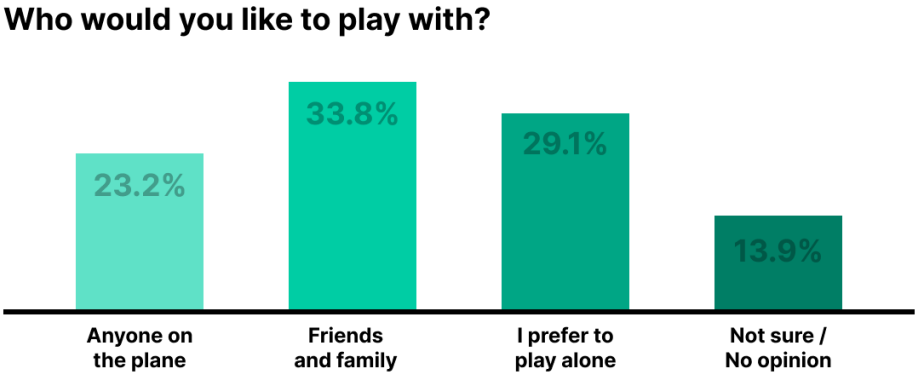
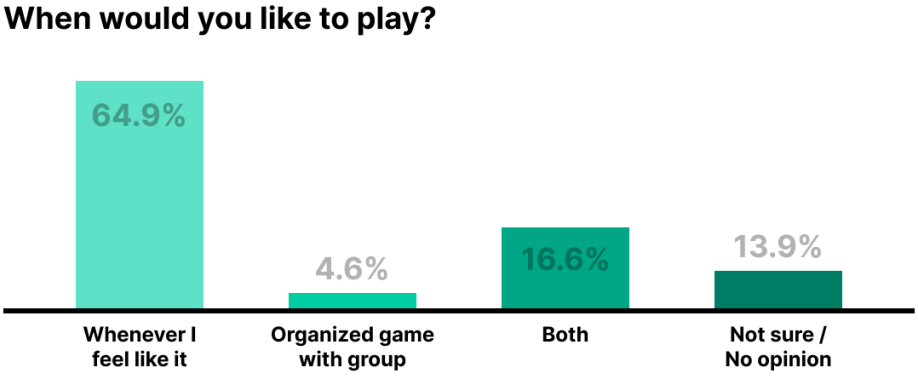


Figure 4.6: Likelihood of testing a game while flying



(a) Data on who the users wants to play with



(b) Data on when the users want to play

Figure 4.7: Data gathered regarding with who and when the users would like to play

4.4 User interviews

To get a better understanding of the market and the results from the survey, user interviews were setup. The goal of these interviews was to triangulate the data from the form and get ideas from potential users. Five interviews were setup, where the interviewees were a mix of different age groups, gender, and varying amounts of flight experience and gaming experience.

The target information for the interviews were.

- **Information about participant**
  - Age, interests, work e.g.
- **Gaming/entertainment habits**
  - Type of entertainment, categorical and specific entertainment alternatives
  - Frequency and time spent on entertainment
  - Newly tested entertainment options
  - Gaming habits
- **Target information specific to gamers**
  - Favorite game
  - What made you stick to that game
  - How does it compare to other games
- **Flight habits**
  - Flight frequency in the last 5 years
  - Ways of passing the time while flying
  - Walk-through of latest flight-experience
  - Wants regarding entertainment
- **Multiplayer game on flight**
  - How would the user want to play
  - What do they user want to play
  - When does the user want to play
  - How does the user feel about playing with other

From the target information an interview guide was created.

4.4.1 Interview data

A lot of ideas and information were gained from the interviews. Concepts and ideas from the interviews were written down and taken into consideration during the consequent design sprints (*See chapter 6: Design Sprints*).

Interviewees discussed the importance that the game wasn't luck based. The player should be able to perform better than others by having more skill within the game.

There was low interest in interacting with the overhead monitor, at most they wanted some information like leaderboard or the lobby to be displayed on the screen. There was a worry that to much information would be portrayed on the monitor. One interviewee mentioned that if they were not playing they would not want the overhead screen to be cluttered with the game, as that would be annoying. Another important aspect was also that all information found on the overhead monitor should be available on their own personal device, as some had issues with sight. It was apparent that there was a fine balance between portraying enough information to make the interviewee interested in playing and portraying to much information making the interviewee annoyed.

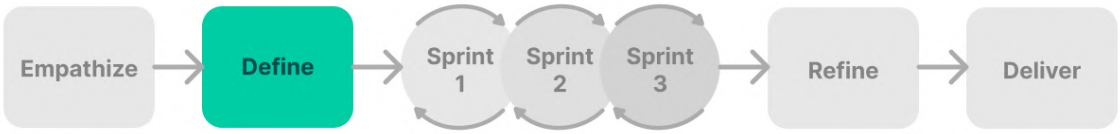
Integrity was an important topic, where interviewees wanted to make sure that they were anonymous while flying. They did not want other players to know who they were or that they were playing. Other points mentioned during the interviews were the ability to customize your character. As well as visual cues that you are not alone while playing was also something that would encourage some interviewees to continue playing.

Some interviewees expressed concerns regarding the threshold of entry, wishing for a sense of familiarity for the user. Even though the game could be a new concept, there should be familiar elements present in the game to guide them. This also included a low technical threshold. The interviewees expressed low interest in downloading an app, highlighting the frustration of already having too many apps cluttering their devices. Many preferred other ways accessing the service than downloading an app if possible.

Overall, there was keen interest toward testing out a game while flying. Four out of five expressed a need to be provided with better entertainment opportunities on their flights.

Chapter 5

Define



In the *define phase* the goal was to summarize the findings in prior phases in a structured way which would benefit the design process later on. Part of this is defining the core problems and needs in a concrete human-centered way, while at the same time making sure there is a clear consensus on what problems points the following design process aim to solve and avoid.

5.1 Key insights

Some key insight were summarized from the research phase to get a better understanding on what needs the end-user has and help the team design a product that the end-user would use. The most important ones are summarized below.

- Largest growing genre is hyper casual games
- Games help to relieve stress and pass the time, two important factors within entertainment on air crafts
- Most sought after genres were Quiz/Trivia, Puzzles and Word-games
- Users wanted to dictate when to play and with whom. Some even wanted to play alone
- Few people noticed the overhead screen during their flights

- The game needed to be non luck-based and mostly skill-based
- The overhead screen should contain low information and not be cluttered with the game
- Integrity and anonymity is important while playing
- Customizability is a fun factor that could drive engagement
- To increase willingness other rewards such as loyalty points or score credits could be earned while playing
- Users would feel more enticed to play if they were to learn something while playing the game

From looking at competitors some of the main takeaways used in the project were as followed:

- Options to integrate loyalty program into user experience
- Web-based gaming from personal device
- More features are available for those who download the app instead of only using the web portal

5.2 Personas

In order to better understand the different types of users, a number of personas were produced to create representations of key audience segments. These were based on the insights and data from the user research and interviews. In consequence of the sheer breadth of the target audience, it was impractical to produce the large number of personas needed to cover audience as a whole. Instead, four divergent key personas were established that would get a good amount of diversity while maintaining a reasonable workload. While this decision results in a lower level of detail in the audience analysis, it was decided to be a reasonable trade-off as it would otherwise consume too much valuable project time.

The personas were narrowed down to the four following:

(a) Alex, 11 **(b)** Sara, 27 **(c)** Christina, 45 **(d)** Björn, 67

Figure 5.1: Mockup images of personas. Images from unsplash.com.

- **Alex, 11**
  Alex is a boy who likes to play football and video games with his friends. He's currently in elementary school, where Geography and P.E. are his favorite subjects. He gets frustrated when he has to wait for things and has trouble handling more mundane periods without getting bored (See figure 5.1a).
- **Sara, 27**
  Sara is an IT consultant in Stockholm, a few years into her career. She loves to try new food and experience new activites with her circle of friends. She also enjoys watching Netflix at home with her partner to wind down after a busy day at work. She always wants to learn new things, but has a hard time finding enough time for hobbies and interests in her busy life (See figure 5.1b).
- **Christina, 45**
  Christina is an experienced manager in the car industry. She has two teenage sons at home that she and her husband take turns driving to tennis practise. She loves traveling, food and pub quizzes, but spends most of her free time with the family. She's currently training for her first marathon and generally hates unnecessary time-consuming activities (See figure 5.1c).
- **Björn, 67**
  Björn is a retired journalist who has finally settled in Portugal with his husband after a life of traveling for work. He's very interested in history and different cultures, and loves Mediterranean cuisine. He's currently writing a book and is working on his golf handicap. As he's just entered retirement, he is trying to cut out the stress in his life and focus on video chatting with his grandchildren. He has a hard time with the small text sizes on computer screens and prefers reading physical books (See figure 5.1d).

5.3 Design Brief

Based on the findings from the market research and user research, a design brief was formulated in an attempt to define what a possible solution should embody. The key aspects of this design brief is summarized below, but the whole document can be found in Appendix X.

The product or service should:

- Entertain passengers on short-haul flights
- Create a shared gaming experience between passengers
- Quickly allow new and inexperienced players to get into and understand the game
- Allow for prolonged entertainment without getting bored
- Promote a positive image of the airline and build loyalty in the player.
- Tie into to existing systems of the airplane and/or airline.
- Be playable without negatively interfering with other passengers' experiences.
- Include the personal devices of the passengers and the over-head screens in the aircraft

5.4 Functional Analysis

In an attempt to map the different kinds of functionality needed in the solution, a functional analysis was also made (See table 5.1). This process was based on the information and insights provided by the market and user research, as well as minor input from mentors. Where ideas can otherwise be unorganized and messy, the value of the functional analysis lies mainly in providing a structure to build ideas from. See table below for a summary of the functionality.

Functional Analysis		
Verb	**Noun**	**Classification**
Provide	Entertainment	MAIN
Offer	Distraction	R
Appear	Exciting	R
Create	Enthusiasm	R
Invite	New players	R
Provide	Friendly competition	R
Lower	Threshold to entry	R
Engage	People	R
Create	Sense of accomplishment	R
Promote	Loyalty	N
Create	Sense of progression	N
Learn	New information	N
Offer	Reward	N
Provide	Personalization	N
MAIN = Main function, **R** = Required, **N** = Nice to have		

Table 5.1: The functional analysis contains three columns, verb, noun and classification. The verb together with the noun creates a function. Each function is given one of three classifications. These classifications dictates how important the function is for the solution.

The function 'Provide Entertainment' was chosen as the main function of the solution, as this is the most vital feature. Without it, the solution lack value as the most basic purpose is not met. A number of functions were classified as Required, as they represent important features and mechanics. The rest were classified as 'Nice to have', as they could add additional value, but was not vital for the solution.

5.5 Expert Workshop

Each week the design team at Tactel holds a design workshop where employees are allowed to submit their problem and gain help. These sessions are for brainstorming new ideas and concepts and give an outside perspective. The thesis workers decided to participate in one of these workshop and submit their problem.

The workshop was setup in such a way that the project was first presented to the designers. All brainstorming was done on a shared board digitally with each designer getting their own board to put ideas in. The designer was then assigned a board to brainstorm in (See figure 5.2). Inside this board they were to put sticky notes for each of their ideas. Above the board there were support words the designer was to keep in mind while generating concepts.

After a set amount of time had passed the designers moved over one square into another participants square. The timer was started again and now the designer was supposed to build upon the ideas of the earlier designer, help define the concept more clearly. The results were then summarized and brought into the design sprints.

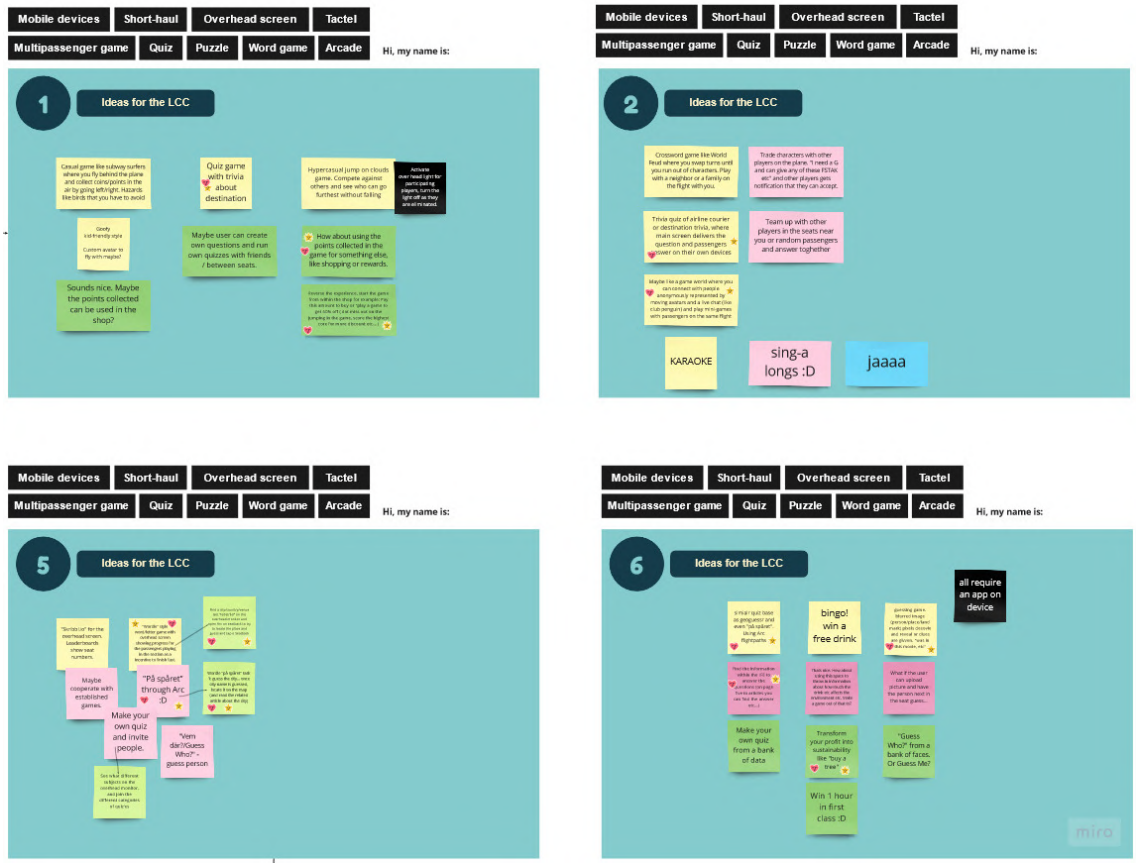


Figure 5.2: Overview of how the workshop was structured

Chapter 6

Design sprints

With the help of research from the earlier phases of the project, design sprints were set up to rapidly design and test ideas to use for more refined prototyping in later stages. A design sprint is a condensed and sped-up version of a whole design process focused on a specific goal or component, utilizing the design thinking mindset (see chapter 3.1 'Design Thinking').

Each design sprint lasted roughly a week, with a small period in between to summarize and refine prototypes and ideas gathered in each step. *(See chapter 3.3 'Design Sprints' for detailed view of each step).* To get a more nuanced look on the concepts designed during the sprints, outside help was brought in during the decide phase of the sprints. These experts were brought in and presented with the concepts generated in the sketch phase and where then asked to give their opinions on the ideas. Afterwards they were asked to decide on which concepts were their favorite. Each sprint ended in a single or a small number of prototypes which were then tested on a selected group of users within the company.

6.1 Design Sprint I

For the first design sprint the goal was to generate a number of concepts for the core gameplay loop. The concepts should complement each other in terms of audience reach. It was decided that more than one idea should come from this sprint, as the data indicated that it was improbable that one idea would be able cover the whole target audience.

When creating concepts for the core gameplay loop, casual game design theory (See chapter 2.4 'Game design theory') was kept in mind to help steer the team away from classic pitfalls in the game creation process.

In this sprint several questions regarding overall design and a user flow mapping were created. These were deemed to exceed the scope of the first design sprint, and were made as general preparation for all sprints (1-3). The user flow was created to get a better understanding of the necessary components required to create a *"Satisfying game experience"* (See figure 6.1). The subsequent goal was to find a solution to every step in the user flow and understand how these interact with each other.

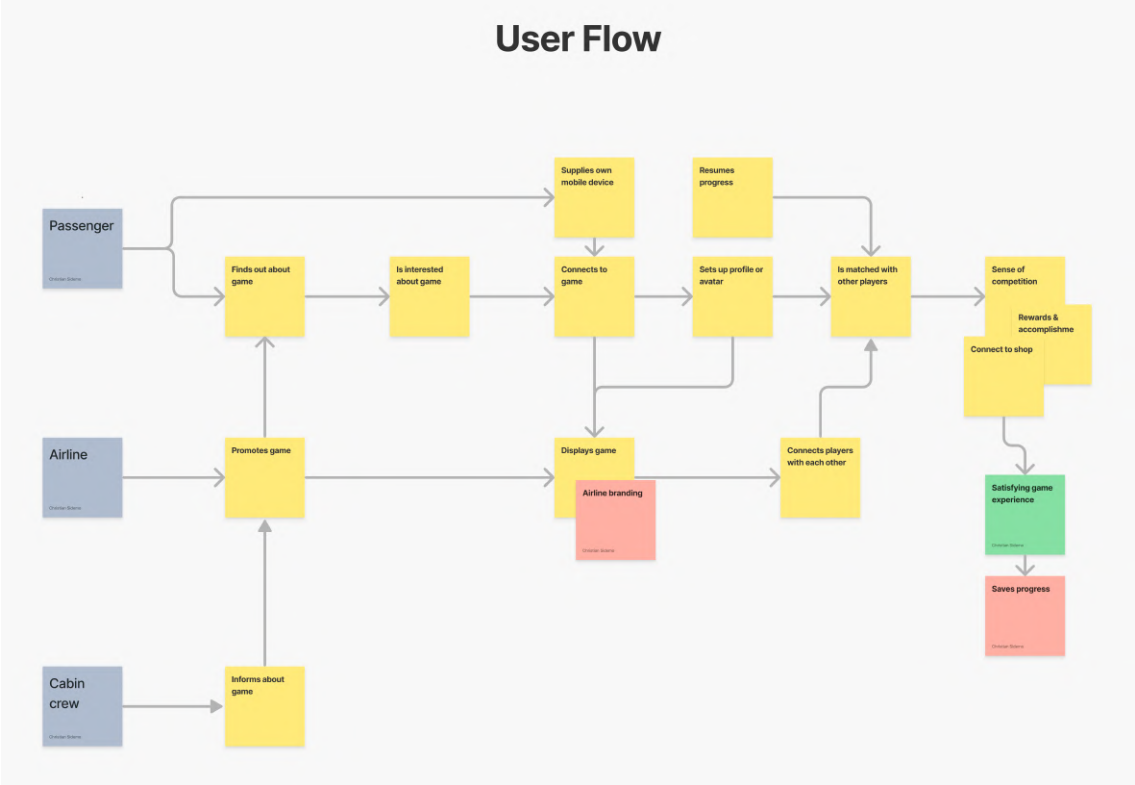


Figure 6.1: User flow created in *Design sprint I*

To make sure the team achieve results that satisfied the needs of the end user and airline client, points of failures were setup. These were created so the team could better understand what the choke points might be and to have them in mind during the sketch phase. The points of failure were identified as follows:

- Game is perceived as boring by the audience.
- Decisions based on inaccurate or incorrect data
- Unable to create a Lo-Fi prototype that fairly represents the gameplay experience.
- Unable to see past previous ideas and concepts
- Game components do not form a cohesive concept.
- Game does not reach target audience.

- Airline does not see the value of proposed game concept.

How Might We's (HMWs) were set up to facilitate an easier design process and frame the possibilities the team wanted to achieve with the final prototype. The HMWs were established for the whole system and not only for the game, so they could be used for later sprints, but also as a reminder to design concepts that will work within a larger system. The HMWs were sorted and divided into different categories (See figure 6.2).

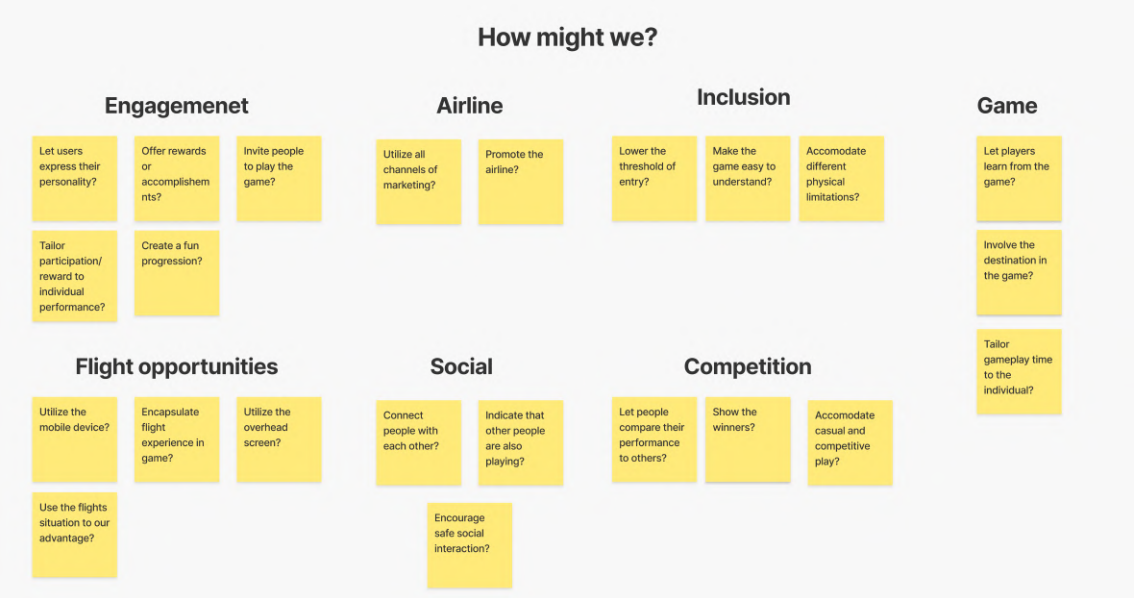


Figure 6.2: Categorised 'How Might We' notes

From the HMWs generated a selection was picked to be featured in this design sprint.

How might we ...

- ...let players learn from the game?
- ...involve the destination in the game?
- ...tailor gameplay time to the individual?
- ...accommodate casual and competitive play?
- ...make the game easy to understand?
- ...lower the threshold of entry?
- ...accommodate different physical limitations?
- ...utilize mobile devices?
- ...encapsulate flight experience inside game?
- ...connect people with other players?
- ...indicate that other players are also playing?

6.1.1 Concepts

The concept phase (also called 'Sketch' phase) was initiated with a quick recap of insights leading into a individual brainstorming session. Then began the rapid concept generation with analogue pen-&-paper techniques. This was decided as an effort to lower the threshold between the brain and the documentation medium, and to quickly be able to document the ideas.

A selection of the concepts are summarized below. The full concept material can be found in Appendices. Some of the concepts were completely ideated in the design sprint, whereas other concepts are a combination of ideas and mechanics put aside from the expert workshop held during the define phase.

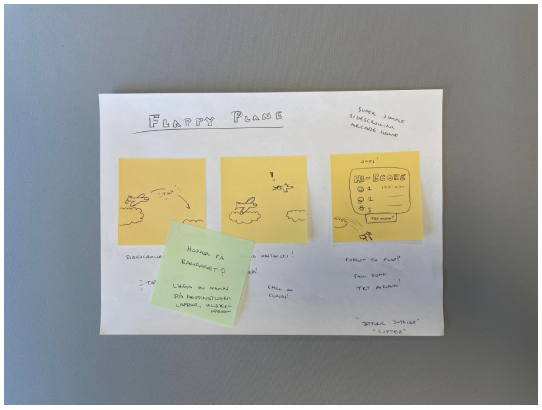
- **Flappy Plane**
  With inspiration from the once popular game "Flappy bird", *Flappy Plane* was a side-scrolling arcade game concept where the player controls an airplane in the sky, trying to jump between clouds and avoid birds coming their way. The goal with the game was mainly a simplistic and fun arcade game that players find familiar and could quickly get into without having to read instructions.

- **Where to Next?**
  With some similarities to the popular Swedish game show "På Spåret", *Where to Next* aims to bring the geography and trivia quiz concept into the skies in order to cater to a more mature audience. Players are presented with clues about famous destinations and tries to guess which city they are referring to. The earlier they guess, the more points they get if they get it right. If they wait, they get more and easier clues. The destination is then revealed and some trivia about the city is presented.

- **What's the Catch?**
  What's the Catch? was an arcade game concept where the player controlled a baggage claim worker on an airport, trying catch falling bags and suitcases in a trolley. Every now and then the player has to empty the trolley before it overflows, creating another layer of complexity and an opportunity for players to express their skill. The proposed concept also suggested an alternative for playing together with a friend, helping each other to catch the bags and cooperate.

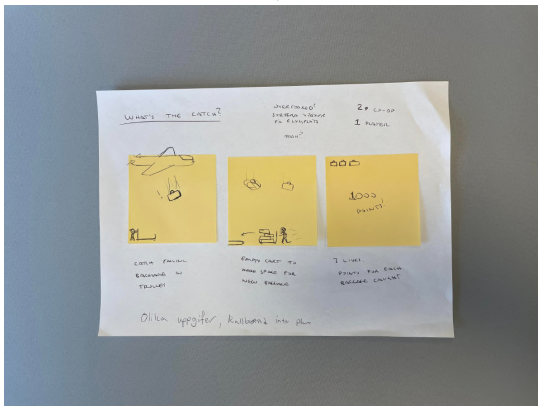
- **Jetstream**
  Jetstream is a 3D game concept where the player controls a character gliding on the jet stream behind an airplane. The goal is to try to catch coins and avoid hazards such as thunder clouds by steering left and right. This concept follows the design of an 'infinity runner' arcade game, where the player tries to get as far as possible and collect the most amount of points possible, with the difficulty level increasing incrementally, the further they get. An idea for a multiplayer mode was syncing the start of all the players on the aircraft, and then displaying how many players were still alive to create a sense of accomplishment. This of course having the drawback of increased wait times for players who failed early on.

- **Drawing in the sky**
  This was a game concept inspired by popular games such as "Draw Something" or "Drawful", where one player is presented with a word or phrase and are then tasked with drawing a representation of the word for the other players to guess. The idea was to customize the theme of the game to better fit the airplane experience, drawing with clouds on a clear blue sky.

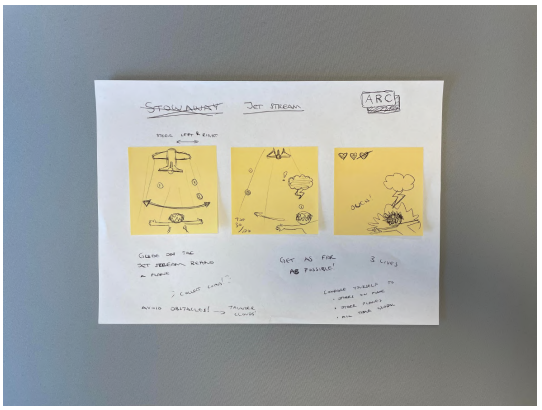


(a) Flappy Plane

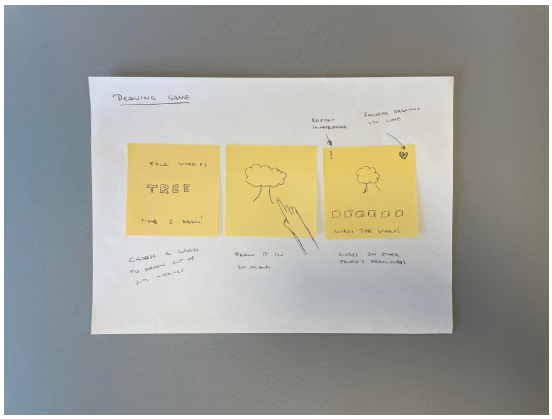
(b) Where to Next?



(c) What's the Catch?



(d) Jet stream



(e) Drawing in the sky

Figure 6.3: Concept sketches for five different core gameplay ideas

With limited time and resources, many concepts had to be cast aside for others to prevail. One such was *Drawing in the sky*, since after some discussion and testing of similar online games was deemed too risky for airlines to implement and moderate. Players are free to draw whatever they like and some players choose to abuse this by drawing profanities and sexual content.

