

# Creating playground-friendly mobile game design (Zoelympic)

## Goal

The goal of this project was to create an exergame (digital game) that stimulates children from 9 to 12 years old to exercise more in semi / public playgrounds. The exergame that I created in this project will be played in public and semi-public playgrounds in Zoetermeer.

## Clients

Research Group Healthy Lifestyle in a Supporting Environment (RG-HLSE) together with The Hague University of Applied Sciences (THUAS) and The municipality of Zoetermeer.

## My Role

Solo UX/UI Designer

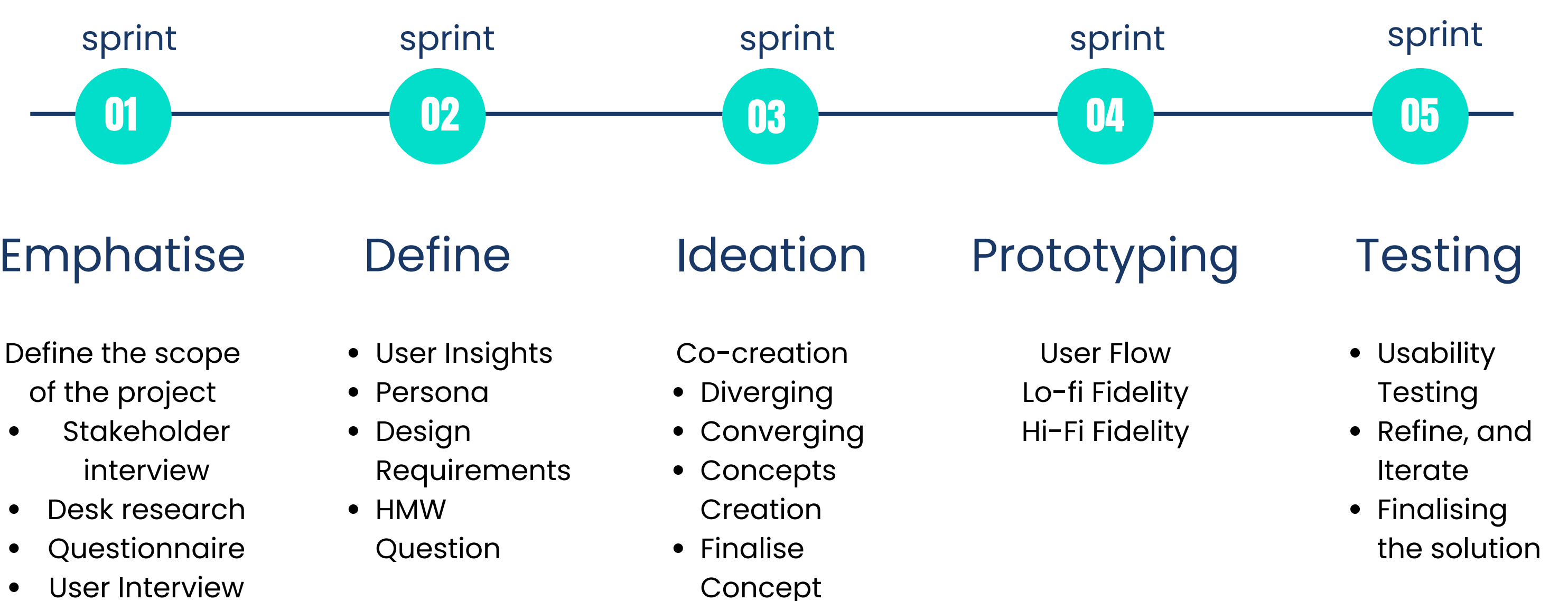
## Tools

Google Survey  
Miro  
Figma  
Photoshop & Illustrator



# Design Thinking Process

I used this design thinking process method with Sprint to plan my project during the course. Every sprint consists of 3 weeks



# 01 Emphasise

## Research Objectives

First I started with research questions. The goal of this research was to learn what motivates children to play in the playground, as well as activities like video games. I also wanted to reveal their values and characteristics regarding playing.

## Research Methods

To get a better understanding of my target group I used multiple methods such as Desk Research, Interviews, Observation (Fly on the wall), and Questionnaire. In that way, I could get to know how they feel and think and also their behavior and actions in regard to my research objectives.

## Desk Research

First, I used this method to get baseline information in understanding my research objective and it was also quick and easy. Besides a few findings that I got from this method. The finding that I got from this method I also used to formulate my interview questions.

*To keep a playground attractive over time, variation in and renewal of equipment and games were recommended. This is especially relevant to older children since they already played for years in the playground.*

(Caro et al, 2016)

*The main barriers for children to play outside are:*

- Play areas are boring (39%).
- I prefer to play indoors (39%).

Jantje Beton (2018)

*children were motivated by challenges in playing video games*

Olson, (2010).

## Interview

Second, I used interview to give me more deep knowledge about what they feel and their perception based on their experience. I interviewed several children that were within my target group. I connected with these children by contacting my friends and my docents. On the right side are a few examples of quotes from my participants.