Other game concepts such as *Flappy plane* and *What's the catch?* were promising, but they were deemed hard to promote towards airlines as they did not depict the industry in a good light with bags falling out of the sky and airplanes crashing. A number of core gameplay mechanics that were found enjoyable were developed and used in other concepts. For example the best parts from the aforementioned concepts were combined into a new concept called *Baggage Run*, a side scrolling game where the player controls an avatar jumping over bags at the airport to get to the gate in time.

Then experts were brought in and presented with the concepts generated in the sketch phase and where asked to give their opinions on the ideas. Afterwards they were asked to vote for their favorite concepts together with the team. Each participant got two votes to distribute, and the concepts with the least votes were put aside and archived. The most popular concepts were prototyped.

6.1.2 Prototypes

There were two concepts that passed the voting phase and continued into the prototype phase. The main and largest game was *Where to next?*, followed by the smaller arcade game *Baggage Run*.

Where to next?

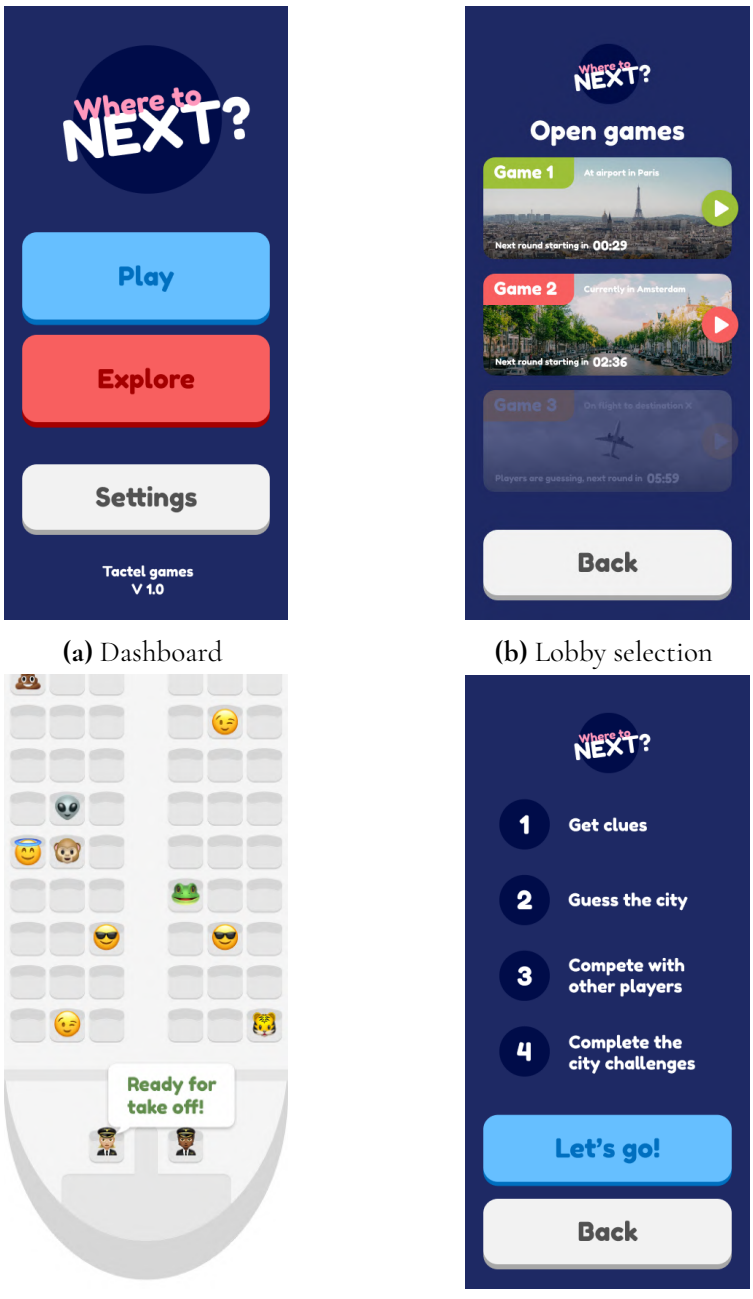
The prototype for *Where to Next?* was created using Figma, as it allowed for rapid prototyping as well as interactive user testing on mobile devices without having to actually code an MVP.

When the user opens the quiz game *Where to next?* they are met by a decision to either join a lobby to play with other players or explore the game single player (See figure 6.4a). If the player decides to play the multiplayer mode they then get the choice of which lobby to join (See figure 6.4b). The player can join any lobby that isn't "mid-flight", i.e. not in the quiz phase of the game. The lobbies are desynchronized, meaning that they are at different stages of the game at a given moment. This means the player should not have to wait for prolonged periods of time before being allowed to play, since at least one lobby should be close to starting a new round.

After joining the lobby the player's avatar gets placed into an airplane with other players while waiting for the game to start. Here they can interact with each other while waiting (See figure 6.4c). Interaction is predefined from a preset of emojis, this to combat any form of abuse and harassment that might occur with non-restricted chat. Each round takes the player to a random destination in the world from a list of destinations decided at the airline's discretion.

To make sure the player understand the rules of the game, the player is shown a quick tutorial screen before entering the game and the first round of gameplay-loop begins (See figure 6.4d).

The core gameplay loop consists of two parts, the first part is the travel phase. Here the user is met with a quiz where they need to guess the correct destination they are traveling to. The player has 60 seconds to guess the correct destination and for each ten second decrement the player is given a new clue making it easier to guess the destination (See figure 6.5a). The quicker they lock in their answer, the more points they potentially gain. The user only has one chance to get it correct and points are only given for the right answer. When the timer ends the user arrives at the correct destination, showing whether they are right or wrong, together with points gained from the round (See figure 6.5b).



(a) Dashboard

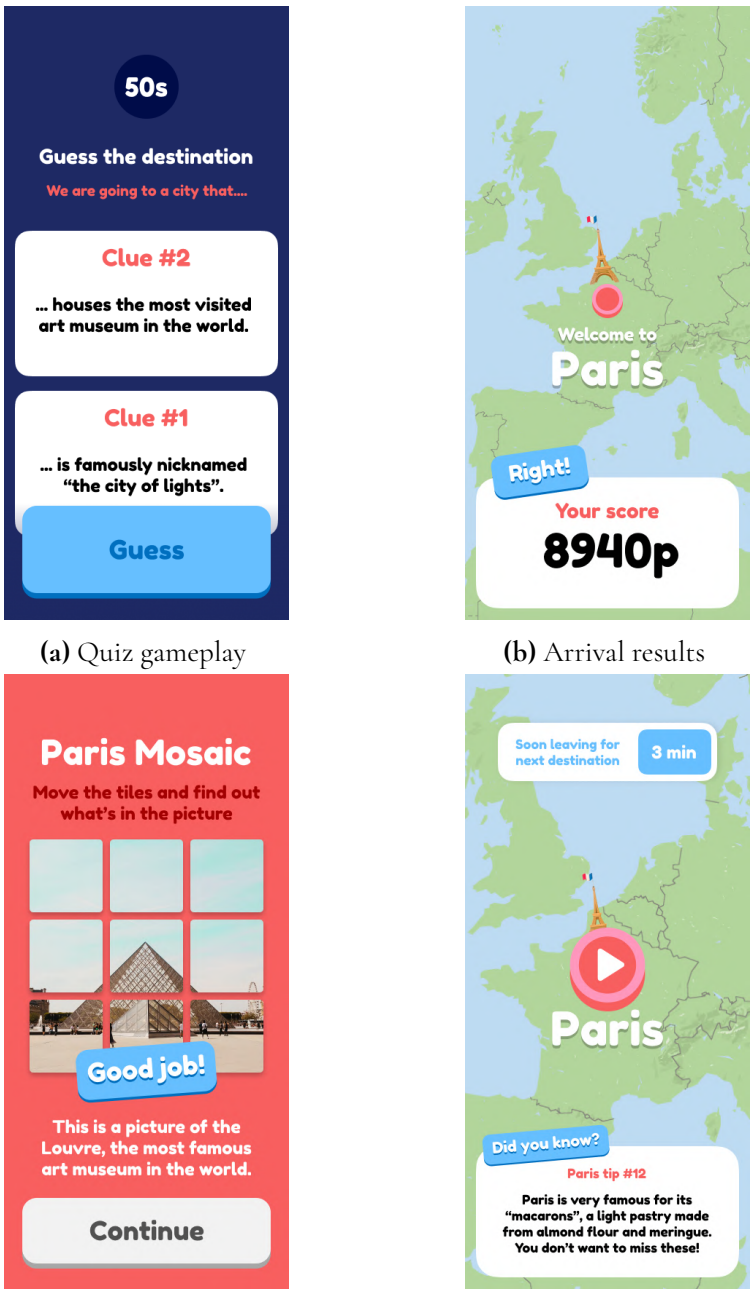
(b) Lobby selection

(c) Lobby

(d) Game rules

Figure 6.4: Views of the on-boarding phase for *Where to next?*

When arriving at the destination the user is met with a mini-game. The mini-game in the prototype was a mosaic game, where the user has to move tiles correctly to create an image of a local monument which on completion will display an interesting fact about the monument (See figure 6.5c). On release the game should contain several mini-games randomized so the player experiences a new mini-game for each destination and also keeps concurrent visits fresh with a new mini-game. After completing the mini-game the player is met with fun facts and tips about activities and famous places near the destination. A timer shows when the next round is about to start (See figure 6.5d).



(a) Quiz gameplay

(b) Arrival results

(c) Mini-game

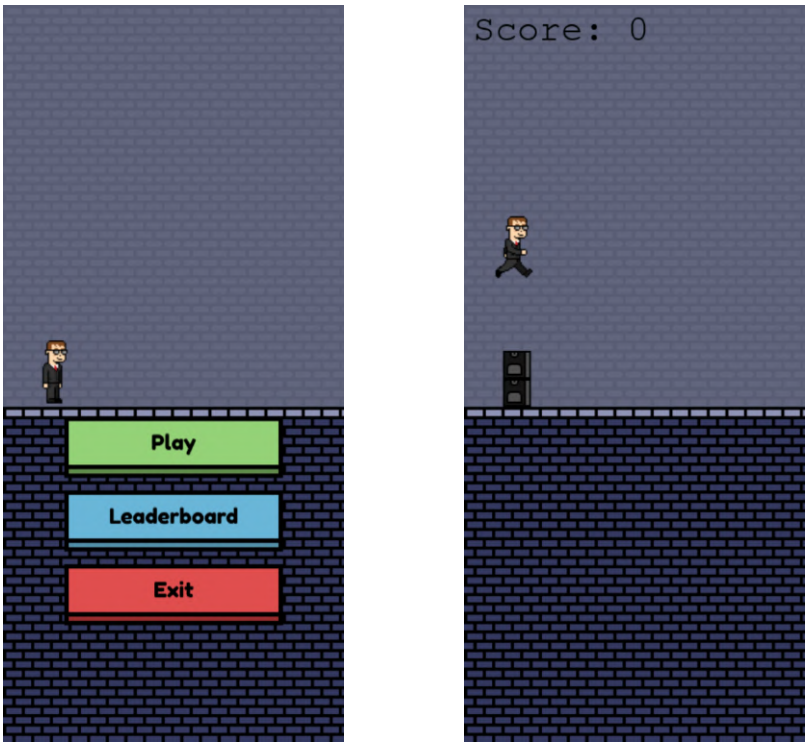
(d) Post Mini-game

Figure 6.5: Views of the core gameplay loop *Where to next?*

6.1.3 Baggage Run

The next prototype *Baggage Run* was created using the framework Phaser3 and hosted using Github pages. This allowed the user to play an early alpha version of the game on their own phone and also allowed the team to test the technical viability of a web-based game as an option for the real platform.

Baggage Run is an infinity runner arcade game where the user takes control of the character *Steve*. Steve is in a hurry to catch his next flight and has to jump over bags in the terminal that are in the way (See figure 6.6). For each completed jump the user gains a point and the score displayed at the top of the screen is updated. The users score will then be uploaded to a leaderboard which the user can compare it's score toward other players. The leaderboard was not implemented in this early version of the game.



(a) Start Screen **(b)** Gameplay

Figure 6.6: Prototype of the core gameplay loop *Baggage Run*

6.1.4 Testing

To test the prototypes, think-aloud interviews were conducted as well as guerilla testing (See chapter 3.5 Data Gathering Methods). The think-aloud interviews were conducted in a room provided by Tactel. Four Tactel employees from different departments in the company were asked to test the prototypes. The interviewee was asked to sit in a chair, resembling how they might be seated in an aircraft. They were then given a phone with the prototypes to use during the test.

The interviews were split up in two larger parts, first part for *Where to next?* and the second part for *Baggage Run*.

Where to Next?

For *Where to next?* the test was split up in four main segments, each segment testing a specific aspect of the system. For each part of the test, the user was given a list of tasks to perform in order, and after all were completed they were asked a couple questions regarding their experience. The test segments were divided as follows:

- **Onboarding**
    1. Find a multiplayer game to join.
- **Lobby**
    1. Choose the dog as your character.
    2. Interact with other passengers.
- **Gameplay-loop**
    1. Read two or three hints.
    2. Try to guess the right city.
    3. See if you got it right.
- **Minigame**
    1. Start the minigame in Paris.
    2. Play the game.
    3. Wait for plane to leave for next destination.

After the user had finished all sections, a discussion was held regarding the experience they had and any concerns or areas of improvement they might have thought of during the process. To not influence the test excessively, the tasks were phrased in a way to not guide the user more than necessary. They had to identify the where and how to navigate the prototype by themselves.

Baggage Run

Since **Baggage Run** is only a smaller arcade game, the user was asked to play for a while and during each play-through notes were taken on how the user played and what they said while playing. In the same way as before the user was given a list of instructions, as follows:

- Take out your own mobile device
- Navigate to **www.airplanegame.fun**
- Play 3-5 rounds

After the user had played for a while some concluding questions were asked regarding both baggage run but also the whole experience and how the users felt these two games could work in a catalogue together.

Guerilla testing for *Baggage Run* was done when the team saw fit, these tests could be during hangout with friends, meeting strangers in a day to day setting or asking unsuspecting colleagues at Tactel. The tests were formatted in a way that the player got to test the prototype in a non structured way without a guide while the person initiating the test observed and asked open-ended questions about the experience. Focus was primarily on how the user interacted with the prototype without any instructions, as well as what they said and what feeling they expressed while interacting.

Feedback from tests

To capitalize on the feedback gained from user testing, a small period of time in between sprints were taken to summarize the feedback and implement changes that seemed relevant and would improve upon the user experience. Changes which seemed out of scope or were to large to fix in this iteration was documented for future improvement.

A majority of the users came to the conclusion that the position of their avatar in the game was correlated to their real position on the plane, and that this information would be displayed on the screen for everyone in the lobby. Some users expressed that this was frightening to them, as they could be identified and their anonymity compromised. This was never the intention of the prototype, but was caused by the lobby too closely resembling a realistic seating map in a plane.

There was also some confusion regarding if the user had the option to type text to communicate with each other in the lobby, as the Non-playable characters (NPC's) could do that in this prototype version. In the lobby it was also difficult for the testers to find how much time was remaining before the game started. This was caused by the timer being fixated to the bottom of the lobby, and required the user to scroll down in order to become visible.

Testers also desired the option to "stay" in the country after landing there and play more minigames and learn more things, instead of having to join the next lobby after a timer reached 0.

Buttons that said back should be changed to continue, as testers felt like they were quitting the game otherwise. Testers also wanted the color scheme of the buttons to stay the same. Meaning they wanted start and back to be the same color through all the views. Most testers didn't feel a sense of playing with others as soon as the game started.

From this several areas of improvement were setup. For *Where to next?* the following areas of improvement were to be added.

- Change lobby layout to reduce sense of reality.
- To increase the sense of multiplayer more score comparisons between players will be added .
- The countdown to next game will now follow the screen in the lobby instead of being fixed to the bottom

- Change button names and color to match function better.
- Give the user and NPC the same options for communication.
- Add a teaser in the beginning of the game to show users what the gameplay looks like.
- Add more activites to do for each location and let player stay in city instead of joining next lobby.
- Indications that a screen is scrollable will be added where applicable.
- Emphasize stress factor of time based challenges, implement points being countdown to create a sense of urgency.

For **Baggage Run** the players had a hard time understanding how the controls were intended to work. Instead, many found their own ways of playing the game. A majority of users expressed a wish to double jump in the game to be able to save themselves in dire situations.

Concerns about difficulty level were also addressed, where the user felt the game was too difficult in the beginning when learning the controls. After reaching 10-20 points, the difficulty level was interpreted as getting easier by some players even though the speed increased. This was due to the timing not being as important as the speed of the bags increased. After 50-55 points, the difficulty scaling was too steep, making the game virtually impossible to continue.

6.2 Design Sprint II

The goal in *design sprint II* was to flesh out the overarching system that should contain the games from *design sprint I*. This included generating concepts on how a platform could be designed, how to tie rewards into gameplay, integrate airline branding, functions that would give an edge to the platform compared to other existing systems and in-flight shop integration into the platform and game. The scope was set wide to make sure the team would not be limited in which ideas could be produced.

The sprint was setup in the same way as the prior sprint and preparatory work done in *design sprint I* was reviewed then updated with learning's from the earlier sprint and tailored to fit the narrative of the new one.

Relevant points of failures were carried over and new ones were created for this process, to encapsulate some of the hardships encountered in the new scope. Some of the new ones are as follows:

- Platform is too scattered and confusing for the user.
- Airline sees no value in adding it to their current offering.
- Concepts are not in line with airlines current narrative, instead have a negative effect on their image and branding.
- Concept are not adaptable and modular enough to tailor to a specific airlines, instead prototypes become to predefined to change for different layouts and uses.

- Scope is to wide, making the concepts from the sprint shallow as the team has to keep to much information in mind while brainstorming.
- Platform does not pay for itself, instead becomes a large cost for the airline to maintain.

From a client perspective it was learned from a meeting with *Panasonic Aviation* that some airlines require that extra systems on-board to be profitable and pay for themselves. As the concepts and prototypes developed in this sprint should be applicable and work with all current airlines within the portfolio, this had to be taken into account when generating ideas. Making sure the team emphasized advertisement and integration of shop elements into the platform and had concepts on how this could be implemented.

As in the prior sprint HMWs were used to frame possible opportunities the team shall work toward. The HMWs created in the prior sprint were reviewed and the relevant ones were brought into the sprint. The result was the following HMWs.

How might we....

- ... let people express their personality?
- ... offer players rewards and accomplishment?
- ... let players learn from the game?
- ... tailor participation/reward to individual actions?
- ... promote the airline?
- ... integrate the game with in-flight shopping?
- ... give loyalty rewards?
- ... let players compare their results to each other?

6.2.1 Concepts & prototypes

Since the sprint had a large scope, focusing on several different functions, smaller concepts were grouped up into larger systems. These groups underwent separate ideation processes in an effort to structure the workflow. Afterwards, the concepts were then categorized into either one of two groups; 'Primary concepts' or 'Secondary concepts'. Primary concepts are concepts that are necessary for the platform to work and fulfill requirements placed on the project.

Secondary concepts are concepts which will add value for the end-user and drive engagement, but are not vital for the system to work. Instead, they are functions that could create an edge to the system, steering the user toward recurrent use and preference of the application over applications they have on their local device.

Primary concepts

The vital concepts from the ideation phase resulted in four main categories of functionality. Dividing them into categories made sure the concepts were coherent and fit together

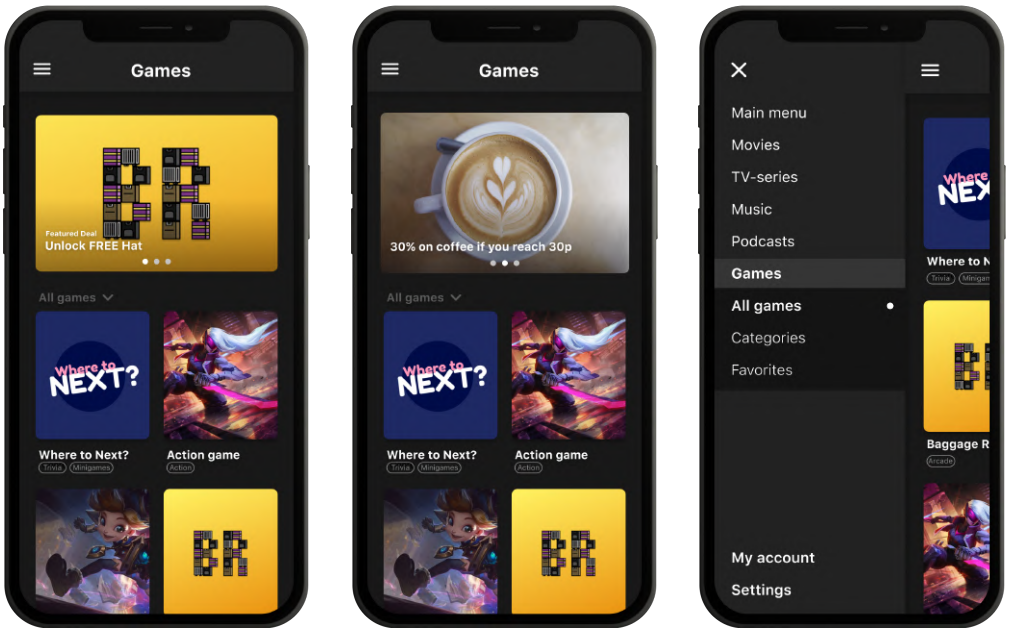
as components. It was from these concepts prototypes were created using Figma. The four categories that are as follows:

- Platform design and store integration within the platform
- Store integration into current game offering
- User profiles
- Leaderboard

Platform design and store integration

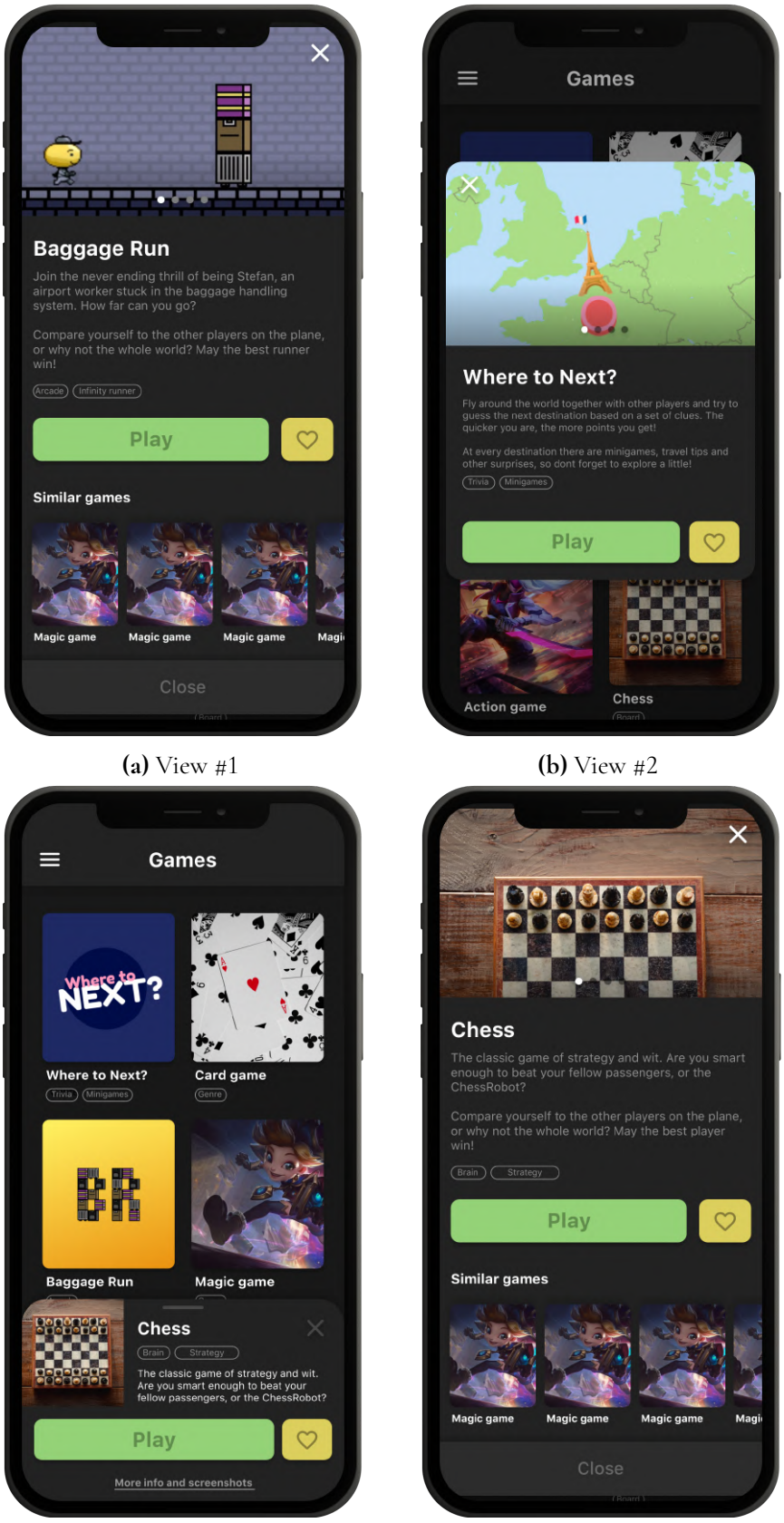
Since the platform was required to have some necessary functions and be able to tailor to individual airline companies, two types of platforms were set up. The first platform had a higher focus on functionality and presentation of information, keeping the color scheme simple (See figure 6.8). The second one was more colorful to show how different colors could be used for airline branding (See figure 6.9) and create a more exciting experience. For the layout of the platform it was decided that the platform would have a card view, as this would allow for scalability when adding more cards such as game titles or store items. This would also resemble familiar systems that the users might be more accustomed to (See figure 6.7).

At the top of the platform view there was a content carousel which would display information such as featured games, featured deals and introduce in-game rewards players could obtain by playing specific games (See figure 6.7a and 6.7b). For example obtaining a certain score in *Baggage Run* could net you a discount on a coffee in the shop, driving both engagement toward the game as well as the in-flight store.



(a) Featured game **(b)** Featured deal from game **(c)** Hamburger menu opened

Figure 6.7: Prototype of the platform



(a) View #1 **(b)** View #2

(c) View #3 closed **(d)** View #4 opened

Figure 6.8: Prototype of the preview cards

In the top left corner there was a hamburger menu icon, which opens a side navigation panel. Here the user could navigate to other media alternatives, as well as their account settings and app settings (See figure 6.7c). This to simulate the gaming platform being part of a larger entertainment system. When selecting the 'Game' section in the side navigation, the user can filter the games displayed by either choosing all games (See figure 6.7a), 'Categories' where they can filter by game genres (i.e. action, quiz or arcade) and 'Favorites' where they can view their favorite games they have saved.

When selecting a game, the user is shown a preview card that displays a short description of the game. Some different concepts on how these preview cards could be designed were created (See figure 6.8). The first alternative had the card cover the whole screen portraying as much information as possible, the second one partially covered the screen allowing the user to still view some of the platform in the background, and in the third alternative a smaller preview appeared in the bottom of the screen with limited information, but which could then be dragged up to reveal a larger preview with more information.

Each game preview card had information such as game genre, similar games and short description of the game to create interest about the game and entice the user to play it. At the top of the card there was a image carousel with screenshots from the game, to help the player further understand what type of game it was. The user also has the opportunity to favorite their games, saving them in the 'Favorites' view found in the side navigation panel. This to allow for quicker access and for later use on future flights (See figure 6.8).

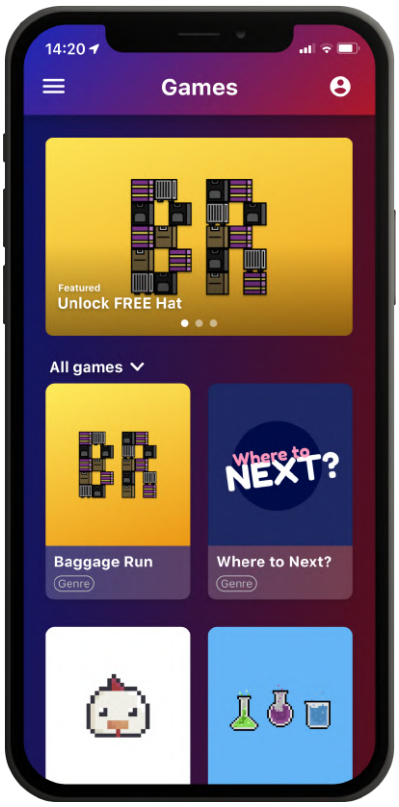


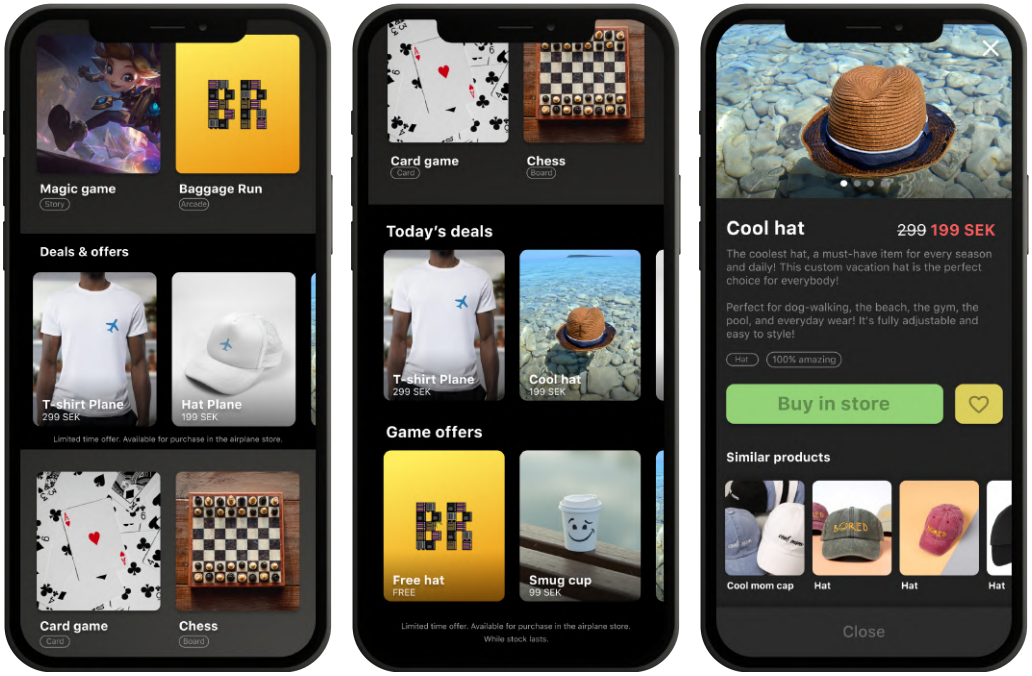
Figure 6.9: Prototype of colorful alternative

Store integration within the platform

To test different ways of integrating the in-flight shop into the platform, two different prototypes for how the shop could be displayed was created. The first alternative had a promotional row in between rows of game cards, and the second one had the promotions as a section at the bottom after the game cards (See figure 6.10). This section contains store products, deals and offers.

In addition to this there was also a row for game offers, such as free skins that players could redeem in game. Creating two systems forced the design into a more modular approach, where the airline themselves could decide how they want their shop integration to be tailored. This also allowed tests to be conducted for gathering data on the experience with different shop integration alternatives.

When pressing a store item, a larger preview was opened up with a short description of the product or service and recommendations on similar products. (See figure 6.10c). Pressing the button brings the user to the in-flight store, allowing them to purchase the item. This store connection was however not inside the project scope.



(a) Store in the middle **(b)** Store at the bottom **(c)** Store preview

Figure 6.10: Prototype of store integration in the platform

User Profiles

To allow the user to save achievements, compare themselves to others and recognize their own name on the leaderboard there was a need for user to have a profile where such information could be displayed (See figure 6.11). The achievements were displayed as badges that were earned through playing different games, these badges can be inspected by other players to be impressed and also learn how to unlock them.

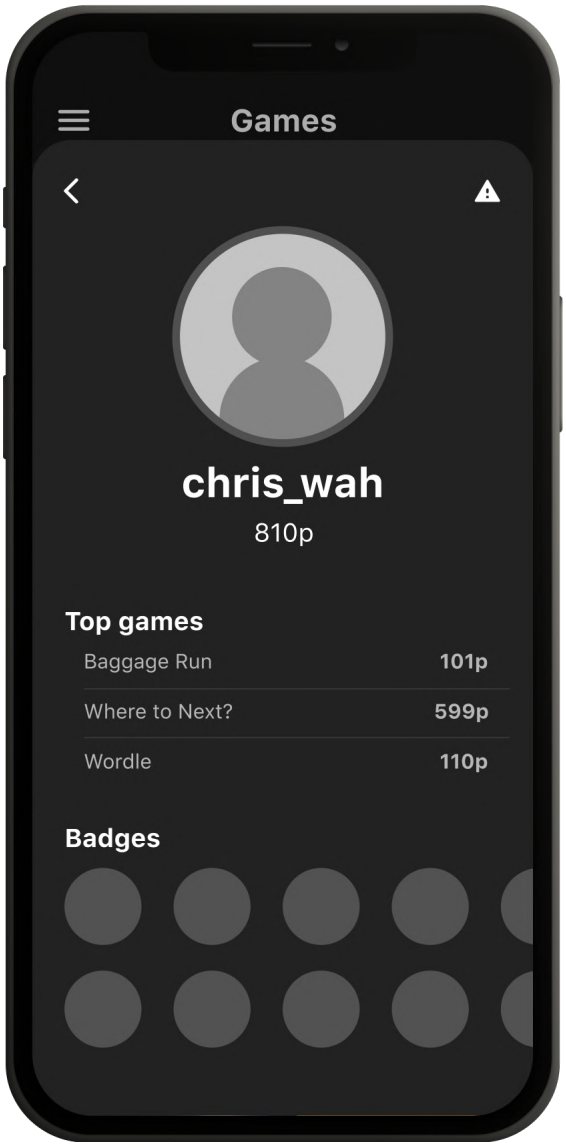


Figure 6.11: Prototype of the user profile

Shop Integration in current game offerings

Ideas for shop integration within **Where to next?** were discussed and drafted in this sprint. These ideas contained tips on souvenirs one could buy from the shop that was bound to the location, for example after a game a local sports teams' shirt could be displayed with a link to the store. Another concept generated was unlocking discounts from playing, for example

when a player unlocked a certain hat inside *Baggage Run* the player could buy that hat in the shop for a time limited discount. What deals and to what extent these deals should be displayed is up to the airline. In *Where to next?* the deals were placed in the same spot as the tip (See figure 7.2b), so if the airline would opt out of displaying deals in-game, only tips would be displayed.

Leaderboards

Since the user research indicated that a group of users wished to compare themselves to each other on their own terms, it was decided to make a concept for leaderboard functionality. This also create an opportunity for friendly competition for those who expressed that need (See figure 6.12).

The leaderboard contains several tabs where the user can segment ranking by different filters. The three filters decided upon for this concept were filtering 'by plane' so the user could see how they compare to others played currently on the same plane, filter by 'in air' comparing themselves to other players currently flying and lastly 'global rank', showing scores from all player around the world.

At the bottom of the leaderboard the user's rank and score was displayed, this bar followed the player when scrolling through the rankings so they could always see how they compared to specific players. Each game should have a separate leaderboard and one leaderboard for total points accumulated in games could exist as well (See appendices for sketch).

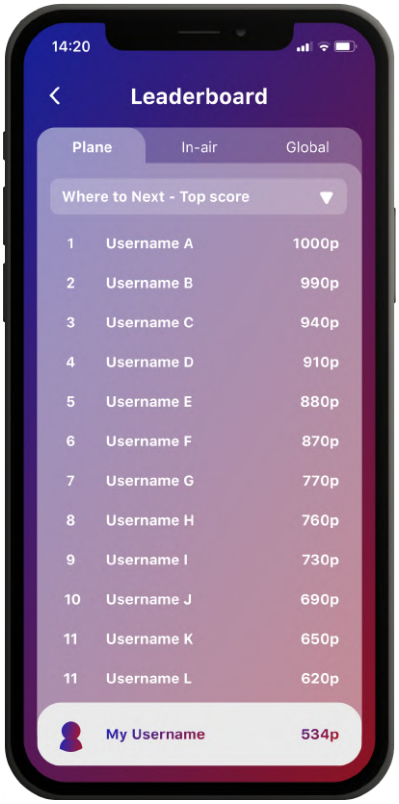


Figure 6.12: Prototype of the leaderboard.

Secondary concepts

As the secondary concepts were categorized as non-vital functionalities required for the platform to work, they were not prototyped or fully fleshed out in this project. However it was still believed that these concepts would greatly benefit the user experience and help the platform gain an edge toward current entertainment options on personal devices.

The concepts vary greatly in function and are summarized in the list below:

- **Onboarding**
  A login flow was discussed. From the data gathered, users wanted an easy streamlined process of accessing the service while the airlines wanted to generate logins. To please both the client and end users, two login options were discussed. One option was to log in as a guest, which would allow the user to access the platform without a profile but with limited functionality. The other option would require an airline login, where the user get full access through their airline credentials. Proposed functions limited by playing as a guest user were in-game unlockables, user profiles, list of favorites, selected deals and leaderboard functionality.
- **Help a friend**
  To create interest and engagement among potential customers, a referral system was discussed. There were several different ways to approach this, and one promising alternative was the *Help a friend* mechanic. In-game, the user could ask a friend on the ground for extra help and bonus perks in the game. Examples of this could be gaining an extra life in *Baggage Run* or unlocking a special souvenir in *Where to Next?* in exchange for the friend creating an airline account. The hope was to drive new users to the platform, create interest in the service and lower the threshold of entry for potential new customers.
- **Insights & Statistics**
  Expanding upon user profile, insights and statistics catered to the user were discussed. This data was meant as interesting insights fun facts about their gaming history. This could include information such as the highest altitude they've played on, how many countries they visited in **Where to Next?** or time spent in their favorite game.

6.2.2 Testing

Since there was a limited time to develop and test the prototypes, it was decided that the two most important concepts to develop and test at this stage was platform design and user profiles.

As in prior sprint concurrent think-aloud interviews were used. The test was split into three parts. In the first part the user was to test different preview card (See figure 6.8). In the second part the user was presented with different store integration alternatives (See figure 6.10) and carousel options. Lastly, the user got to test the platform with a new color scheme and card designs to evaluate the experience and usability (See figure 6.9).

The interviewee was given tasks they had to complete while the interviewers took notes. After each part questions regarding their experience were asked.

- **Card previews**
  (a) Read more about the game "Where to next?".
  (b) Read more about the game "Baggage Run".
  (c) Read more about the game "Chess" .
  (d) Open up the side navigation bar.
- **Ads & Carousel**
  (a) Get familiar with the view
    i. Check out the "Cool hat" product.
    ii. Try pressing the carousel at the top.
  (b) Get familiar with the second view.
    i. Check out the "Cool hat" product.
    ii. Try pressing the carousel at the top.
    iii. Claim your discount on coffee.
- **Colorful view**
  (a) Get familiar with the view.
    i. Try the side navigation bar.
    ii. Open a preview.

At the end of test the user was asked to compare their different experiences and decide on what they liked the most from each view and in what combination different features would work the best.

Feedback from testing

After testing the feedback was summarized as follows:

- Advertisement in the middle of the view were to similar to game cards, creating annoyance among some users. Most users wanted the advertisement at the bottom.
- Users did not notice advertisement when at the bottom to the same extent.
- Putting game offers and deals together led to more users looking at the deals as well.
- Issues with tags and text being to small to read was brought up.
- There was a preference toward preview cards that didn't cover the whole screen, as the users otherwise felt like they entered a whole new view instead of just opening a quick preview.
- Testers thought the smaller previews lacked some information that the larger card contained. Where only the larger previews had suggestion for similar games.

- Users had a hard time understanding how the carousel worked and could be navigated.
- Some users did not think the current store integration was enticing enough to buy items from the store. This was not thoroughly tested by the test cases, but good feedback nonetheless.

6.3 Design Sprint III

In the third sprint, the sole focus was on how to incorporate and utilize the over-head screen in the gameplay experience in accordance with the user insights and project specifications. A brief market research of the air travel industry and other similar transportation industries was also conducted in order to get inspiration of possibilities and points of frustration with different kinds of infotainment screens.

6.3.1 Understand

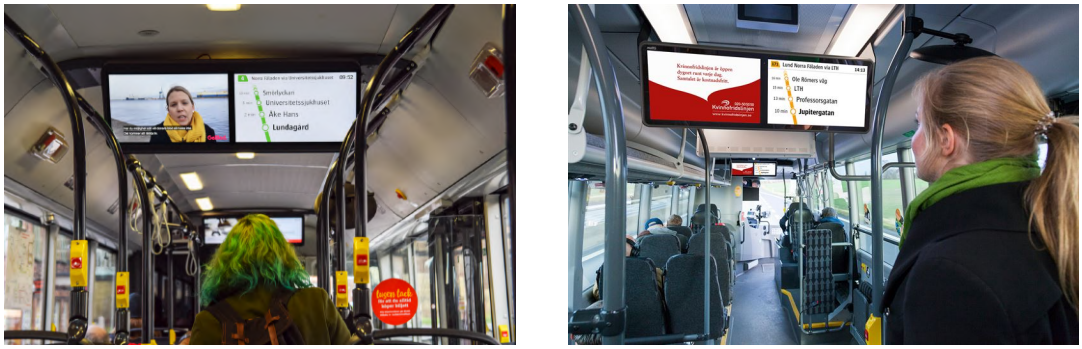
The previously conducted user research heavily pointed towards over-head screens not being noticed to a great degree while travelling. Some potential users also expressed a concern about unintentionally annoying other passengers that did not want to play games if the over-head screens continually showed gaming related content. It was therefore decided to not display necessary core game mechanics on the over-head displays and instead utilize them as secondary displays, with a focus on displaying supporting content. This would also allow them to be used for content and information normally displayed through the screens and sporadically show gaming related content.

Some participants also expressed concerns regarding usability and inclusiveness for players with worse eyesight. These users could have difficulty seeing the text and other content presented on the screens if seated in unfortunate locations on the aircraft. This would result in an unfair and frustrating gaming experience for these players.

Figure 6.13: Mockup of overhead screen from Panasonc Avionic's Twitter account, 2015.

To get better insight in how over head screen could be used, the team conducted research into how they were being used to date. Many airlines showed information and video material regarding the safety instructions on the aircraft before take-off. A majority also showed map information on where the plane was currently located in the world, as well as other statistics about the aircraft like speed, altitude and outside temperature to name a few (See 6.13). Some number of airlines sporadically used the over-head screens to display airline branding and promotional content, and in some cases even showing a movie.

The team also investigated other industries that use over-head screens or infotainment screens in similar situations to travelling on an airplane. One example was *Skånetrafiken*, a local public transport company in southern Sweden that have utilized their over-head screens to display information about the next stops, showing ads, the latest news from news outlets and having short pop-quizzes for the passengers (See 6.14). Another similar use case is the Swedish train carrier SJ's trains. They utilize screens in the carts where they show trip information, showcase bistro selection and play ads. In contrast to Skånetrafiken's big over-head screens, SJ utilize portrait oriented screens in some of the walls, not being visible to all seated passengers.



(a) News. Image from Skånetrafiken

(b) Ads. Image from MultiQ

Figure 6.14: Skånetrafiken Infotainment screen examples.

6.3.2 Concepts & Prototypes

The sketch phase was initiated with a quick recap on prior insights, leading into an individual brainstorming session. Then began the rapid concept generation that included both sketches and quick notes. A number of the concepts are summarized below.

Leaderboard

One concept for the overhead screens was to display a leaderboard of the best players in the different games available in the systems. To make it less one-dimensional, different rankings could be implemented for different metrics such as:

- Top score
- Most time played
- Most achievements unlocked

- Accuracy in quiz games
- Fastest average answer speed in quiz games
- Most destinations visited in *Where to Next?*
- Most time spent in lobby

An idea for the concept was to also segment the rankings in different groups of players, to allow the player to compare themselves to different groups. A couple of segmentation ideas were as follows:

- Global ranking
- Currently in air
- Best on the plane
- National ranking
- Best this week
- Best this month
- Best this year

Celebration and showcase

Another idea was to sporadically celebrate and showcase players who had performed great in a game. Some ideas for this were as follows:

- Top 3 players in specific game on a pedestal
- Player set new record
- Best plane currently, with most active and engaged players compared to other planes

Game promotion

A third idea for game-related content to display on the overhead screens was promotional content. Deals, offers or short reels to raise interest for the entertainment offering among the passengers and get them to purchase access to the platform. Ideas for this were:

- **Try for free**
  Show a short reel of the game and offer passengers an opportunity to try the game for free for 15 minutes or a number of rounds. This to lower the threshold of entry and let them try the service before they had to commit to the purchase.
- **Collaborative goals**
  Another idea for engaging passengers was to set up collaborative goals that they collectively could work towards. This would incentivize players to invite their friends and grow the player base. An example could be to have the plane run a set amount of kilometers together in Baggage Run.

- **Limited time offers**
  Limited time offers on entertainment packages, like 50% off after half the flight has passed is another idea that could lower the threshold enough to get more people to join. Exactly what these offers should be were out of scope for this report.
- **Package deals**
  Yet another idea to bring people to the platform was to offer package deals where entertainment packages could be bundled with other products and services. An example could be a kids meal with included game access to the kid friendly games. Again, exactly what these deals should be were out of scope for this report.

(a) Leaderboard example.

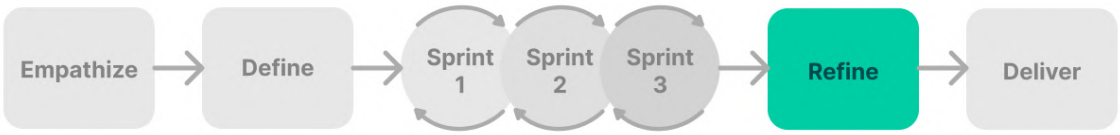
(b) Celebration of top players.

(c) Promotions through collaborative goals.

Figure 6.15: Mockup prototypes of overhead screen contents.

Chapter 7

Refine



After the whole *design sprint* phase, the team entered a refinement phase. Focus was on continuous testing and development of concepts, and refinement of the prototypes created in the different sprints. The four main areas this process focused on were:

- **Platform**
- **Where to Next?** (Quiz game)
- **Baggage Run** (Arcade game)
- **User engagement mechanics**

Work was also devoted to the development of a functional prototype of the *Where to Next?* game, as this had previously only been a clickable Hi-Fi prototype in Figma. These kinds of prototypes are great for showing functionality and testing interfaces, but lack the ability to present and test actual multiplayer functionality.

7.1 Platform

From the user testing in the design sprints, feedback was documented and a number of improvements were identified. Small and quick fixes were made straight away, but larger changes to the platform interface were categorized and prioritized. The tests indicated that

there was no single concept that was better than the other. Therefore the best parts from the different test concepts were merged into one concept. The main areas updated in this concept were:

- Card design
- Preview design
- Ad/shop integration
- Colorway

The updated functions and components were then connected together into one coherent prototype that could be navigated by a test user.

7.1.1 Card design

The card design for the games in the platform was revamped, primarily based on a semi-opaque look from prior tests. This design was determined to be a good balance between readability, content grouping and an intriguing visual aesthetic (See figure 7.1b). The font size of the category tags was enlarged to increase readability, but without interrupting the visual hierarchy too much.

7.1.2 Preview design

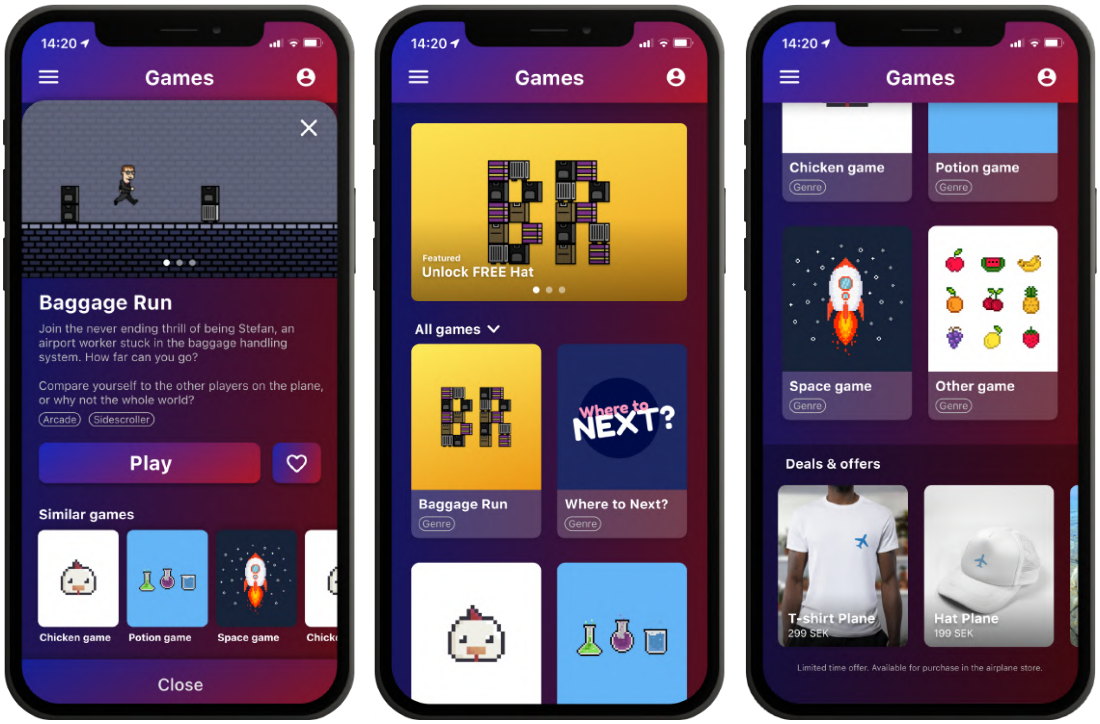
For the game preview card design, it was decided to utilize a big card size, since it could fit a lot of relevant information that could not be present on the smaller preview sizes. An updated preview card design was produced, which covered a large part of the screen but still made sure the user feel like they were staying on the same page by not covering the whole screen (See figure 7.1a). The 'similar games' section was well received by the test group and was therefore carried over to the new design. Finally, text contrast on the 'Play' button was increased for readability purposes.

7.1.3 Ad/Shop integration choices

In the updated prototype, the shop integration was also changed in accordance with the user input. Deals and offers were merged into one row and designed to be more easily distinguishable from the games. This was accomplished through changes to the background color of the segment and tweaking the shop card design to diverge more from game card design (See figure 7.1c). The preview of the shop items was also updated to be more cohesive with the rest of the platform, utilizing a similar look to the game preview card, but with a price component and without the favorite option. The placement of the cards are still up to the airline company depending on how intrusive they want their shop integration and what monetization model they use.

7.1.4 Colorway

The colorway was updated to the more colorful version and adapted throughout the system, as this was well received by the users. A majority perceived this visual style to be more exciting and fun, while still maintaining decent readability of other components. It also presented better opportunities for airline branding through color choices of the gradient in the background and accents (See figure 7.1).



(a) Card view **(b)** Game cards **(c)** Store cards

Figure 7.1: Updated prototype of platform

7.2 Where to next?

From the second design sprint, a number of changes were proposed for **Where to next?**. After some discussion, the team chose to prioritize a few to fix and implement. This decision was based on how vital a function was, the time required to update it and how much of a negative effect it had on the users during the tests. The following updates were made:

- Changed lobby layout to reduce unintentional mapping to the passenger's own airplane seat (See figure 7.2a).
- Indication that a screen is scrollable was added where applicable, for example the lobby screen.
- The countdown to the next game now followed the screen in the lobby instead of being fixed to the bottom.

- To increase the sense of multiplayer more score comparisons between players was added.
- Changed button names and color for better consistency and familiarity.
- Added more activities to do for each location and let player stay in city instead of joining next lobby.

7.2.1 Lobby

The lobby layout was updated through the removal of the middle aisle in the seat map. Instead, an improbable and physically impractical seat map was adopted, with seats filling almost every available floor space in the plane (See figure 7.2a). This to avoid unintentional mapping to the players real seat in the airplane. An addition of a scroll indicator was also made to show players that the lobby can be explored through scrolling. The round countdown was also updated to always be floating at the bottom of the screen so that the player can't miss it.

7.2.2 Sense of multiplayer

Some users indicated that there was not enough sense of playing with others. To tackle this, features were added where the player's performance was measured against other players currently playing. For example, the right/wrong screen shown after a player has guessed was updated to not only show how many points were given, but also what current position the player was in compared to others.

7.2.3 Button consistency

In the second design sprint, some buttons in the prototype were colored to just contrast the background color and without much thought. Many of these were updated in the refine phase to build consistency and help the user build a better conceptual model in terms of primary, secondary and tertiary buttons.

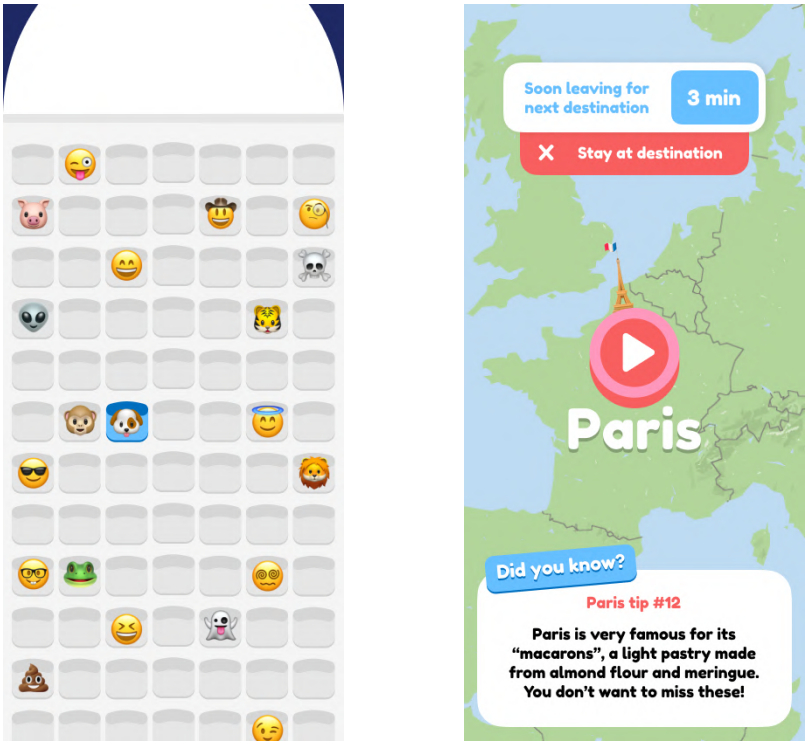
7.2.4 Destination activities

Additional tips and fun facts were added to the destination view in the prototype to give the user more to explore at the destination other than a mini-game. This feature could both convey useful information to the passenger, but was also a good way for the airline to promote businesses or activities they might have business collaboration with.

7.2.5 Shop integration

In addition to the user tests, discussions with other stakeholders at Tactel was also held. These brought up the possibility of adding souvenir suggestions in the destination map view, as links to the shop. The idea was that the passenger could also get inspiration and suggestions for souvenirs for their real destination as well, possibly purchased through the airline

in-flight shop. If an order was made, the passenger could then pick the goods up at the airport. Exactly how this would be implemented was deemed out of scope for this project, but is an interesting business opportunity nonetheless.