*"I don't like a game that needs a lot of concentration or where it takes lots of time to be good at it. But I do like games that are a little bit hard because I like to challenge myself. But not too difficult. I am always up for challenges." -- Maurits, 11 yo*

*"Because it is fun. I like running and I am pretty good at this game. I feel good when I can catch someone or when someone cannot catch me." -- Edwin, 10 yo*

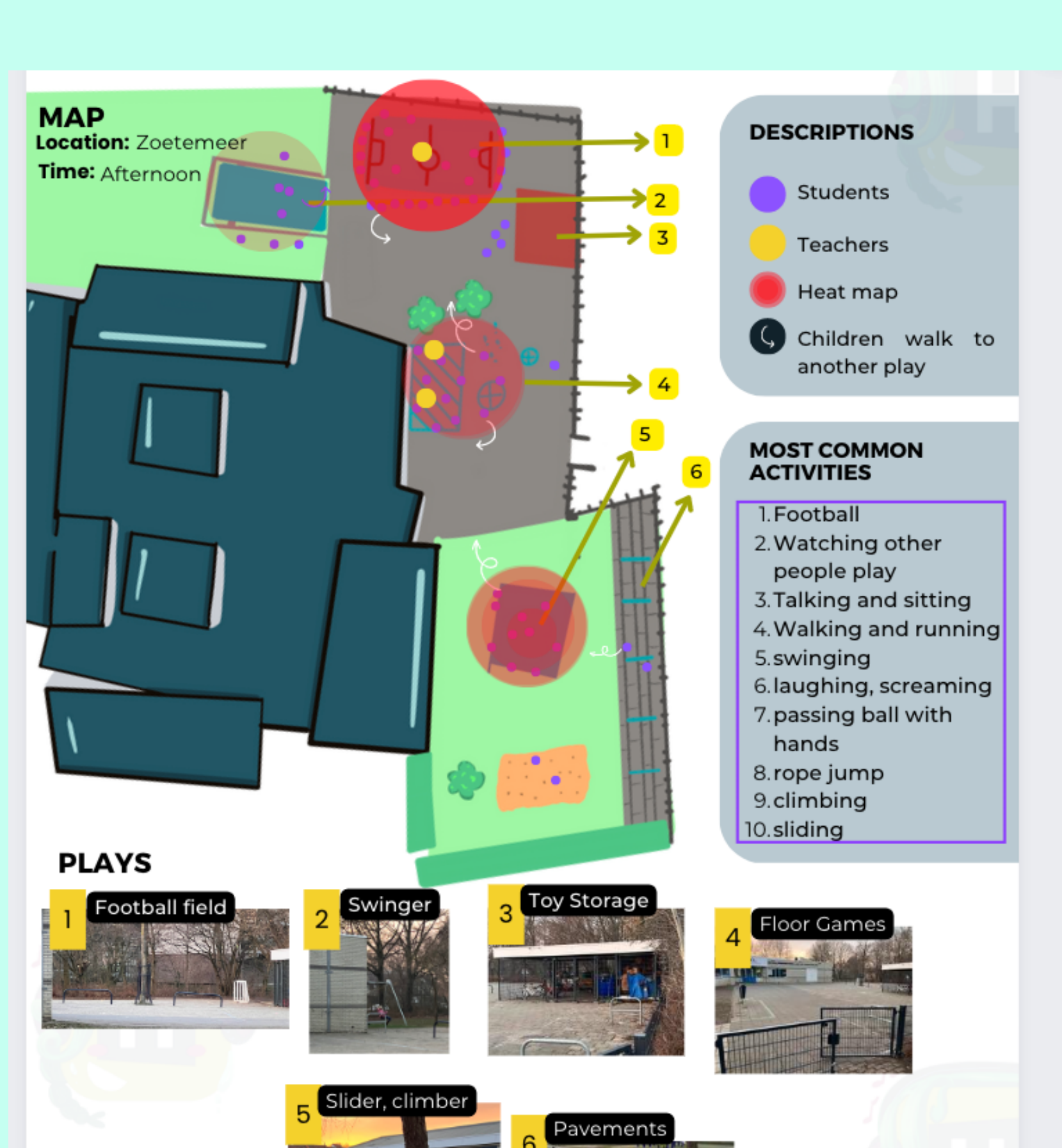
*"I like it, but not too easy then the game end quickly. I like when I need to put effort to catch someone." -- Daphne, 9 yo*

Example of interview Questions:

1. What are your favorite activities in the playground? Why?
2. What do you like and don't like about your school playground?

## Observation

Third, I used observation to allow me to unobtrusively gather information (such as their behavior in natural environments ) by looking at and listening to my target group without interfering with them. For this method, I went to some primary schools and also public playgrounds around Zoetermeer. On the right side, you can see the floorplan of one school and also a few findings that I got.



*The most frequented play equipment was the football field, followed by floor games, slider, and climber.*

*Many children watched other people play because the play was occupied.*

## Questionnaire

Lastly, I used this method to reach more people to participate and quickly gathered more information for this research. I went to one of sports events for children from the Municipality of Zoetermeer during Spring Break.