(a) New Lobby **(b)** New world view

Figure 7.2: Updated prototype of *Where to next?*

7.3 Baggage Run

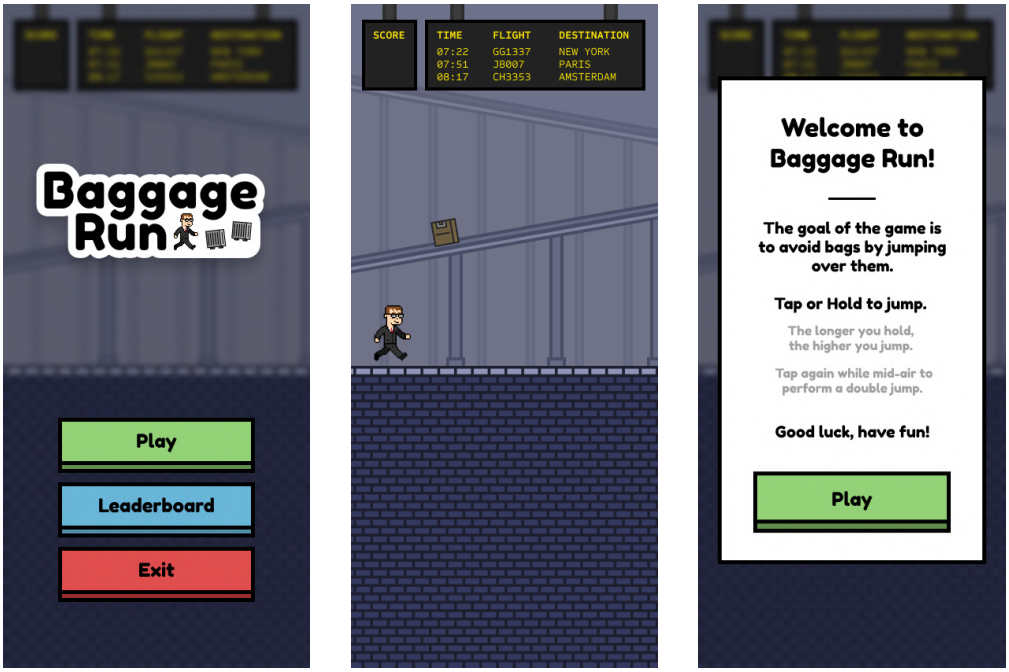
From testing in *Design Sprint 1* several improvements were drafted and added to the prototype. One of the larger issues players had was understanding the game and its controls. One large change to help players was the addition of a tutorial screen in the beginning of the game for first time players, explaining the goal of the game as well as the controls (See figure 7.3c). To further help new players understand the game and make it easier for them, the early difficulty level were adjusted. This was done by setting a fixed start sequence of obstacles, meaning that the first couple of obstacles were of a lower height and easier to jump over. This allowed the player to get a feel for the game and its controls more quickly, as well as gain more points in their first play through. This to lower the threshold of entry and motivate further play.

Later difficulty levels were capped at a certain level to make sure the game wasn't impossible after a certain score. The difficulty increments between levels were also lowered so it took a longer time to reach the difficulty roof. This allowed players to gain higher scores, increasing the length of the gameplay loop. Aside from this, small fine tuning was done on the highest and the lowest difficulty levels and tested to make sure the game felt fun and fair.

Personalisation in the form of hats and skins for the main character *Steve* were added to the

game. These were skins players could equip to customize *Steve* more to their liking. The skins added in the game served as a showcase for how future unlockable content could look and be implemented into the game.

A visual overhaul was done to *Baggage Run* to better fit the narrative of the game. A logo for the game was added to the main menu to make it feel less void as well as two large signs (See figure 7.3a). The first sign contained the player's score and the second one contained a flight time-table to create the sense of being at an airport terminal. The game view had the same update with the signs, but also added a conveyor system with a bag in the background (See figure 7.3b).



(a) Main menu **(b)** In game view **(c)** Tutorial screen

Figure 7.3: Updated prototype of *Baggage Run*

7.4 User engagement mechanics

An important part of the system were the mechanics discussed that would improve the user experience, drive engagement to the platform and promote recurrent use. These were referred to as user engagement mechanics. One of the goals of these mechanics was to create an experience where players could feel a sense of fun progression and entice new players to register to the platform. Implementation of these functions was decided to be outside the scope of the project, but could be a valuable addition both for users and for the airlines.

7.4.1 Friend Codes

To create a sense of community around the game it was decided that players should be able to add each other as friends. However to uphold player integrity and not allow random people

to add others and harass them, friend code system was decided upon.

Each player would get a code on their profile only they themselves could see and by sharing this code with their friends they could add each other to a friend list. Functions between friends that were proposed included:

- The ability to see which games their friends are currently playing (a function one could toggle on or off and only accessible while in air).
- The ability to visit each others' profiles from the friend list.
- A filter in the leaderboard that would allow users to only compare their score to their friends.

7.4.2 Ground access to platform

Even though the platform is to be used while in air, the team wanted to find ways to make sure the platform wasn't obsolete when the user was on the ground. One idea was letting the user have access to the leaderboard and their user profile while on the ground. This would allow users to see if their score had been beaten by other players, bringing some sense of competition outside of the cabin. The user could also see their badges by accessing their profile and showcase them to friends. They could also add their friends through the friend code system while on the ground.

7.4.3 Geolocation

Since some of the achievements discussed were based on geolocation, players had the option to decide if they wanted to display these or turn them off, the latter being the default mode. If a player has geolocation turned off, other players can not see badges that were earned from geolocated achievements. This was done to protect the integrity of the player as some might experience discomfort in knowing that other players could potentially see where they had traveled.

7.4.4 Airline specific rewards

To increase loyalty and further airline branding within the games, airline specific rewards could be included in the overall system. These rewards can range from specific souvenirs found in *Where to next?*, too hats in *Baggage Run* with the specific airlines logo. Other rewards can include badges earned for the user profile through achievements only available on certain airlines. This hoped to create a sense of loyalty toward the airline and incorporate them into more aspects of the platform, tailoring the experience more toward the airline company.

7.5 Technology

At the end of the project the team was invited to participate in a fair at Tactel's office, where a small presentation and demonstration of the results from the project were to be held during

the day for smaller groups of people. During the demonstration the visitors got to test out the prototypes. To allow players to test a prototype of the multiplayer functionality it was deemed necessary that a technical prototype of *Where to next?* had to be implemented.

The scope of the technical prototype was set to showcase the core gameplay. This included the ability to join a lobby with other players, play the quiz portion of the game and then compare the results to other players afterwards.

7.5.1 Implementation

To fulfill the technical specifications several systems and components had to be created, there had to be a dynamic front-end for the game which the user could interact with and be shown necessary information. In addition to the front-end there had to be a server to connect people with each other and handle information as well as a simple admin page from where games could be started by the admin user. There also had to exist a database where information was stored, such as questions and user scores.

The front-end was built using the framework *React* and the design was taken from the Figma prototype. However some components were slimmed down to save time, for example the lobby was built as a text-based feature (See figure 7.4b). The mini game portion and map was not implemented as the Figma prototype was deemed enough to showcase these features for the user.

The back-end system was designed using a socket server. This server kept track of information such as current users, 'game state' i.e. keeping track of whether there was a game running or not, and also questions for the quiz. When a user entered the game they were connected to the server and saved as a current user in the server, this list was updated for each user joining or leaving the game. Depending on 'game state' they were either placed in the lobby or entered directly into the game. For each connection the server associated a name to the user with their socket connection id, which is a unique id a client gains when connecting. The name was entered by the user and had to be unique, meaning that if the username already existed in the database they were prompted to pick another name (See figure 7.4a).

After the user locked in their name they entered the lobby and saw the names of the other players currently online (See figure 7.4b). Each time a new player joined the lobby, all users were updated with a new list of players from the server, updating the lobby view. After all players had joined, the game was started from the admin page and the users were sent to a page displaying the core gameplay loop (See figure 7.4c).

In the core game view the users were displayed a timer starting at 60 seconds and a clue. For each ten second decrement the server would send a new clue which would be displayed to the user. When only ten seconds were left the timer changed color to red to create a sense of urgency (See figure 7.4c). To submit a guess to the game, the player pressed the 'Guess' button and a list of cities appeared, from where they could lock in an answer using the 'Submit' button (See figure 7.4d). When the player had locked in the answer, it was sent to the server and compared to the correct answer by the server and if the player answered correctly a score was calculated based on time left.

(a) Name selection

(b) Lobby

(c) Game view

(d) Answer view

Figure 7.4: Functional prototype for *Where to next?*

An API was also implemented to allow the server to query data from the database. The database and website was hosted locally at the Tactel's office (See figure 7.5).

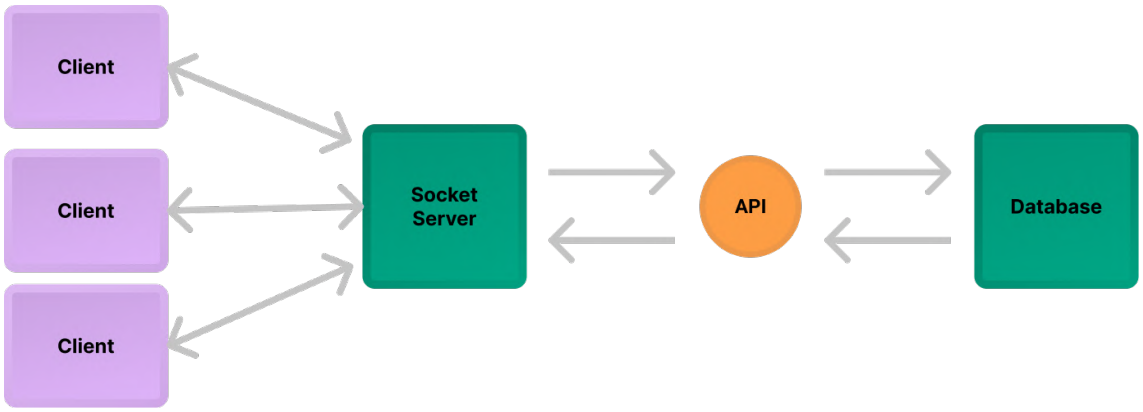
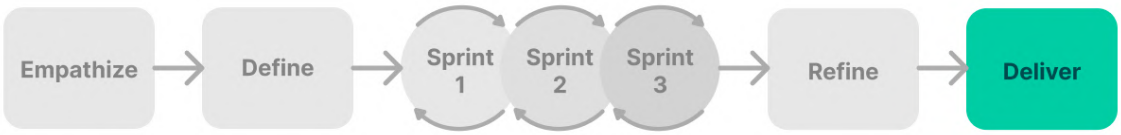


Figure 7.5: An overview of the data communication.

Chapter 8

Deliver



Several functions and components have been discussed and designed in this project. The results can be summarized into three main categories:

- A platform prototype.
- A quiz game prototype called *Where to next?*.
- An arcade game prototype called **Baggage Run**.

This chapter will summarize the results for each category and showcase the end result of the system.

8.1 Overview

In this chapter an overview of the results is presented. For different purposes, multiple ways of representing this were created. The first one is a system diagram which sorts components into different categories and displays which systems communicates with each other. The second overview is a screen flow explaining the different steps and decisions a user makes when playing the game *Where to next?*. This contains the flow and decision made by the user. The flow starts at the platform view and then shows a round of *Where to next?*. The screen flow can be found in appendices for further reading.

8.1.1 System diagram

The system diagram portrays an overview of all the different functional components that were created in this project. In this overview the different components were grouped together into larger categories (See figure 8.1). The three main categories of the system were:

- The overhead screen
- The platform
- External systems provided by the airline company

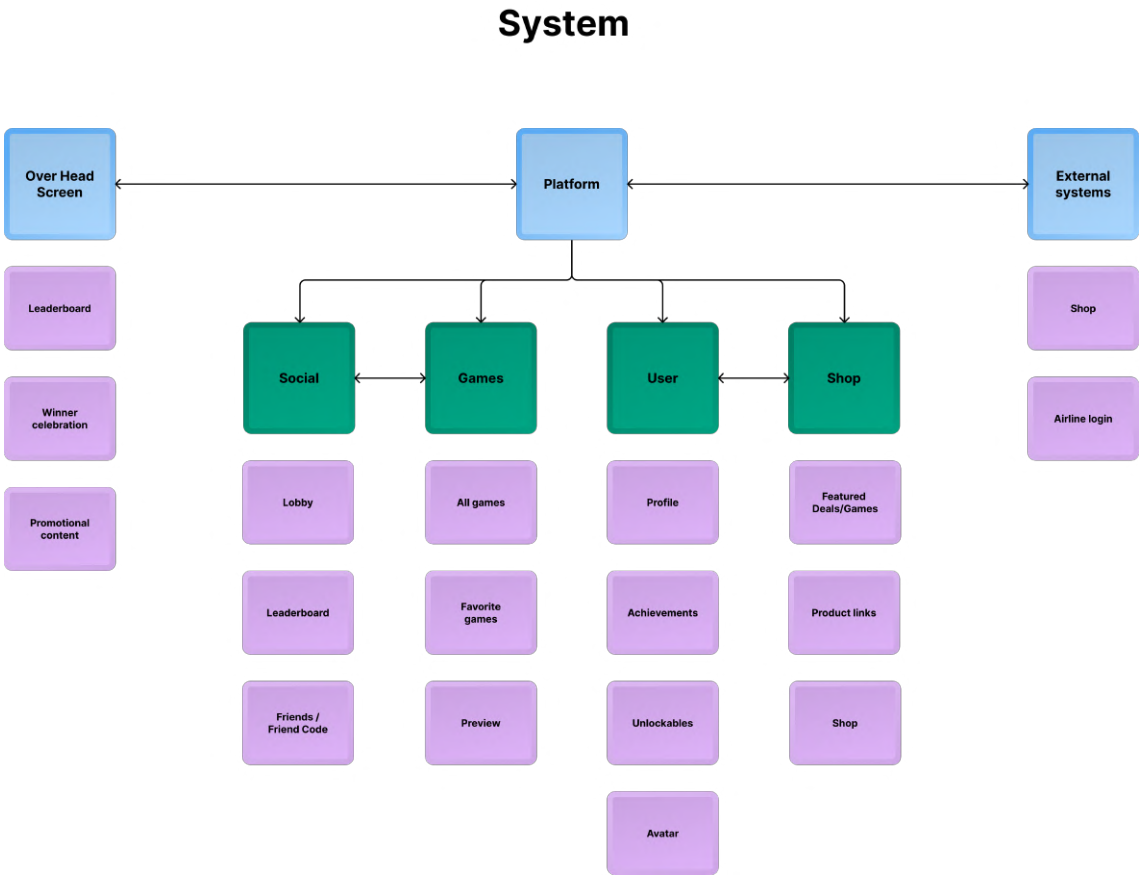


Figure 8.1: Diagram of the proposed system and its functions

The overhead screen category contains all components that are tied to the overhead screens. This category is in direct connection and communication with the platform. This means that the systems in the overhead screen should be linked to relevant systems in the platform, i.e. the leaderboard on the overhead screen should have the same rankings as the platform.

The second category is the the platform, which is the largest system in the project. The platform functions as a container for several components that are necessary to create a fun and cohesive experience for the passengers. The platform contains four subcategories where components designed in the project are placed:

- **Social**
  These are functions that facilitate a multiplayer experience and create a sense of community. This houses components such as the leaderboard where players can compare their scores to other players.
- **Games**
  The games category contains the game catalogue and surrounding systems tied into how the game catalogue can be presented.
- **User**
  The user category contains components and systems that are directly tied into the user profile and the user progression.
- **Shop**
  These are systems that connect the in-flight store experience to the platform. This category does not contain the in-flight systems themselves, as they are provided by the airline company. Instead the shop category contains the necessary components to incorporate these systems into the platform.

The third category are the external systems. This category is connected to the platform and contains the components provided by the airline company. Some examples brought up in the project include airline login possibilities as well as an airline connected in-flight store.

As the external systems are components or systems provided by the airline company they are deemed out of scope for this project. These are already existing systems to be incorporated to the platform and not systems to be developed for the platform. Additional systems to be incorporated into this category depends on the needs of the airline company and what system they can provide.

8.2 Platform

The final result for the platform was a Figma prototype covering a selection of the most vital functionality. The purpose of this was to give a suggestion and example of how the two prototype games could be incorporated in a bigger system. The final prototype had 3 main areas of functionality:

- Game catalogue and previews
- User profile
- Leaderboard

8.2.1 Game catalogue and previews

The game catalogue aims to give the user an overview of the games available in the entertainment system. Each game card displays information about the title, genre, and a cover image, to give the user an idea of what can be expected from the game.

When pressed, the game card opens up as a preview with more information about the game. Here, the user is presented with more in-depth information about the game, such as multiple

in-game screenshots from the game, a short description and similar game titles. There are also two buttons for either launching the game on the passenger's personal device or adding it to their favorites for easier access. If the user is not interested in the previewed game, they can close the preview and continue browsing for another game by pressing the 'X' in the top right corner or anywhere outside the preview window.

8.2.2 User profile

The user profile houses all information related to the user. This includes basic account information such as username, avatar and top played games. It also gives the user access to all their unlocked content, badges, skins and achievements they have made. The user can also see a list of their friends and compare themselves to the rest of the world through the leaderboard function.

Achievements and unlockables

The achievements and unlockables function covers all content the user can gain from playing games. These are often rewards for making certain achievements or fulfilling predefined goals. The most common type are badges, which are visual icons that indicate that the user has made a certain achievement. A popular type of unlockable is skins, which are used to customize the user's platform avatar or in-game character. These types of unlockable content are often a way to induce a sense of progression in the game and an important driving force to keep the user interested.

Friends and referrals

As previously mentioned, the user can also access their friend list from the profile. This is a list of other players that the user has added through their individual friend codes. These need to be manually shared between players to allow them to connect, in an effort to secure the player's integrity and minimize harassment on the platform.

The social function also allows the player to share a referral link to friends who might not currently be in the air. This code gives the player extra rewards, and is a way for an airline to invite new people to the platform and organically create interest for the service.

8.2.3 Leaderboard

The leaderboard was added to give players a way to compete with each other and add more multiplayer aspects to the platform. Here users could compare their own score with that of other players. Each game in the game catalogue should have their own leaderboard as well as a leaderboard for total points accumulated while playing games.

The leaderboard contains several tabs which the user can pick to filter the ranking by different categories. The filters decided upon in this project were:

- Filter by players on the same plane.
- Filter by players currently in air.

- A global filter, which would display all scores.

At the bottom of the leaderboard a bar with the user's score and rank was displayed. This would follow the screen when scrolling, so that the user could always easily compare their score with others.

8.3 Quiz game - Where to Next?

In the project, a multiplayer quiz game called *Where to next?* was designed using casual game design theory and the design sprint methodology. Two versions of the game were created, the first version was a Figma prototype which displays the whole game loop and design of the game. The second prototype was a functional multiplayer prototype which was scaled down to only include a lobby and the quiz portion of the game. This prototype aims to present the multiplayer aspects of *Where to next?*.

The game takes the player on a journey around the world, where they have to figure out their destination by a set of clues given to them. Upon arrival the user sees if they guessed correctly and can compare their score to the other players. Then they have the chance to play a mini-game to gather more points or the opportunity to learn more about the city and purchase local products.

The game is split up into five major parts:

- **Onboarding**
  The goal of onboarding is to introduce the user to the game and help them understand how to play the game. It's from here the user decides if they want a multiplayer or singleplayer experience.
- **Lobby**
  The lobby servers as a gathering spot for players inside the same game. Here they can interact with each other and view other players' avatars while they wait for the game to start.
- **Core gameplay loop**
  The core gameplay loop consists of a geography quiz where the player is given clues and has to guess which city the clues refer to. The player starts out with one clue and after ten seconds gains a new easier clue. This is repeated until sixty seconds has passed. If the player answers correctly they gain points which they can compare to other players. The quicker they answer the question, the more points they gain.
- **Map**
  After the player completes the quiz they arrive at their destination, which is represented by a needle dropped on a map. In this view the player gets their result from the quiz, accompanied by a fact or tip about the destination. The player can explore the map and read about different locations inside the city, this could be restaurants or monuments for example. Here the airline company has the opportunity to advertise local products available in their store for purchase. The player can chose to stay in this view and explore for an unlimited time or after a timer has expired continue traveling

with the rest of the lobby to a new destination. This resets the gameplay loop and the player is directed to a new lobby screen while other players are getting ready.

- **Mini-game**
  From the map, the player can enter a mini-game. The mini-game created in this project was a mosaic game. In this game the player has to move tiles around to create an image of a local monument. After completion they gain more points toward their total score as well as a fact about the monument. After finishing the mini-game the user returns to the map and are free to explore the functionalities of the map.

  Only one mini-game was implemented in the prototype due to time constraints, but in a real-world implementation, the idea was to have a number of mini-games from which one game would be chosen at random for each destination. The mini-games would be designed to allow the airline to theme them differently according to the destination.

8.4 Arcade game - Baggage Run

A second game was created as a complement to *Where to next?* and to evaluate the capabilities of web-based gaming. The game *Baggage Run* is an infinity runner arcade game, where players take control of the character *Steve*. Players have to help *Steve* run through the terminal to reach his flight which he is running late to. On their way to the flight players encounter obstacles in the form of luggage they have to jump over. The game was created using *Phaser3*, an HTML5 framework.

The goal of the game was to gain as many points as possible. The player gain points by jumping over the obstacles moving toward them. The obstacles come in three different heights and are randomized. As the score increases so does the difficulty level. At higher scores the obstacles move more quickly.

The controls of the game were made to be as simple as possible, and even allows for one handed play. Steve runs by himself and players jump by pressing the screen. The longer they hold their finger down, the higher *Steve* jumps. There is also a double jump mechanic, where players can press the screen again after their initial jump. This will initiate a second jump mid-air and allow players to save *Steve* from a dire situation.

Within the game users can customise *Steve* with different hats and skins. This was done to showcase how future unlockables could look.

Chapter 9

Discussion

9.1 Research evaluation

A the beginning of the project a research phase was conducted. The aim of this phase was to gain information regarding the target audience, current market trends and background knowledge within the aviation market. To accomplish this, research on the video game market, aviation market and surveys together with interviews were conducted.

The aim of the game market research was to discover current trends and user behaviour within multiplayer and mobile gaming. This was then compared to the target audience research. For the user research the goal was to understand the interest in a multiplayer experience while in-air, flight habits and current level of knowledge regarding in-flight entertainment systems. What specifications a multiplayer game had to contain to entice users to play was also investigated, as this would help the team with ideas for their prototype.

To gain knowledge within the airport industry, industry reports were read. Since the pandemic limited travels the group had to make the assumption that trends that were on the rise before the pandemic hit would continue in this direction post-pandemic. This assumption was also discussed with supervisors at *Tactel*, who agreed that only looking at data from the pandemic would skew the results.

From the game market research it was discovered that the largest growing game genre was hyper casual gaming. This combined with the knowledge from the surveys, that indicated that players sought after genres such as quiz/trivia, puzzles and word-games formed what type of games the project aimed to build. From the surveys it was also discovered that recent passengers had not noticed the overhead displays. This led to the decision that the overhead screen should not contain vital information or be required for users to play the game. This was also strengthened by interviews that indicated that users were not interested in playing

games on the overhead screen. From this, a change of scope had to be made, as the initial goal of the project was to create a multiplayer game for the overhead screen.

The results from the user research gave a lot of important insights. It was discovered that there was interest in playing games on an airplane, however users did not want games that were too time consuming. The interest for multiplayer games from the target audience was deemed high enough for the project to be relevant. These insights resulted in a shorter core gameplay loop with optional possibility for multiplayer engagement.

A secondary goal of the user survey was to understand how flight experience might affect interest in multiplayer gaming on flights. As frequent flyers would be potential recurring customers for the platform. However the results from the research showed that there was no clear difference between the groups. In the data the sample group for frequent fliers was smaller than the sample group for low frequency flyers. This made it harder to determine if the results were due to small differences between the groups or if more data needed to be gathered. There might also be a bias from the definition of who is a frequent flyer, as there is no hard definition of how much one must fly to be a frequent flyer. However this bias was taken into account when constructing the survey. Instead of allowing the users to label themselves, they had to answer the amount of times they had flown on average in the last couple of years. From that information the team then decided what constitutes a frequent flier, with the help of supervisors at *Tactel*. From the results of the flight frequency analysis, an assumption was made that flight frequency did not affect whether a user would be interested in a multiplayer game or not while flying.

For comparisons with the game market research, gender segmentation on the target audience research was done. It was discovered in the game market research that female players were more prone to hyper casual gaming and were one of the quickest growing emerging groups when it came to gaming (See 4.1 Game Market Research). The comparison yielded no results, as both groups were similar in their answers and a gender segmentation was deemed unnecessary. Since this did not align with the findings from the game market research, it was decided that more qualitative data could have been gathered. This could have been done by interviewing females whom have recently begun gaming. Which would hopefully yield new data regarding how to introduce and engage a new emerging group of gamers. Another bias taken into account was that female users, to a lesser extent label themselves as gamers. This was most apparent from feedback received when pilot testing the user survey. This might be because of preconceived stereotypes on what constitutes a gamer at a societal level. Even though this was acknowledged and taken into account during the creation of the form, it might still have affected the data. It is a difficult task to measure the effectiveness of these efforts, and was deemed out of scope for this project.

Overall the group was happy with the result of the research and the effect it had on the project. Good insights into the target audience and market were discovered that helped form the project moving forward.

9.2 Process evaluation

The project researched a number of methodologies and frameworks commonly used in different design processes, such as *Double Diamond*, *Design Thinking* and *Design Sprint*. The first two choices are quite similar in their approach and are great for long-term projects with a clearly defined goal. The sprint methodology instead allows for rapid iteration and more flexibility. Therefore it was decided to use the *Design Thinking* approach initially and then transition over to a few of rounds of *Design Sprints* when the ideation phase traditionally would have started. The *Double Diamond* methodology was used as reference, but not in practise as the design thinking methodology has substantial overlap with this methodology.

Even though the named methodologies are not explicitly tailored for one type of project or the other, the approach in *Double Diamond* is slightly angled towards physical product development. Design Sprints were therefore a great addition to the arsenal of methodologies, as this framework contains many techniques that fit the development of digital products and services well. This, in addition to parts of the team having experience in the interaction design process and its techniques, there managed to be a healthy balance between the different methodologies.

As mentioned, the process started with a long *Empathize* phase where the team tried to understand as much as possible about the problem, the surrounding market and environment, as well as the users. This was done both through literature studies, online research and through user research, to have foundation to develop the concepts from. The team planned and completed this phase in four weeks with the intent of learning as much as possible, but in a future project this time could probably be more effective and efficient if divided into two research stages. One initial and then another one later on in the project when the project direction is clearer. For example, this could fit after the first design sprint to further empower the following sprints.

Then came a brief *Define* phase, where the team tried to summarize and analyze the data from the previous phase. The purpose of this was to identify frustrations, touch points and areas of opportunity within the scope of the problem. This was done by organizing and analyzing all the insights gained from the research, to have easier access to them in the following phases. The key values and focus points decided in this stage helped guide the team during the development process, but could have been made more concrete and precise for easier evaluation and measurement of the created concepts.

When the ideation phase normally would have started, the team instead entered the "Sprint" phase where they underwent three rapid design processes. Each design sprint went through six phases, which were *Understand*, *Define*, *Sketch*, *Decide*, *Prototype* and *Test*, but still had their own distinct focus. The purpose and power of this approach was to rapidly go from insight to concept, and then to prototype. Even though the team had not used this framework previously and therefore naturally met some difficulties which slowed the process down, it yielded great results in terms of how quickly they still could come up with different concepts and prototypes. In future projects, this framework should therefore be viewed as a very efficient tool to quickly approach a problem and produce decent concepts.

Since the design sprints covered both quick prototyping and user testing, the team came out

of the "Sprint" phase with a lot of input and ideas for continued development. There was not enough time inside the sprints to update and develop every aspect brought up, and many points of feedback were put into the backlog. It was therefore decided that the team were to enter a *Refine* stage, where these changes and ideas previously put aside could be brought up and prioritized. The most important topics were fixed and then the late stage prototypes were polished upon.

It was in the *Refine* phase where the team also decided to produce a working MVP prototype of the multiplayer aspect of the quiz game *Where to Next?*. This to showcase the possibility of multiplayer entertainment through a passenger's personal electronic device onboard an aircraft. A majority of the time was spent developing the core mechanics of the game. The visual design was deprioritized, as long as it conveyed a similar experience to the Hi-Fi prototype. This part of the project was not completely in the scope, but proved a great opportunity for further proof of concept and galvanization of the proposed solutions, and also a learning opportunity for the team.

Overall, the choice of not following one single proven methodology and instead stitch together a new approach from three separate process templates was somewhat of a gamble by the team. It was not always a straight road, but presented many moments for reflection and evaluation of the process along the way. Not all steps taken by the team were in the right direction, but proved to be opportunities for learning. The gamble paid off in terms of efficiency and iteration speed, but lacked slightly in the documentation department. However if done again, this approach was well liked by the team and it delivered the results the team had hoped for, even if it was the first time for all the team members.

9.3 Concept evaluation

In the project three larger prototypes containing subsystems were created (See 8.1.1 System diagram). The three prototypes created were:

A platform

In the platform the users could view previews and launch the games developed in the project, they could also view a leaderboard and redeemable deals for the in-flight store (See 8.2 Platform). Users could also access their profiles containing information such as score, achievements and their friend codes (See 8.2.2 User profile). In the platform airlines had the opportunity to integrate their in-flight store (See 8.2 Platform).

Where to next?

Where to next? is a quiz game that takes the user on a journey around the world. Here they have to guess the destination from a set of clues and get the opportunity to explore the locations they visit. By exploring the location they can learn new things about the destination and take part in local shopping (See 8.3 Quiz game - Where to Next?).

Baggage Run

The last prototype is an infinity runner arcade game where players take control of the character *Steve*. The player has to help *Steve* reach his flight on time by jumping over obstacles they encounter while playing the game (See 8.4 Arcade game - Baggage Run). The game heavily plays into the hyper-casual game genre and the design can be found in results.

To make sure that the prototypes catered to the user needs gathered in the *Empathize* phase, the needs were defined and summarized in the *Define* phase (See chapter 5 Define). A design brief was created as a way to keep track on what the design should contain and achieve (See 5.3 Design Brief). This was complemented with a functional analysis that further defined what functionality the solution should and could contain (See chapter 5 Define).

9.3.1 Design brief & Functional analysis

From the design brief, two goals for the prototype were to create entertainment on short haul flights, while providing a shared gaming experience. Providing entertainment was also the main classification in the functional analysis (See chapter 5 Define). This was worked toward by taking into account the key insights found in the data (See chapter 5.1 Key Insights). The team deems that these goals were fulfilled by the results of the project. Both the games and the platform was met with excitement from both testers and stakeholders. A large part of this can be contributed to the games being heavily influenced by the data gathered from the audience (See discussion 9.1).

From these tests it was also assumed that the prototype fulfilled another part of the design brief. That the game should not negatively interfere with the passengers' experience. The tests were however conducted in an office environment and therefore did not simulate a true flight experience. To fully understand the implications of the prototype, there should be further testing in an environment that more closely resembles an aircraft. However the team still believes that this wont change the outcome, as the prototype was designed with the environment in mind. Which in turn resulted in the prototype not requiring any larger physical movements, neither by having controls that require movement or game mechanics that require the player to move around the aircraft.

In the design brief an emphasis on the airline company was put by defining two criteria:

- Promote a positive image of the airline and build loyalty in the player.
- Tie into existing systems of the airplane and/or airline.

For the first one the team generated concepts for a "recruit a friend" system (See chapter 8.2.2 User profile) as well as airline specific rewards. However more ideas regarding integration in loyalty programs could have been discussed. But to understand how loyalty could be built, one or two airline companies should be involved in the process. As their insights would help understand how they work with building loyalty and what loyalty needs their customers have. This was not done, as it was decided that involvement of airline companies at this stage was out of scope.

Instead the team put more focus toward the second point, "tie into existing systems of the airplane and/or airline". Shop integration became an integral part of the project, with a

heavy focus on customisability for the airline companies. This to make sure that the team's concept could tailor to several different airline companies. By discussing the results with stakeholders, the result were deemed sufficient at this point but would require future work in a true implementation.

In *Design Sprint II* the on-boarding view with airline login was discussed (See chapter 6.2 Design Sprint II). An interesting idea that would further tie into the airline's systems was the concept of using airline login for the platform. Here the team laid the foundation for the idea but never got the opportunity to develop or test a prototype, as this would have to be implemented on a case by case basis.

Overall the team is happy with the results and felt that if more time was given, the next step would be fulfilling parts of the design brief linked to the airline companies.

9.4 Future Work

During the project a lot of interesting concepts and ideas were discussed. Some of them were deemed out of scope or there was not enough time to work on them. Some of the more important ones have been identified and are suggested as the next step for future work.

Onboarding

A large emphasis was put on the "ease of access" to the platform as well as a desire from the airline companies to gain airline logins. To get a better understanding of these features, an onboarding flow should be created. In this flow, the users should be able to either login, register a new account or login as guest without registering. A design this flow should be created and tested with future users. These tests would also help to provide valuable information regarding the user experience, from entering the application to finishing their first game.

User Engagement Mechanics

In the project, user engagement mechanics such as "refer a friend" were discussed. These need to be expanded upon, preferably another design sprint should be conducted to understand what mechanics could be put into place, to increase user engagement.

These mechanics are vital economic driving forces and important features for the success of the platform. These were not prioritised as the overall system had to be in place first. Furthermore, a platform is required to even be able test user engagement mechanics at all.

Concepts for how the airlines' loyalty programs can be integrated into current systems should be investigated. These concepts would also help with the airlines' overall quality of service, which in turn should hopefully lead to a higher customer loyalty.

Tailoring to specific airlines

A next logical step in the design of the platform (See 8.2 Platform) and the advertisement proposal for the game *Where to Next?*, would be to involve one or two airline companies. This would help gain a better understanding in what the airline needs are and how they would like to have their brand integrated into the system. By involving two or more airlines the platform's modular design could also be tested to see if it fits the needs of different airlines.

Further development of overhead screen prototypes

The prototypes for the overhead screen were not tested during this project. Since the concepts already exist, a prototype where the games are linked to the overhead screen concepts should be created. This prototype should be tested, to see if the users feel an added value in the concepts generated for the overhead screen.

From this data Hi-Fi prototypes should be created to give a better representation of how the true system will look while flying.

Chapter 10

Conclusion

10.1 Fullfillment of goals

The aim of this project was to explore the possibilities for entertainment aboard an aircraft and develop the entertainment offering on low-cost carrier and short-haul flights, where the passenger's own device is the main access point. Several sub-goals were specified for the project to measure how well the overall goal was met:

- **The project should be tailored for short-haul flights where there is no personal entertainment system built in.**
  The final prototypes have taken into account the hardware limitations and is based on the user research focused on the short-haul flight segment. All prototypes are available on local devices and scaled to work with phones and in some cases tablets. The time sink required to play the games or use the platform has been kept to a minimum, to ensure that users have the time play during a shorter flight. Ideas for a faster on-boarding flow have also been discussed.
- **The developed idea should be engaging to a wide audience and multiple age groups.**
  The data from the market and user research in the *Empathize* phase has been incorporated into the platform and game design. The needs in both game genres and in-game system has been taken into account, to appeal to a wider audience. For the audience not interested in gaming, possibilities to learn and gain rewards have been incorporated and for the users who are more inclined toward a competitive play, systems such as the leaderboard has been put in place.

  The different age groups have been accounted for by deciding on categories and game concepts that was of interest across all age groups.

- **The concept should have a low threshold of entry and be easy for new players to pick up.**
  Both games and platform have been designed with few rules and easy systems for the user to get used to. The design has taken elements from other games or systems that could help the user recognize important aspects, requiring less time to get used to the prototypes created in this project.
- **A Hi-Fi prototype of the core components and functions should be created to test and showcase the idea.**
  This has been done for the game *Where to next?* and the platform using Figma. Both prototypes have been tested on a small test group and refined from the feedback gained during these tests.
- **A functional proof-of-concept should be developed to showcase the technical viability of the solution.**
  Two functional proof-of-concept prototypes have been created, to showcase technical viability. The first one for the quiz game *Where to next?* and the second one for the arcade game *Baggage Run*. First proof-of-concept was created to showcase the multiplayer aspects of the game and how it can be created using web-socket technology and standard web-application frameworks (See chapter 2.5 Technologies). The second one to demonstrate how a game could be created using HTML5 frameworks such as *Phaser3*.

10.2 Key takeaways

The user research yielded a number of insights that the team hadn't thought of before starting the project. The most impactful ones are listed below. They are however based on limited testing, and need to be further tested and evaluated.

Player integrity

Both industry experts from *Tactel* and interviewed users expressed concerns about integrity for the service. While social interaction could be pleasant, there is also high risk for abuse and harassment. Since people are unable to leave the aircraft while in transit, it is also important to avoid a breach of anonymity, like unintentionally giving away a user's seat position.

Market demand

The limited testing indicated that there is weak customer demand for true multiplayer gaming onboard aircraft. Instead, a majority of the surveyed users preferred a passive multiplayer experience, i.e. Leaderboards. They also wanted to choose themselves whether or not others were involved in their gameplay experience.

Overhead screens

The survey data also indicated that an alarmingly low percentage of passengers had noticed the overhead screens on their latest flight. A majority of the surveyed users answered that

they either did not have one or that they had not noticed it. It may therefore be a good choice to avoid using them as a sole channel for important information on flights.

Shop integration

Almost all of the user tests indicated a preference towards having the ad integration in a separate section at the bottom of the games catalogue to better allow for users to separate games from ads. On the other hand, the data also indicated that users ignore ads to a greater extent if they can mentally compartmentalize them. The design choice is therefore a balance between user satisfaction and airline value, and has to be evaluated on a case by case basis.

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Appendices

Appendix A

User Survey

In-Flight Entertainment

Welcome!

We are Arvid Berntsson and Christian Sidemo, two students from Lund University currently writing our master thesis in collaboration with Tactel AB in Malmö, Sweden. The goal of the research project is to create/expand upon in-flight entertainment systems for shorter Low-cost Carrier flights (LCC flights).

This survey aims to get a better understanding of current entertainment consumption and flight experience among different audiences. Participation is fully anonymous and the data will primarily be used in the Master Thesis, but might also be used in commercial applications and other Master Theses at Lund University.

Participation is voluntary and you may refuse to participate. You can at any time choose to discontinue your participation in this survey without penalty. Answers can be withdrawn up until publication of the Master Thesis in June 2022 by contacting us at either ar4253be-s@student.lu.se or ch8323si-s@student.lu.se

Please answer the questions in the survey as accurately as possible. If no answer applies to you, choose the one you can relate to the most. If you have any questions, please contact us through via the email addresses shared in the previous paragraph.

The survey takes approximately 5-10 minutes to complete. Thank you for your time!

* Required

1. Do you give your consent that your data is used as described in the intro section above? *

Mark only one oval.

- ◯ Yes, I consent.
- ◯ No, I do not consent. *Skip to section 9 (Thank you for your participation!)*

General

This section aims to gain an understanding of what type of person you are. Please answer as truthfully as possible. If no answer applies to you, choose the one you can relate to the most.

2. How old are you? *

104

3. To which gender identity do you most identify? *

Mark only one oval.

- ◯ Male
- ◯ Female
- ◯ Non-binary
- ◯ Prefer not to answer
- ◯ Other: _____

4. Occupation *

Mark only one oval.

- ◯ Student
- ◯ Full-time employed
- ◯ Part-time employed
- ◯ Retired
- ◯ Not employed
- ◯ I'd rather not say
- ◯ Other: _____

5. Do you work on an airplane? *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ I work in the aviation industry, but not on an airplane.

6. Location *

Mark only one oval.

- Africa
- Antarctica
- Asia
- Australia
- Europe
- North America
- South America

7. Have you been on any flights shorter than 5 hours in the last 10 years? *

Mark only one oval.

- Yes
- No *Skip to section 9 (Thank you for your participation!)*
- Unsure

Gaming habits

8. How experienced are you with video or mobile games? *

Mark only one oval.

	1	2	3	4	5	
No experience						Very experienced

9. In the last year, have you played any video or mobile games? *

Mark only one oval.

- Yes *Skip to question 10*
- No *Skip to question 14*

Video game experience

This section is about gaming experience. Please answer as truthfully as possible. If no answer applies to you, choose the one you can relate to the most.

10. What platforms do you play on? *

Check all that apply.

- [ ] Smartphone
- [ ] Tablets / iPad
- [ ] PC
- [ ] Xbox
- [ ] Playstation
- [ ] Nintendo Switch
- [ ] Retro consoles
- [ ] Other: _____

11. In the last month, how much time have you spent playing video games each week? *

This includes mobile games, video games and computer games.

Mark only one oval.

- ◯ Less than one hour
- ◯ 1 - 5 hours
- ◯ 5 - 10 hours
- ◯ 10 - 15 hours
- ◯ More than 15 hours

12. What type of games do you play? *

Check all that apply.

- [ ] Action / Adventure
- [ ] Arcade (i.e. PacMan, Tetris)
- [ ] Board games
- [ ] Casual (i.e. Flappy Bird, Temple Run)
- [ ] Card games
- [ ] Education
- [ ] Fighting games
- [ ] Music
- [ ] Puzzle (i.e. Candy Crush)
- [ ] Quiz / Trivia
- [ ] Racing
- [ ] Shooters
- [ ] Sports
- [ ] Strategy
- [ ] Word games (i.e. Wordfeud)
- [ ] Other: _____

13. Please name the most recent games you have played!

_____

_____

_____

_____

_____

Skip to question 18

Video game experience

This section is about gaming experience. Please answer as truthfully as possible. If no answer applies to you, choose the one you can relate to the most.

14. How likely would it be for you to try a game? *

Mark only one oval.

	1	2	3	4	5	
Very unlikely	◯	◯	◯	◯	◯	Very likely

15. If you don't play any mobile or video games, why is that? *

Check all that apply.

- [ ] Not interested
- [ ] Never tried
- [ ] It does not align with my self-image
- [ ] No time
- [ ] None of my friends play video games
- [ ] I've had bad experiences
- [ ] Never had anyone introduce me to it
- [ ] Never had the opportunity
- [ ] Unsure
- [ ] Other: _____

16. What would make you interested in trying a video game out? *

Check all that apply.

- [ ] Easy to understand rules
- [ ] Does not require a lot of time
- [ ] Happy and colorful look
- [ ] Cool avatars or characters
- [ ] It's similar to a classic game I already know
- [ ] It allows beginners to make mistakes without being too punished
- [ ] It allows me to create something new
- [ ] It is safe
- [ ] It does not require too much focus
- [ ] Nothing would make me interested in playing a video game.
- [ ] Other: _____

17. Do you have any other thoughts on what might make you want to try a game?

_____

_____

_____

_____

_____

Skip to question 18

Flights Habits

This section is about flight habits. Please answer as truthfully as possible. If no answer applies to you, choose the one you can relate to the most.

18. For what purpose(s) are you usually flying? *

Check all that apply.

- [ ] Business
- [ ] Holiday
- [ ] Visit family and friends
- [ ] Other: _____

19. How often did you fly pre-pandemic? *

Please choose closest alternative.

Mark only one oval.

- ◯ Less than once per year
- ◯ 1-2 flights per year
- ◯ 3-6 flights per year
- ◯ Once a month
- ◯ Once a week
- ◯ More than once a week
- ◯ Unsure

20. How much do you expect to fly in the future? *

Mark only one oval.

- More than before
- Same as before
- Less than before
- Not at all
- Unsure

21. What type of in-flight entertainment existed on your most recent short flight? *

Mark only one oval.

- Overhead (display in the ceiling)
- Seatback (personal display in front of you)
- Both
- None
- Unsure

In-flight entertainment

Following questions are regarding flights shorter than 5 hours. When applicable answer from the perspective of these flights.

22. What did you do to pass the time on your most recent flight(s)? *

Check all that apply.

- [ ] Read books
- [ ] Video games
- [ ] Movies / TV-shows
- [ ] Board & dice games
- [ ] Music / Podcasts
- [ ] Puzzles (crosswords, sudoku etc.)
- [ ] News
- [ ] Trivia quizzes
- [ ] Shopping
- [ ] Other: _____

23. If you could choose, what type of entertainment would you want on a shorter flight? *

Chose your top three needs/wishes. What would you most likely use?

Check all that apply.

- [ ] Books
- [ ] Video games
- [ ] Movies / TV-shows
- [ ] Board & dice games
- [ ] Music / Podcasts
- [ ] Puzzles (crosswords, sudoku etc.)
- [ ] News
- [ ] Trivia quizzes
- [ ] Shopping
- [ ] Other: _____

24. If you were to play a video game on this flight, what type would you prefer? *

Check all that apply.

- [ ] Action / Adventure
- [ ] Arcade (i.e. PacMan, Tetris)
- [ ] Board games
- [ ] Casual (i.e. Flappy Bird, Temple Run)
- [ ] Card games
- [ ] Education
- [ ] Fighting games
- [ ] Music
- [ ] Puzzle (i.e. Candy Crush)
- [ ] Quiz / Trivia
- [ ] Racing
- [ ] Shooters
- [ ] Sports
- [ ] Strategy
- [ ] Word games (i.e. Wordfeud)
- [ ] Other: _____

25. How likely are you to try a game on an airplane? *

Mark only one oval.

	1	2	3	4	5	
Very unlikely	◯	◯	◯	◯	◯	Very likely

26. When would you like to play? *

An organised game is played with others at predetermined time, and pick-up-&-play is played at your own discretion.

Mark only one oval.

- ◯ I prefer to play whenever I feel like it.
- ◯ I would enjoy an organized game with a larger group at specific time(s)
- ◯ Both
- ◯ Not sure / No preference

27. Who would you like to play with? *

Mark only one oval.

- ◯ Anyone on the plane
- ◯ Friends and family
- ◯ I prefer to play alone
- ◯ Not sure / No opinion

28. What would make you interested in playing a game during a flight?

Check all that apply.

- ☐ Competition with others
- ☐ Cooperation with friends or family
- ☐ Chances to win prizes and discounts
- ☐ It challenges me
- ☐ Lower anxiety or fear of flight
- ☐ Opportunity to learn facts about destination/flight
- ☐ Social interaction (e.g. chat or emotes)
- ☐ The type of game
- ☐ Unlockable content for games I already play
- ☐ Other: _____

29. How much time would you probably spend playing during a 2 HOUR flight? *

Mark only one oval.

	1	2	3	4	5	
None (0%)	◯	◯	◯	◯	◯	2 hours (100%)

30. How much time would you probably spend playing during a 5 HOUR flight? *

Mark only one oval.

	1	2	3	4	5	
None (0%)	◯	◯	◯	◯	◯	5 hours (100%)

31. Outside actual gameplay are there any functions you would like to have?

Check all that apply.

- [ ] Chat with others
- [ ] Leaderboard
- [ ] Information about destination
- [ ] Fun facts
- [ ] Save progress between trips
- [ ] Other: _____

Final thoughts

Thank you for participating!

Your answers will be very helpful in our Master Thesis. If you are interested in the report, please send us an email at ar4253be-s@student.lu.se or ch8323si-s@student.lu.se and we will send you a copy when it is finished (Estimated June 2022).

If you have any additional thoughts about gaming on flights and/or about the survey, please feel free to share them in the field below.

Have a great day!

// Arvid & Christian

32. Addtional thoughts and feedback

_____

_____

_____

_____

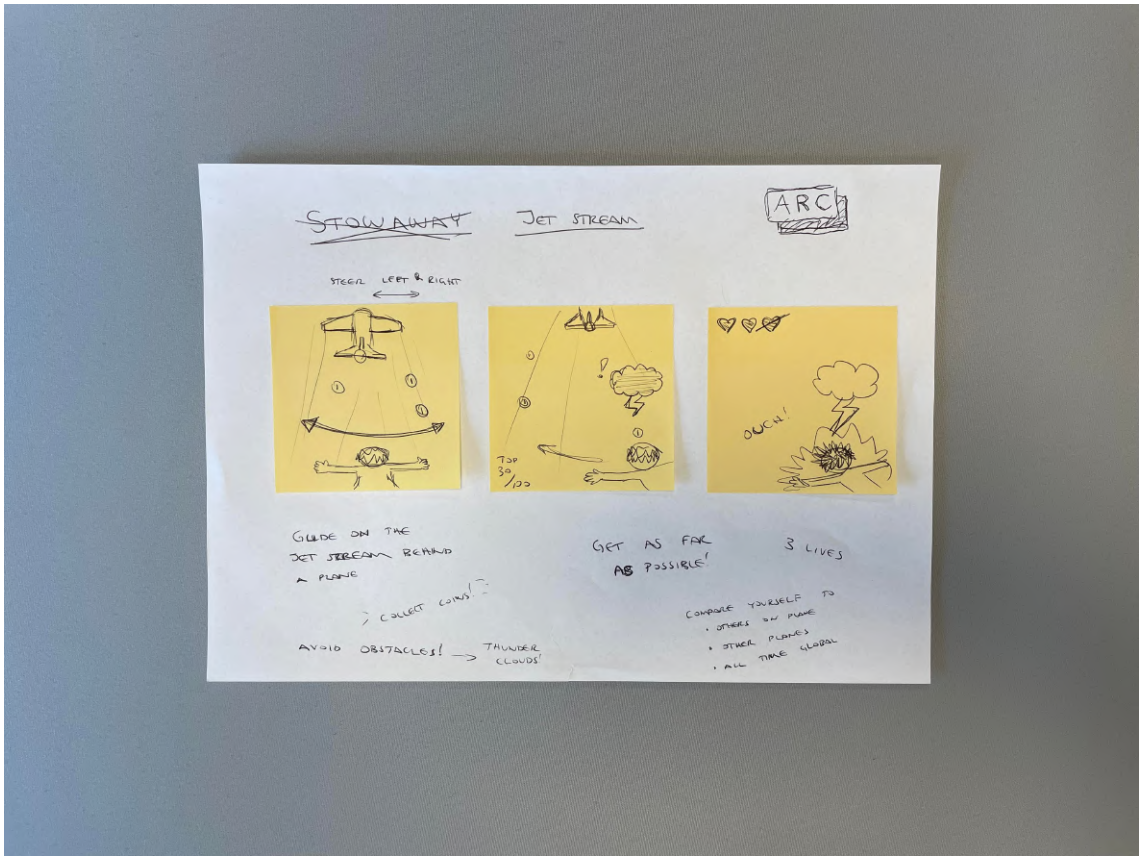
_____

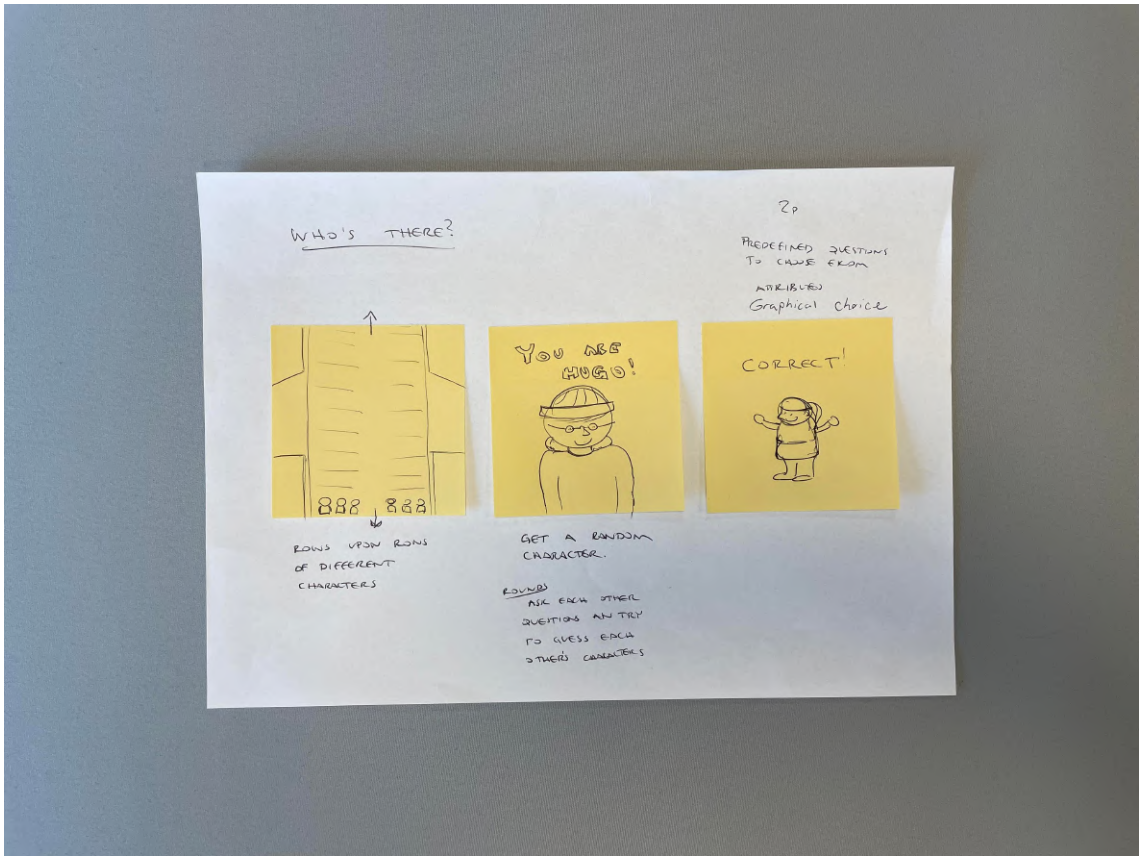
Thank you for your participation!

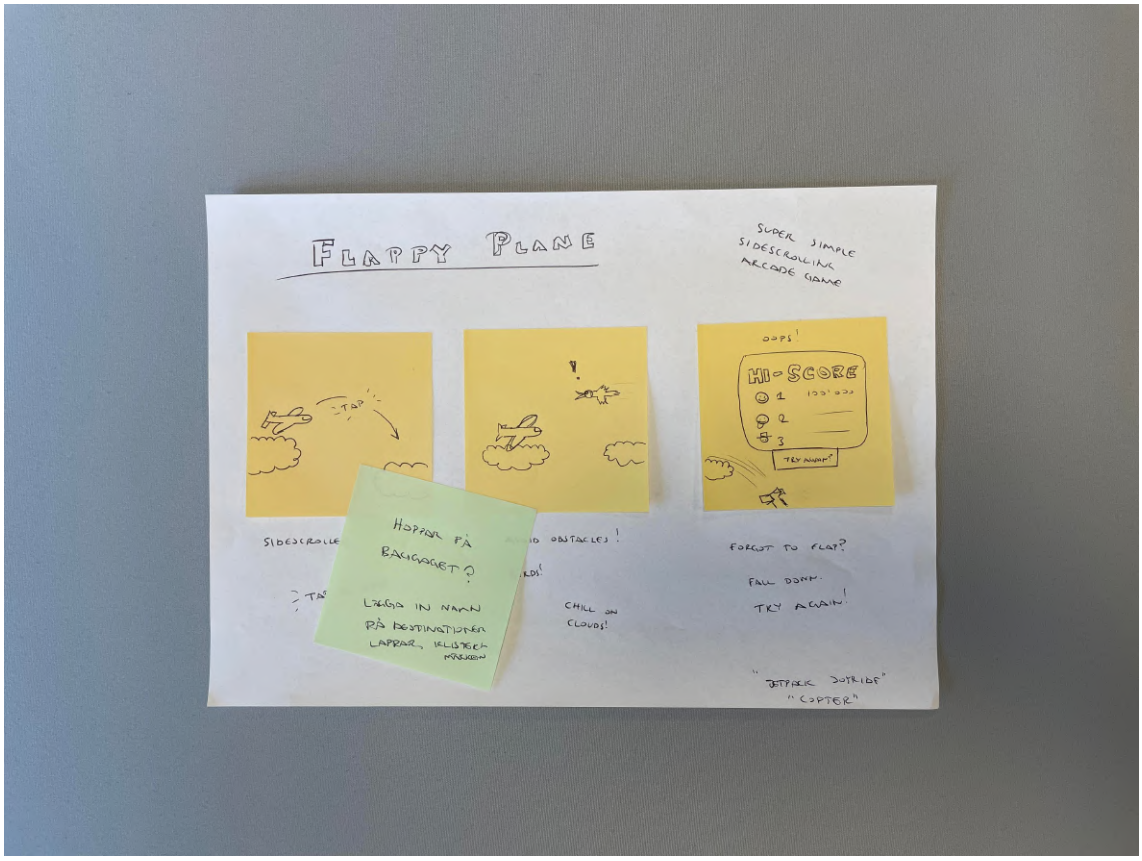
Unfortunately, your profile does not match our target group. Thank you for your time!

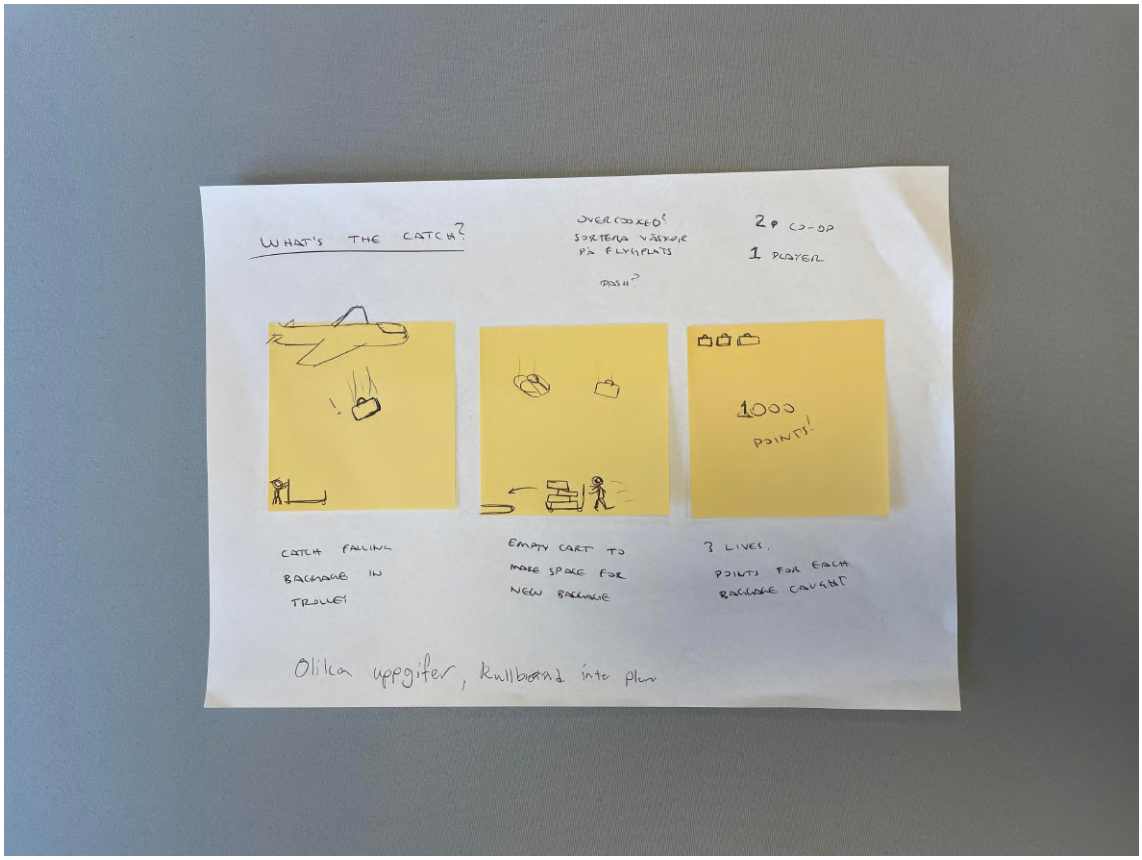
Appendix B

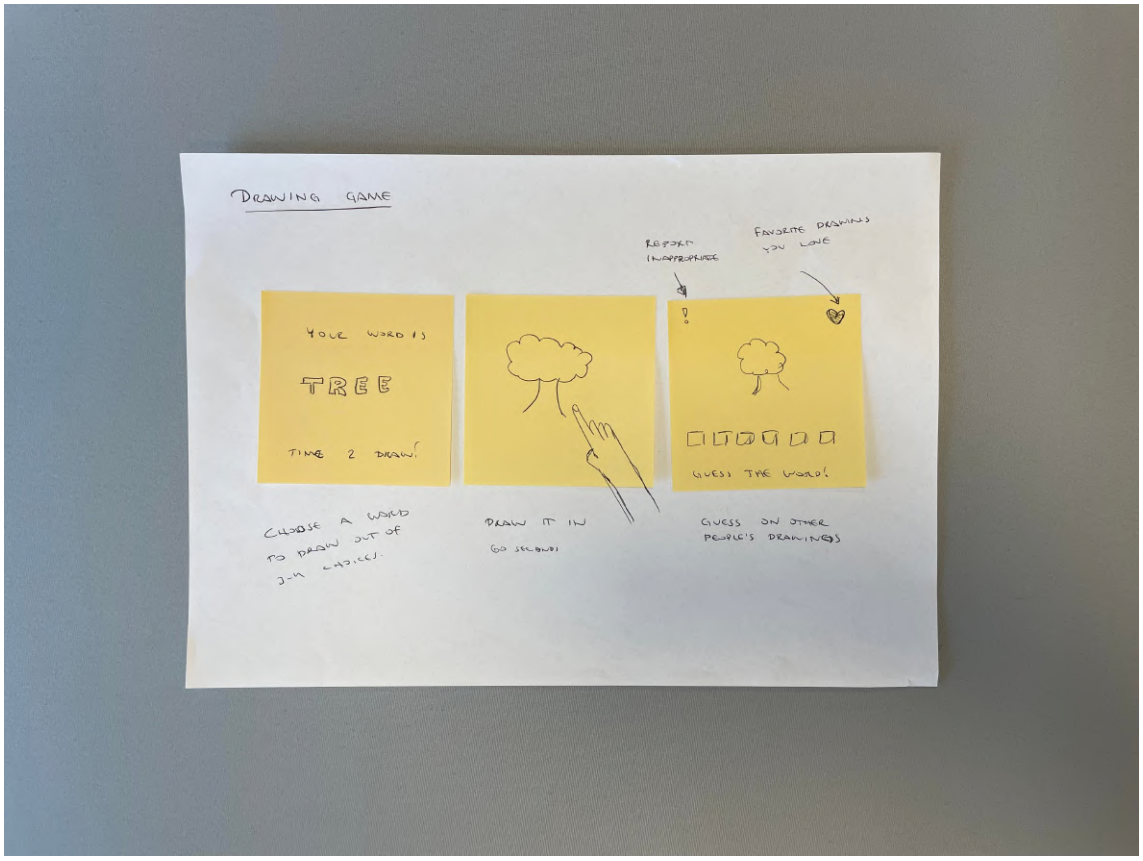
Concept Sketches - Design Sprint I

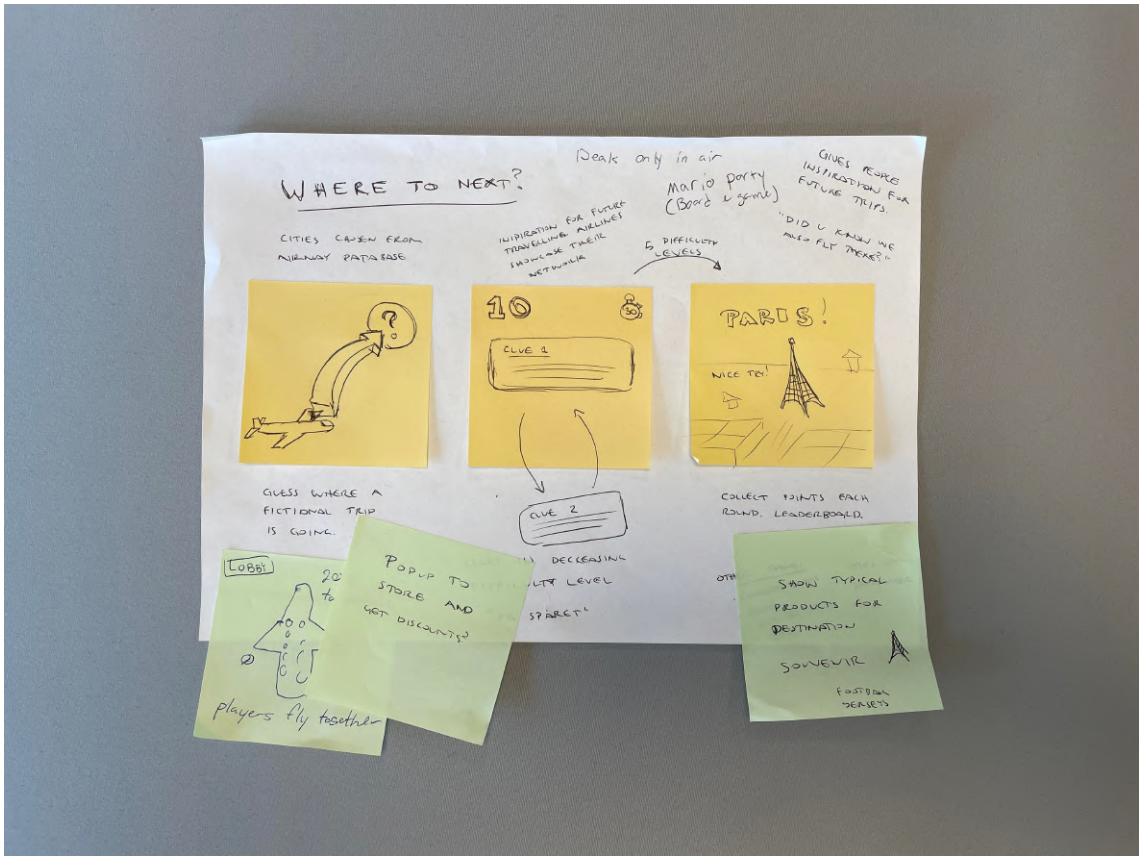

STOWAWAY
JET STREAM
ARC
STEER LEFT & RIGHT
OUCH!
GLIDE ON THE JET STREAM BEHIND A PLANE
COLLECT COINS!
AVOID OBSTACLES! → THUNDER CLOUDS
GET AS FAR AS POSSIBLE!
3 LIVES
COMPARE YOURSELF TO
• OTHERS ON PLANE
• OTHER PLANES
• ALL TIME GLOBAL

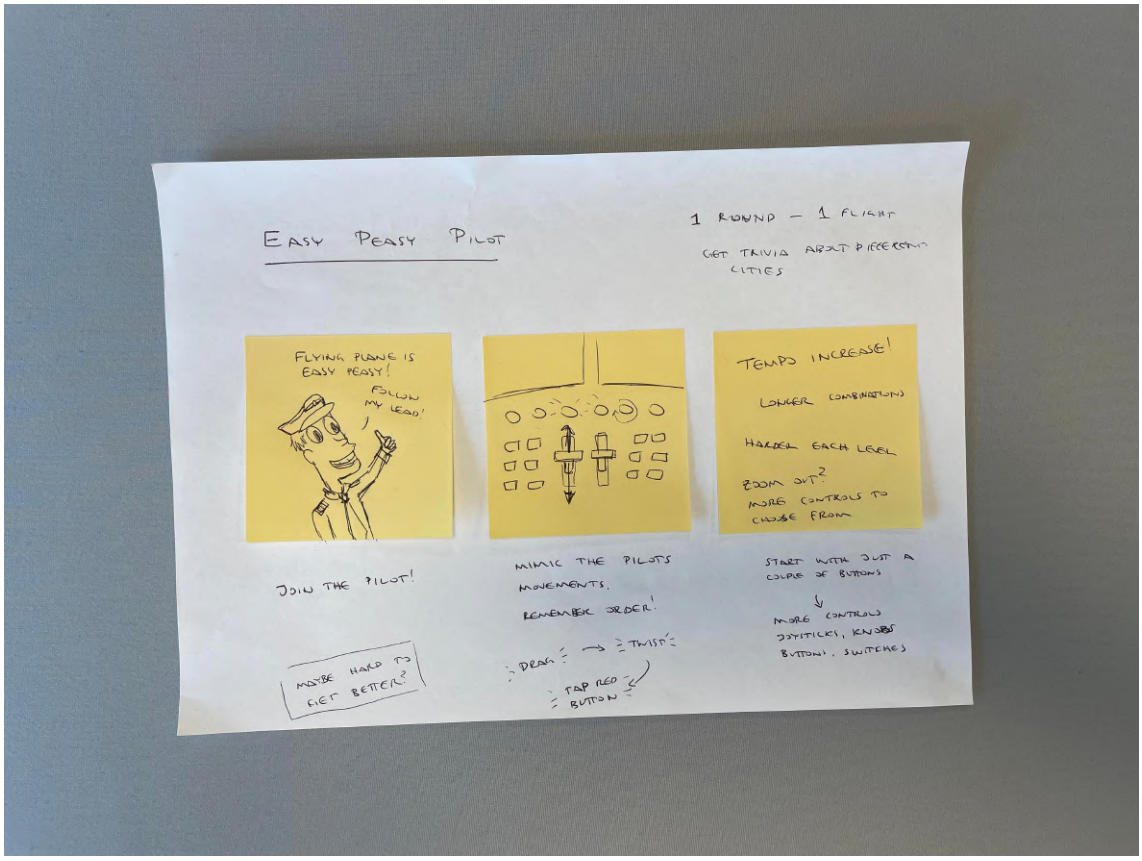

WHO'S THERE?
2p
PREDEFINED QUESTIONS TO CHOSE FROM
ANIMATED Graphical choice
YOU ARE HUGO!
CORRECT!
888 888
ROWS UPON ROWS OF DIFFERENT CHARACTERS
GET A RANDOM CHARACTER.
ROUNDS
ASK EACH OTHER QUESTIONS AN TRY TO GUESS EACH OTHERS CHARACTERS

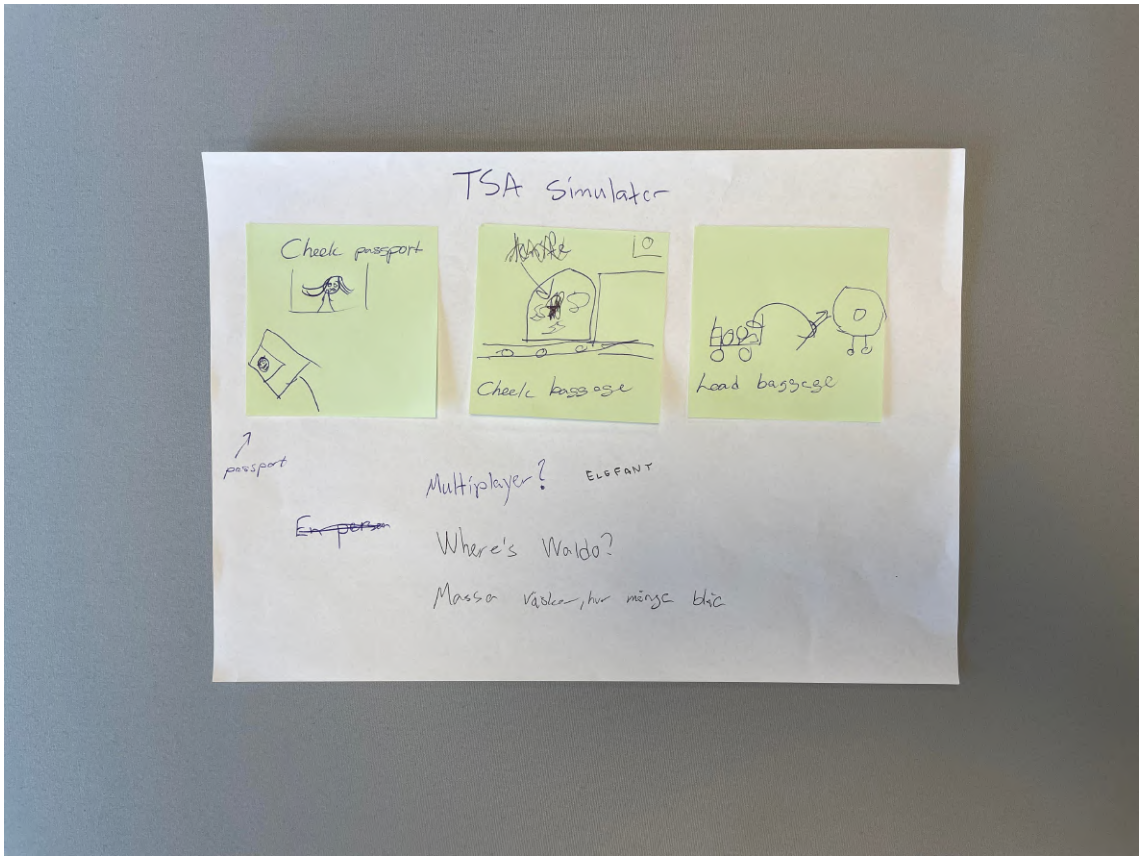

FLAPPY PLANE
SUPER SIMPLE SIDESCROLLING ARCADE GAME
TAP
HOPPAR PÅ BAGAGET?
LÄGGA IN NAMN PÅ DESTINATIONER LAPPAR, IKLISTER-MÄRKEN
CHILL ON CLOUDS!
OOPS!
HI-SCORE
1
2
3
TRY AGAIN?
FORGOT TO FLAP?
FALL DOWN.
TRY AGAIN!
"JETPACK JOYRIDE"
"COPTER"

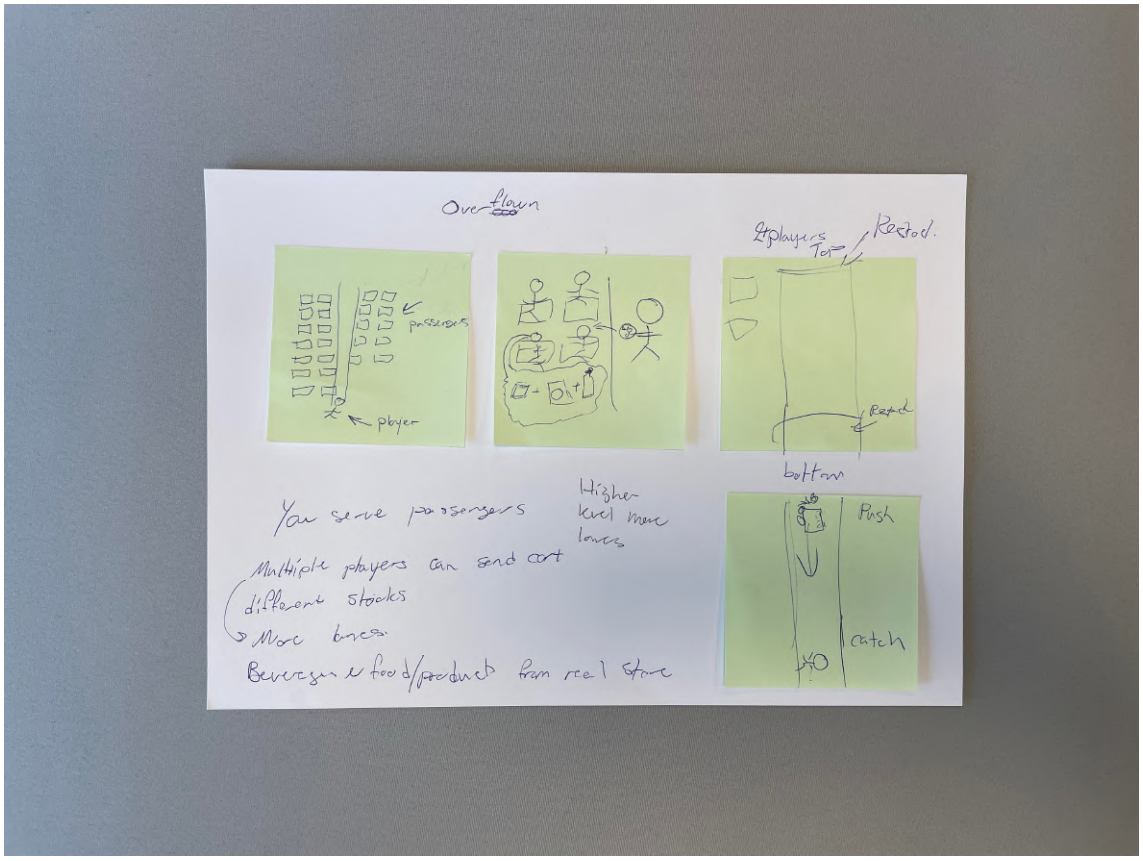

WHAT'S THE CATCH?
OVERCOOKED!
SORTERA VÄSKOR PÅ FLYGPLATS
PASS H?
2 CO-OP
1 PLAYER
1000 POINTS!
CATCH FALLING BAGGAGE IN TROLLEY
EMPTY CART TO MAKE SPACE FOR NEW BAGGAGE
3 LIVES.
POINTS FOR EACH BAGGAGE CAUGHT
Olika uppgifter, kvällsmat inte plan

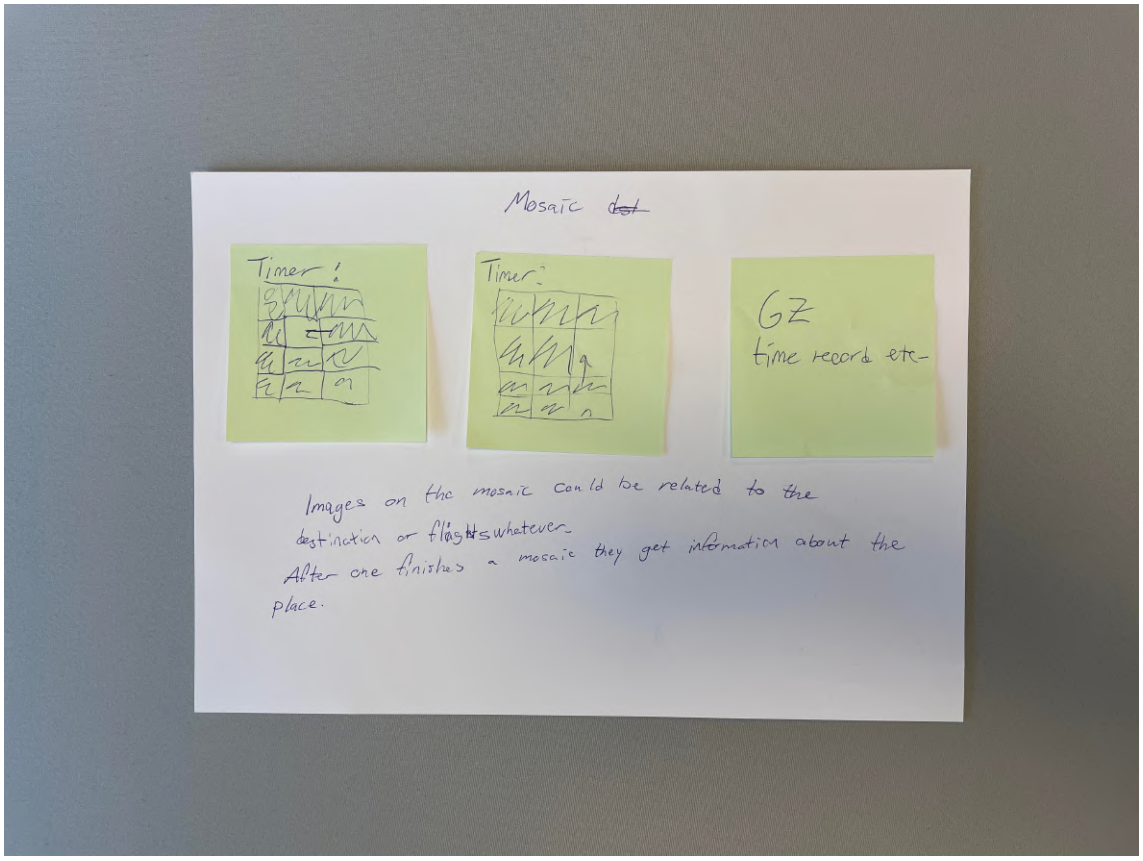

DRAWING GAME
REPORT INAPPROPRIATE
FAVORITE DRAWINGS YOU LOVE
YOUR WORD IS
TREE
TIME 2 DRAW!
GUESS THE WORD!
CHOOSE A WORD TO DRAW OUT OF 3-4 CHOICES.
DRAW IT IN 60 SECONDS
GUESS ON OTHER PEOPLE'S DRAWINGS

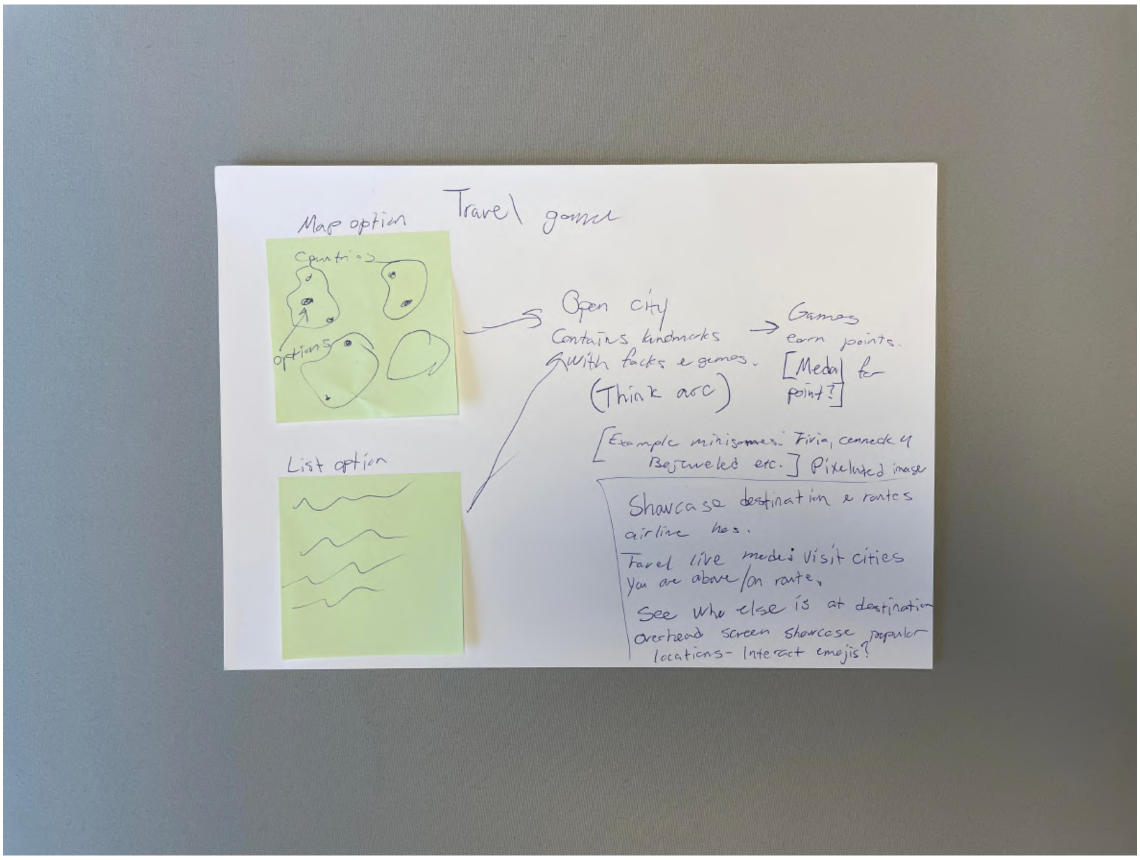

WHERE TO NEXT?
Book only in air
Mario party (Board game)
GIVES PEOPLE INSPIRATION FOR FUTURE TRIPS.
"DID U KNOW WE HAVE FLT THERE?"
CITIES TAKEN FROM AIRWAY DATABASE
INSPIRATION FOR FUTURE TRAVELLING AIRLINES INCREASE THEIR NETWORK
5 DIFFICULTY LEVELS
10
CLUE 1
CLUE 2
PARIS!
NICE TRY
GUESS WHERE A FICTIONAL TRIP IS GOING.
COLLECT POINTS EACH ROUND. LEADERBOARD.
LOBBY
20 to
players fly together
POPUP TO STORE AND GET DISCOUNTS
SHOW TYPICAL PRODUCTS FOR DESTINATION
SOUVENIR

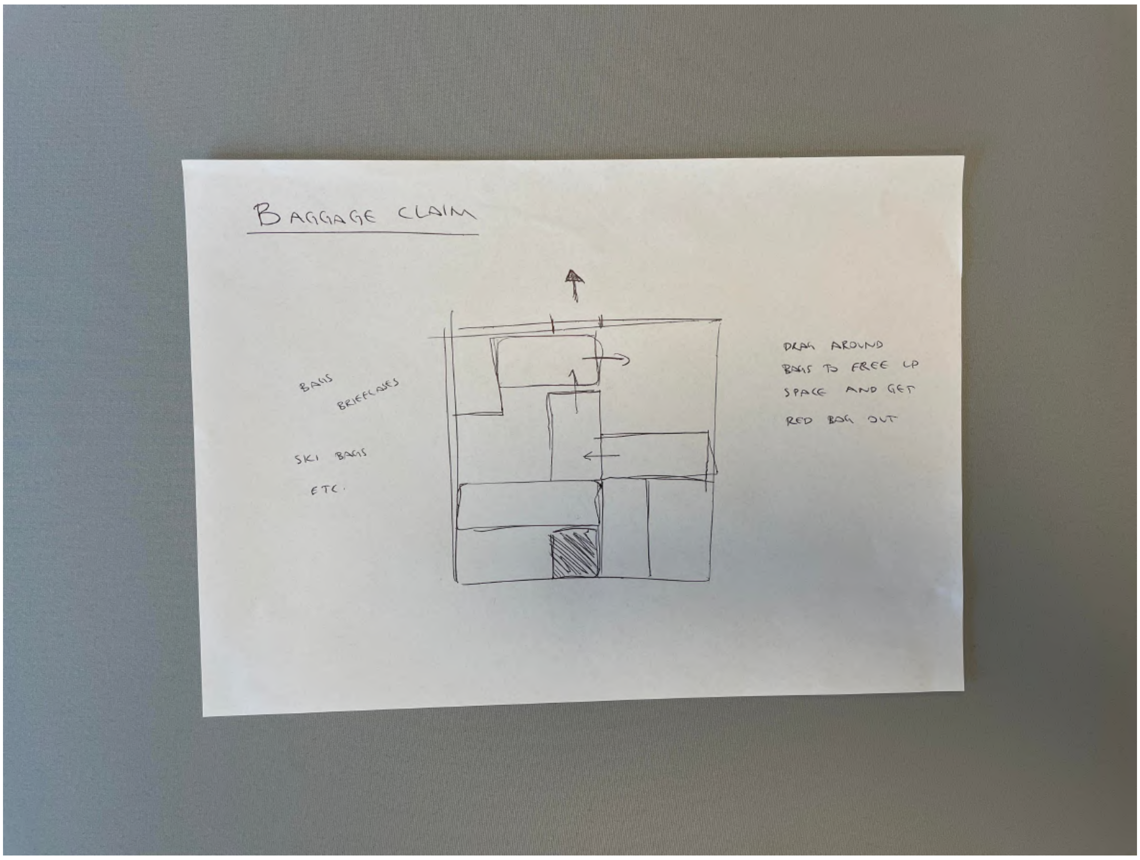

EASY PEASY PILOT
1 ROUND – 1 FLIGHT
GET TRIVIA ABOUT DIFFERENT CITIES
FLYING PLANE IS EASY PEASY!
FOLLOW MY LEAD!
JOIN THE PILOT!
MAYBE HARD TO GET BETTER?
MIMIC THE PILOTS MOVEMENTS.
REMEMBER ORDER!
PEAK
TWIST
TAP RED BUTTON
TEMPO INCREASE!
LONGER COMBINATIONS
HARDER EACH LEVEL
ZOOM OUT?
MORE CONTROLS TO CHOOSE FROM
START WITH JUST A COUPLE OF BUTTONS
MORE CONTROLS JOYSTICKS, KNOBS BUTTONS, SWITCHES

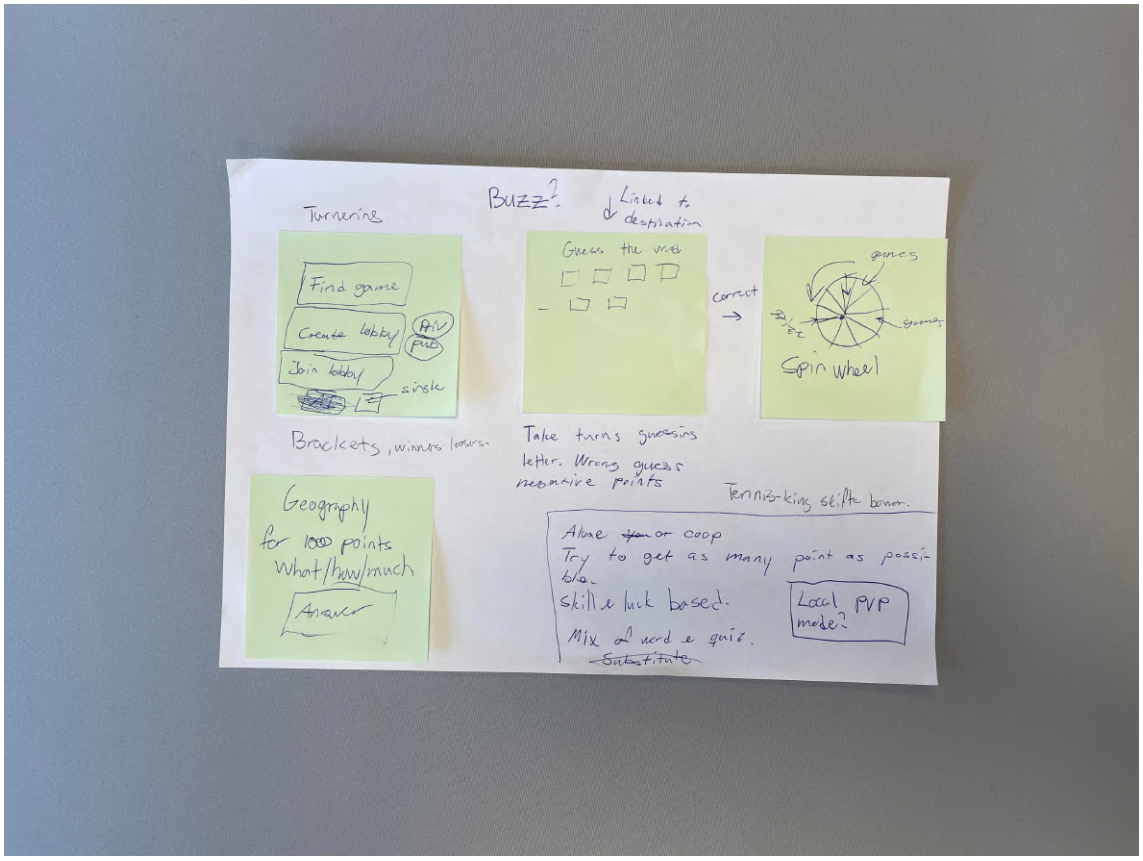

TSA Simulator
Check passport
Check baggage
Load baggage
passport
Multiplayer?
ELEFANT
Where's Waldo?

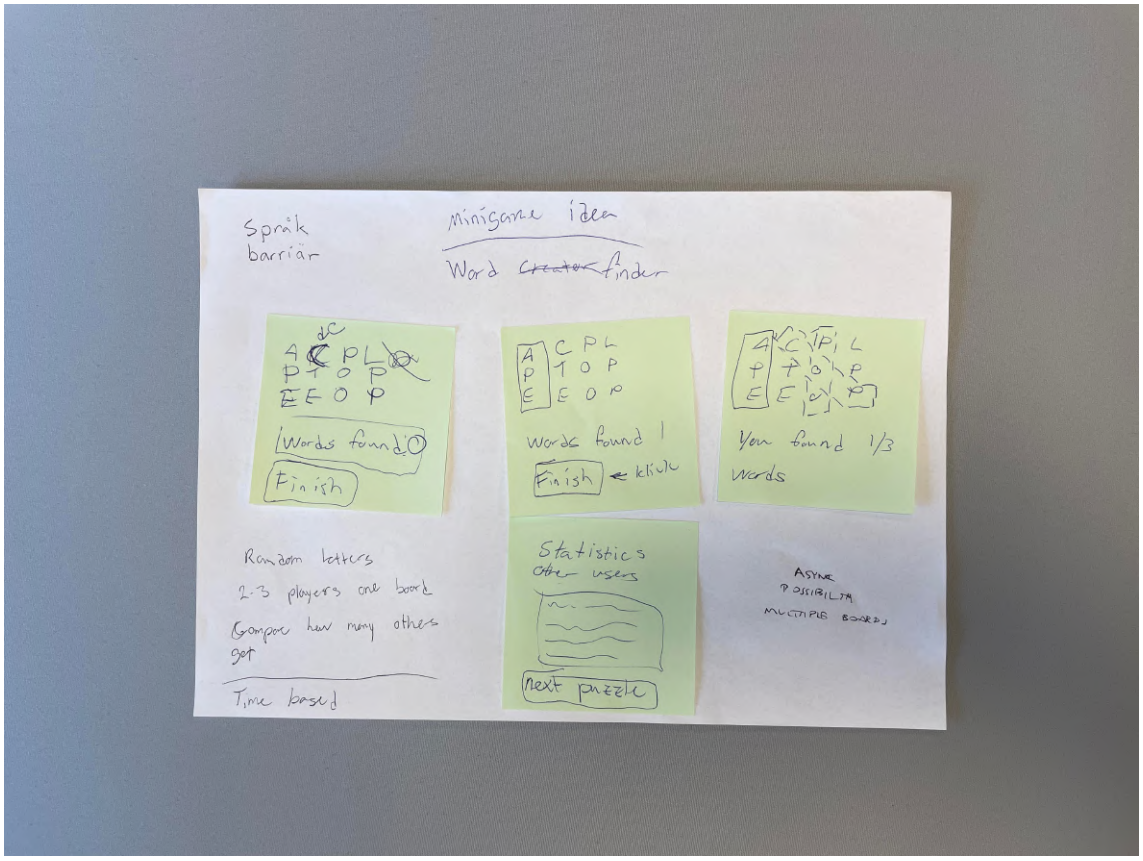

Overflown
passengers
player
2 players
Restrd.
Restrd
bottom
You serve passengers
Higher level more lowers
Multiple players can send cart
different stocks
More lowers
Beverages food/products from real store
Push
catch


Mosaic
Timer:
Timer:
GZ
time record etc.
Images on the mosaic could be related to the destination or flights whatever.
After one finishes a mosaic they get information about the place.


Travel game
Map option
Countries
options
List option
Open city
Contains landmarks
with facts & games.
(Think arc)
Games
earn points.
[Medal for point?]
[Example minigames: Trivia, connect 4
Bejeweled etc.] Pixelated image
Showcase destination & routes
airline has.
Travel live mode: visit cities
you are above/on route.
See who else is at destination
Overhead screen showcase popular
locations - Interact emojis?

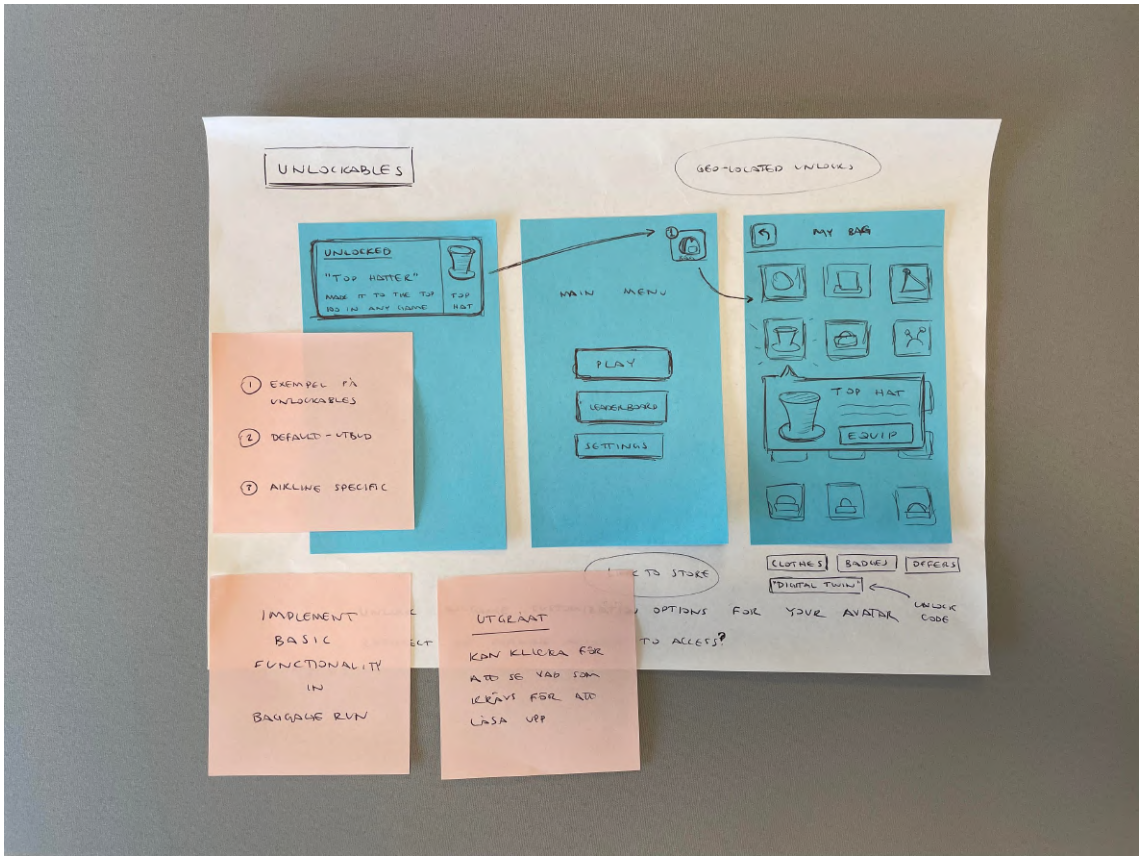

BAGGAGE CLAIM
BAGS
BRIEFCASES
SKI BAGS
ETC.
DRAG AROUND
BAGS TO FREE UP
SPACE AND GET
RED BAG OUT

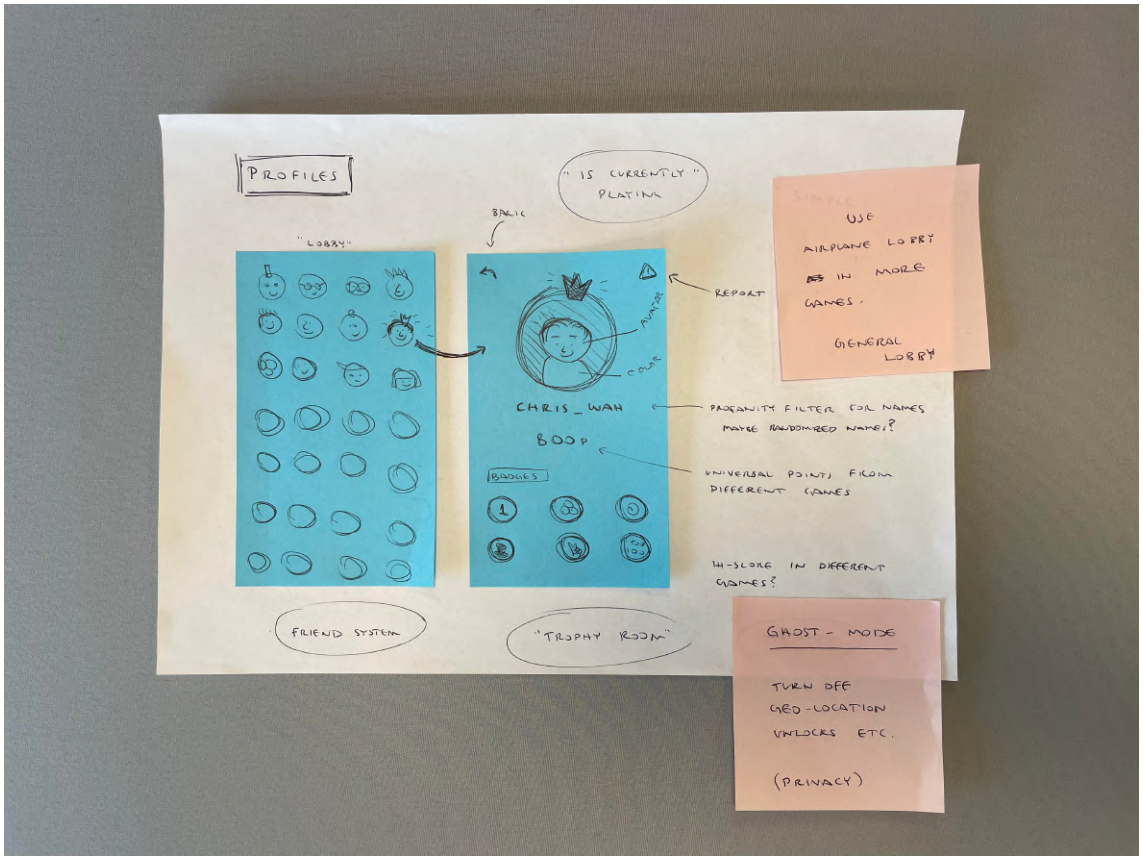

Turnering
Buzz?
Linked to destination
Find game
Create lobby
Join lobby
Guess the word
correct
Spin wheel
Brackets, winners losers.
Take turns guessing letter. Wrong guess negative points
Geography
for 1000 points
What/how/much
Answer
Alone or coop
Try to get as many point as possible.
Skill & luck based.
Mix of nerd & quiz.
Local PVP mode?

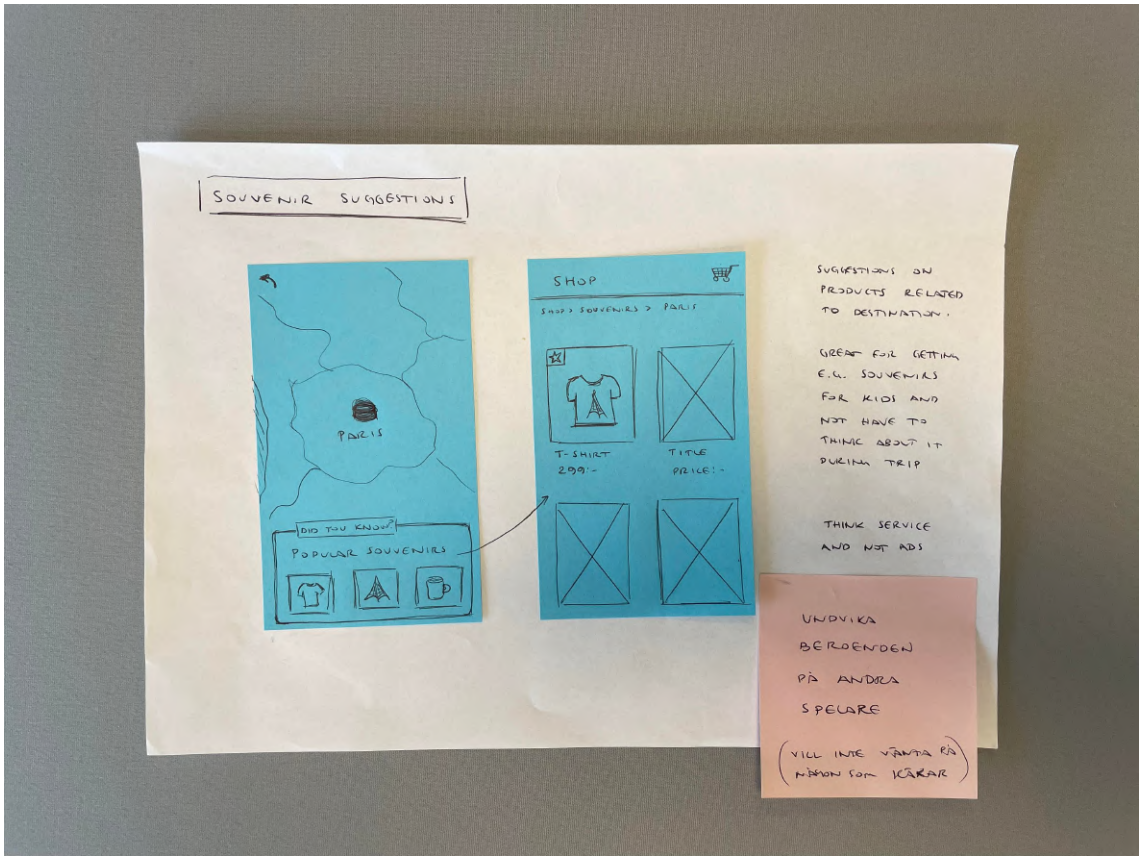

Språk barriär
minigame idea
Word finder
Words found: 0
Finish
Words found: 1
Finish
You found 1/3 words
Random letters
2-3 players one board
Compare how many others got
Time based
Statistics
Other users
Next puzzle
ASYNC
POSSIBILITY
MULTIPLE BOARDS

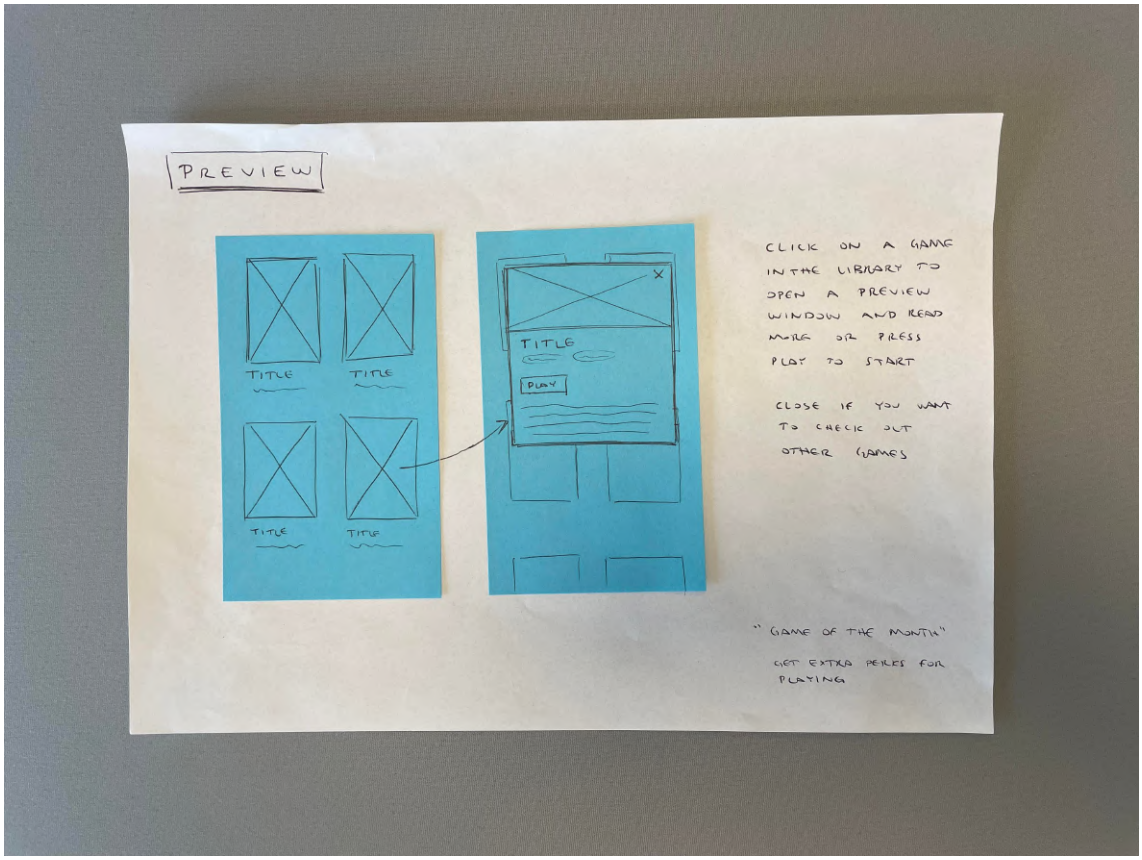
Appendix C

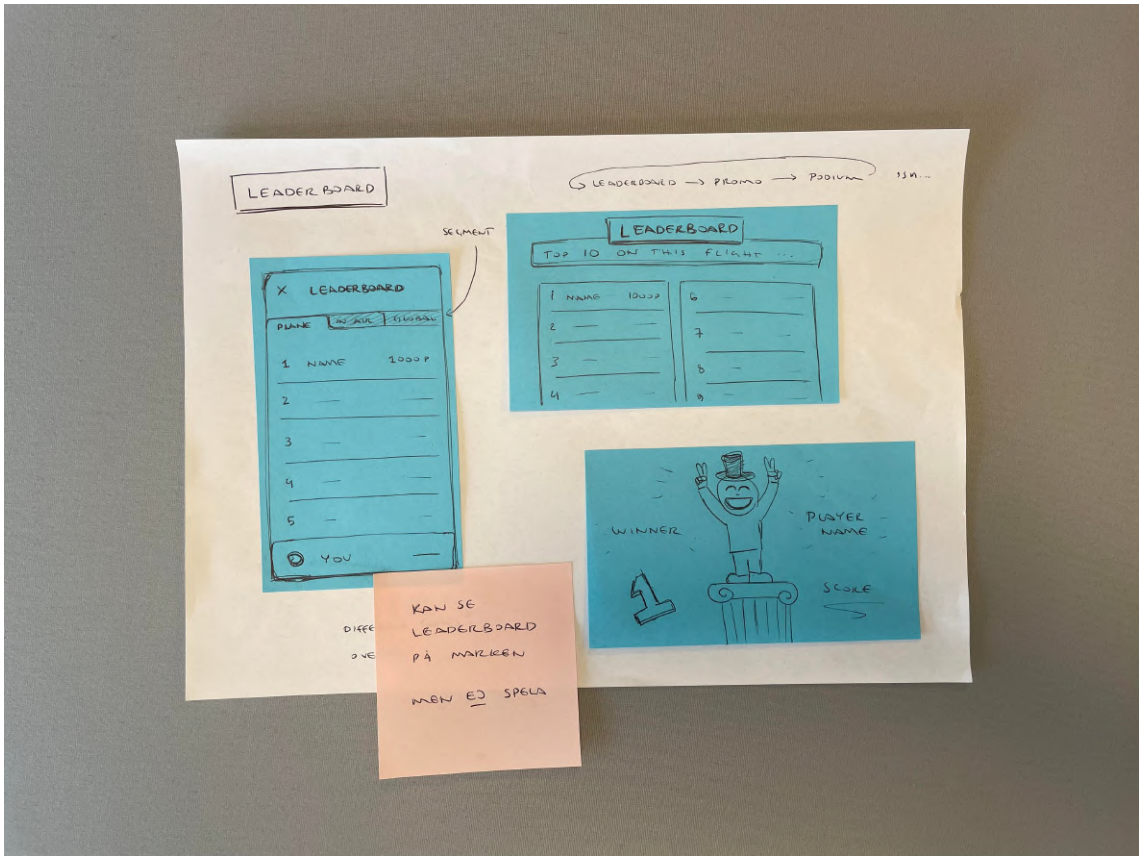
Concept Sketches - Design Sprint II

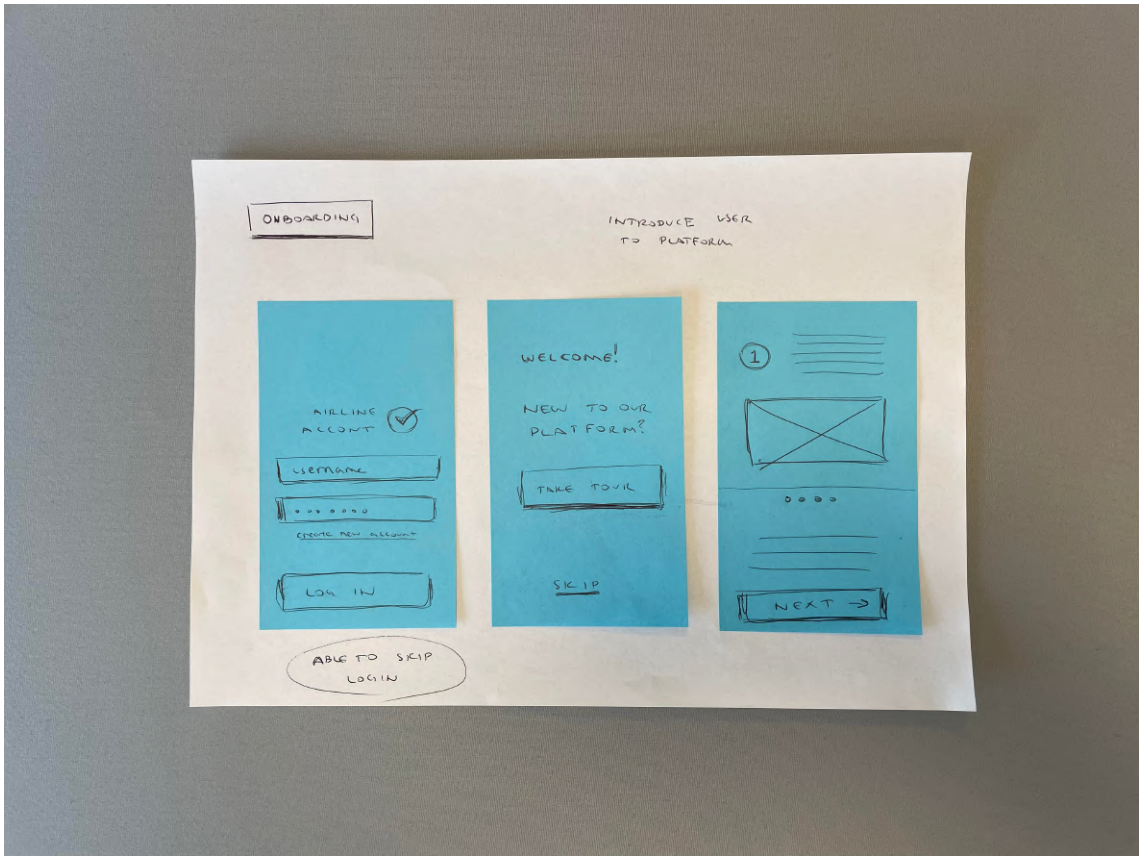

UNLOCKABLES
GEO-LOCATED UNLOCKS
UNLOCKED
"TOP HATTER"
MAIN MENU
PLAY
LEADERBOARD
SETTINGS
MY BAG
TOP HAT
EQUIP
1 EXEMPEL PÅ UNLOCKABLES
2 DEFAULT - UTBUD
3 AIRLINE SPECIFIC
CLOTHES
BADGES
OFFERS
"DIGITAL TWIN"
UNLOCK CODE
IMPLEMENT BASIC FUNCTIONALITY IN BAGGAGE RUN
UTGÅNG
KAN KLICKA FÖR ATT SE VAD SOM KRÄVS FÖR ATT LÅSA UPP

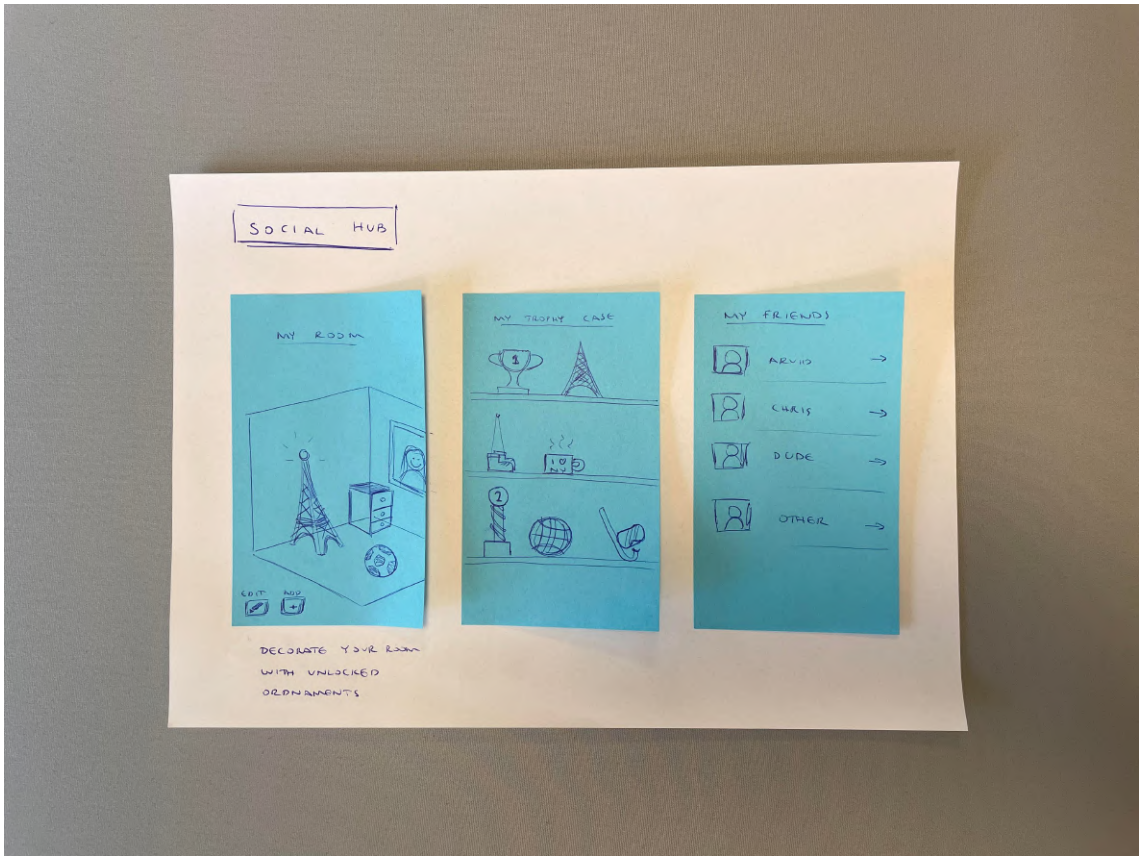

PROFILES
"IS CURRENTLY" PLATINA
BASIC
"LOBBY"
USE AIRPLANE LOBBY IN MORE GAMES.
GENERAL LOBBY
REPORT
AVATAR
COLOR
CHRIS_WAH
BOOP
BADGES
PROFANITY FILTER FÖR NAMES
MAYBE RANDOMIZED NAMES?
UNIVERSAL POINTS FROM DIFFERENT GAMES
HI-SCORE IN DIFFERENT GAMES?
FRIEND SYSTEM
"TROPHY ROOM"
GHOST - MODE
TURN OFF GEO-LOCATION UNLOCKS ETC.
(PRIVACY)

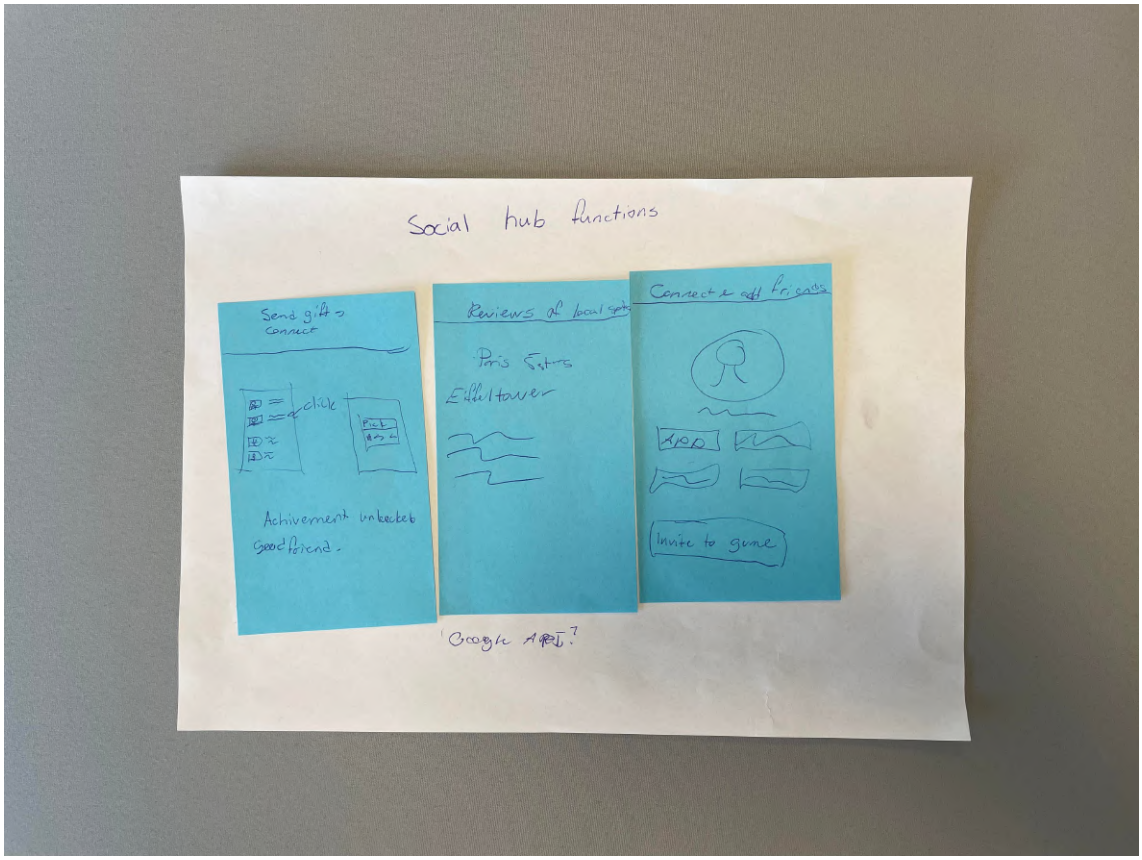

SOUVENIR SUGGESTIONS
PARIS
DID YOU KNOW?
POPULAR SOUVENIRS
SHOP
SHOP > SOUVENIRS > PARIS
T-SHIRT
299:-
TITLE
PRICE:-
SUGGESTIONS ON PRODUCTS RELATED TO DESTINATION.
GREAT FOR GETTING E.G. SOUVENIRS FOR KIDS AND NOT HAVE TO THINK ABOUT IT DURING TRIP
THINK SERVICE AND NOT ADS
UNDVIKA BEROENDEN PÅ ANDRA SPELARE
(VILL INTE VÄNTA PÅ NÅGON SOM KÖRAR)

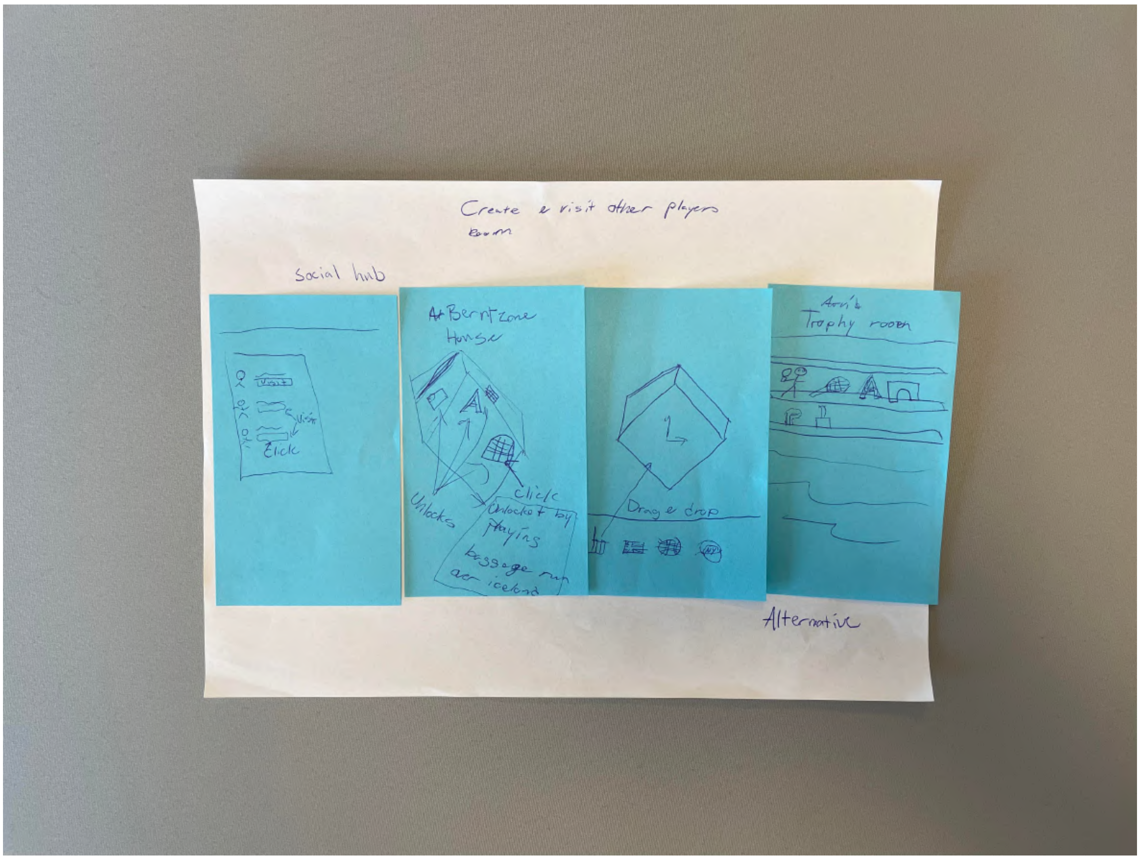

PREVIEW
TITLE
TITLE
TITLE
TITLE
TITLE
PLAY
CLICK ON A GAME IN THE LIBRARY TO OPEN A PREVIEW WINDOW AND READ MORE OR PRESS PLAY TO START
CLOSE IF YOU WANT TO CHECK OUT OTHER GAMES
" GAME OF THE MONTH"
GET EXTRA PERKS FOR PLAYING

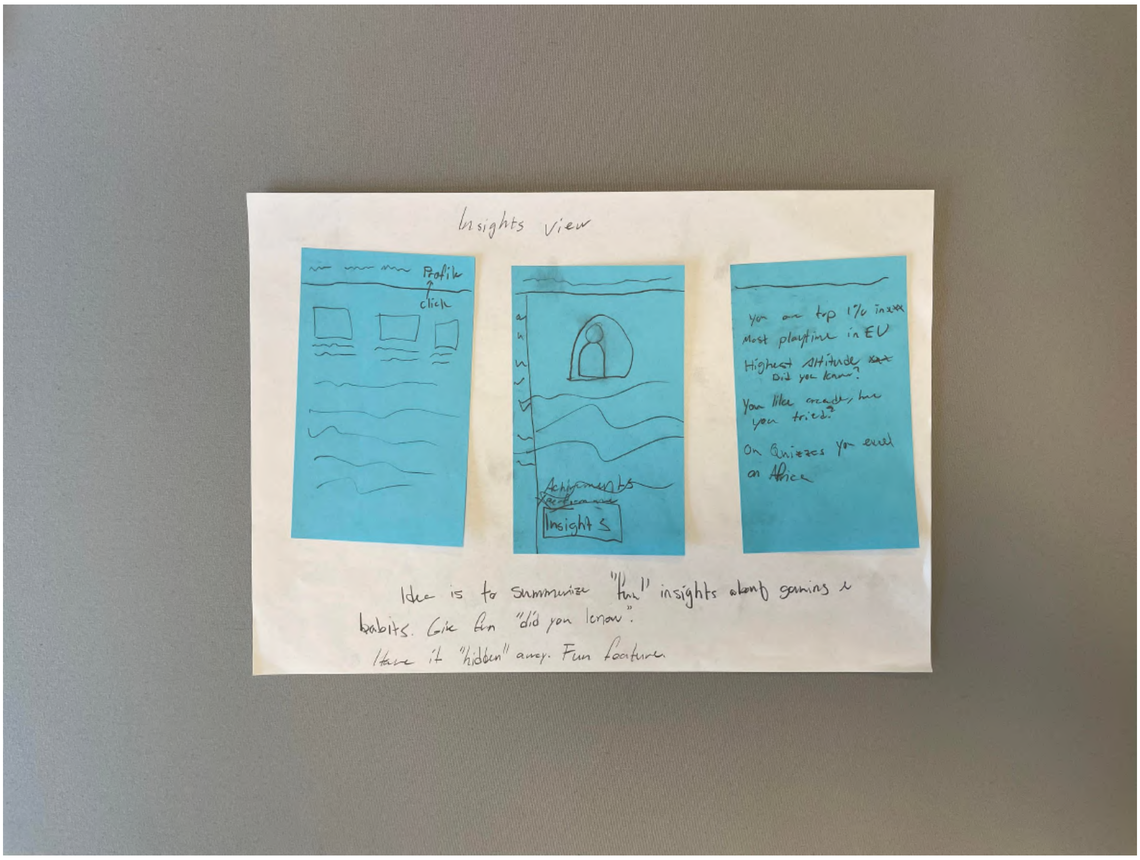

LEADERBOARD
LEADERBOARD → PROMO → PODIUM
SEGMENT
LEADERBOARD
TOP 10 ON THIS FLIGHT
X LEADERBOARD
PLANE
1 NAME 1000P
2
3
4
5
YOU
WINNER
PLAYER NAME
1
SCORE
KAN SE LEADERBOARD PÅ MARKEN
MEN EJ SPELA

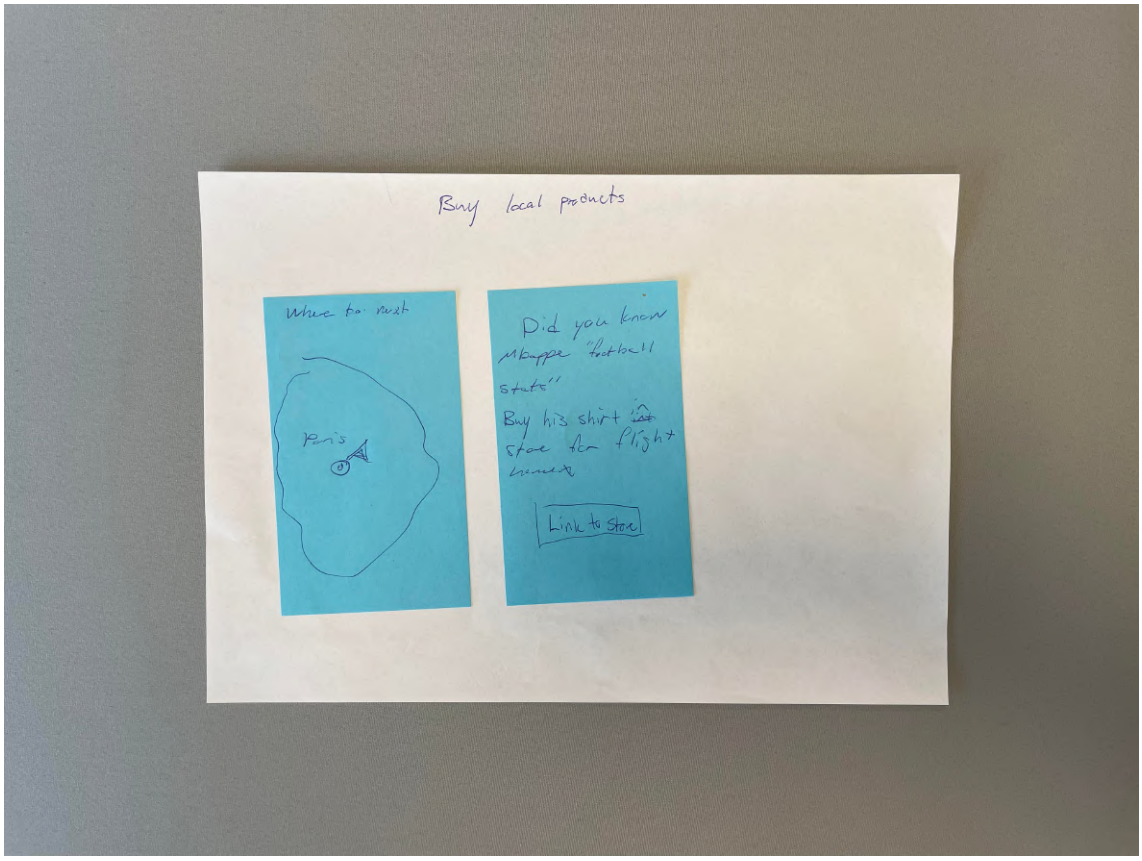

ONBOARDING
INTRODUCE USER TO PLATFORM
AIRLINE ACCOUNT
USERNAME
CREATE NEW ACCOUNT
LOG IN
WELCOME!
NEW TO OUR PLATFORM?
TAKE TOUR
SKIP
1
NEXT →
ABLE TO SKIP LOGIN

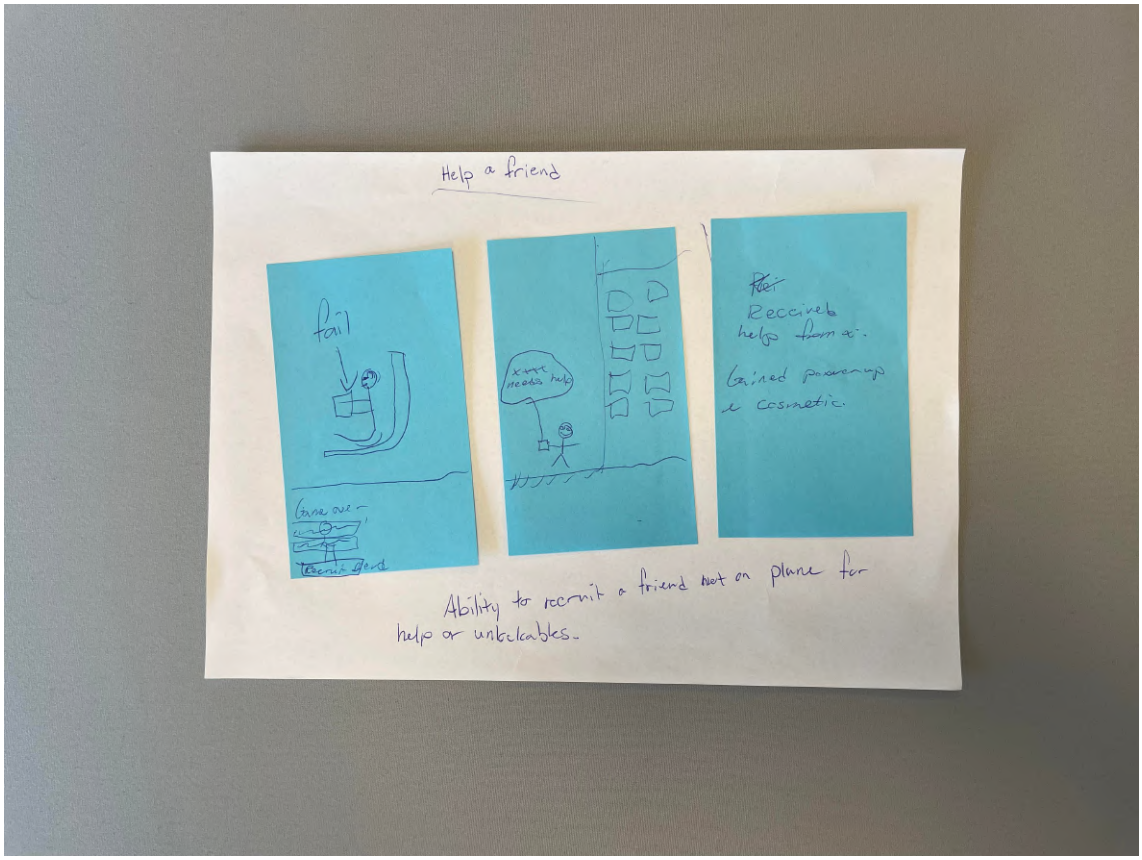

SOCIAL HUB
MY ROOM
MY TROPHY CASE
MY FRIENDS
ARVID
CHRIS
DUDE
OTHER
DECORATE YOUR ROOM WITH UNLOCKED ORNAMENTS

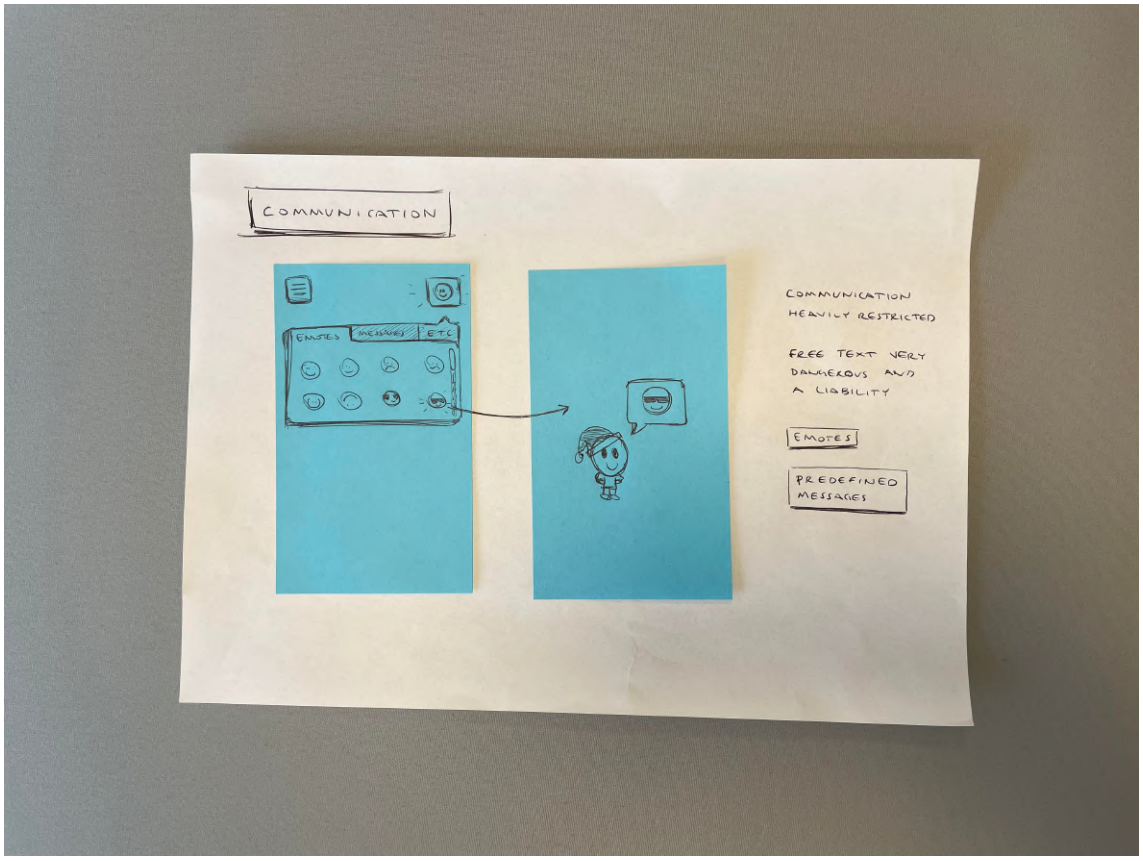

Social hub functions
Send gift → connect
click
Achievement unlocked
Good friend.
Reviews of local spots
Paris Sights
Eiffel tower
Connect w/ friends
Invite to game
Google API?


Create & visit other players
room
Social hub
Click
Trophy room
Unlocks
click
Unlocked by playing
Drag & drop
Alternative


Insights view
Profile
click
Most playtime in EU
Did you know?
you tried?
Insights


Buy local products
Where to next
Paris
Did you know Mbappe "football stuff"
Buy his shirt in store for flight
Link to store


Help a friend
fail
Game over
Tennis Ball
Received help from a.
Gained powerup & cosmetic.
Ability to recruit a friend not on plane for help or unlockables.


COMMUNICATION
EMOTES
MESSAGES
ETC
COMMUNICATION
HEAVILY RESTRICTED
FREE TEXT VERY
DANGEROUS AND
A LIABILITY
EMOTES
PREDEFINED
MESSAGES