*Children like a variety of activities in playgrounds and Football was the most mentioned, and after that freeze tag, and then Running. The activities that they described usually around sports.*

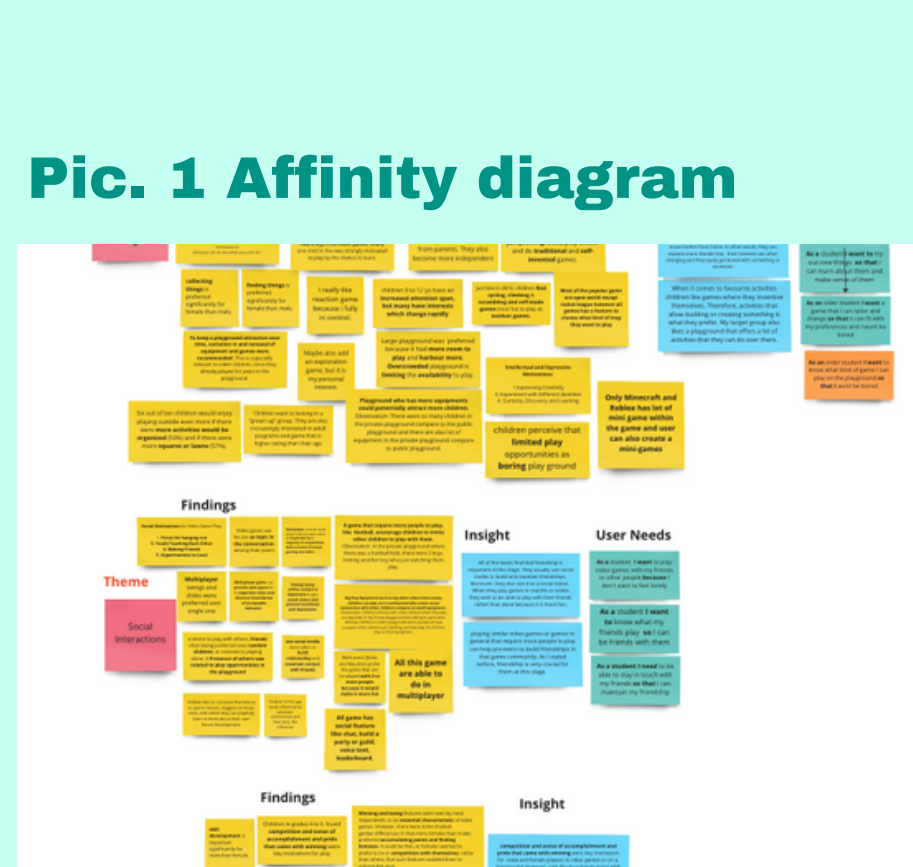
*4 out of 7 participants mentioned that they used a smartphone as a video game console at home. All participants had a smartphone at home.*

# 02

# Define

## Insights

Pic. 1 Affinity diagram



After I gathered all my findings, I used an affinity diagram (See Pic on the left side) to cluster the findings that have similar patterns and put them into themes. After I extract insights from each of the themes.

## Not FUN = Boring

What I learned was children were playing in the playground because they thought their playground was boring. They considered if the playground were boring it means it was not fun to play at. During my research, I found four themes that children considered fun which were: Challenges, Positive Social Interactions, Variation and Novelty, and Aesthetic (3D and Colorful). I also got 11 insights from those themes (below you can see 1 theme and 2 insights that I can show you).

### CHALLENGES (THEME)

#### INSIGHTS:

- My target group likes to push their limits and finds it very rewarding if they can do the difficult challenges in a play. However, a challenge that is too difficult will frustrate them and one that is easy will bore them.
- My target group likes to compete with themselves and their friends during a play because they like the sense of winning that comes from it.

#### FINDINGS:

- Some children like to challenge themselves
- Some children who played basketball, after they could shoot at a short distance then they tried to shoot a bit further (**observation**).
- Children made a loud noise and screamed happily when they win during a football game (**observation**).
- "well in Minecraft there is a mode that is very hard to boss. Like there was one mode that you need to kill the boss but the boss is too strong and it is very difficult will frustrate to kill it. It frustrated me" -- Andre (10 yo). (**interview**).
- "I like to compete with my friends when running, like who gets first to a finish line." -- Maurits, 11 yo (**interview**).
- children were motivated by challenges in playing video games (Olson, 2010). (**desk Research**)
- "Compete and win was one of the strongest motivators for video games among boys and girls." (Olson, C. 2010)(**desk Research**)



# Personas

I also created personas to represent my target group. These personas were created based on the findings that I got during the empathize phase. In the persona, you can a description of a target group, their preferences such as playground activities, play areas and etc, and also what they want in a video game.

### Playground Activities

Favorite Playground activities:

Running Hide and Seek Passing ball Chatting

### Play Areas

I prefer to play in a garden and also in a small playground with playground equipment.

### Game Genre

I like action / adventure, strategy, arcade and puzzle games.

### Video games

Favorite video games:

Roblox Minecraft Mario Kart Wii sport

**Samantha, 12 yo**

She is part of a middle-income family. She likes to play on Nintendo Switch and on a PlayStation. Every weekend she invites her friends to come over to play with her together. She is a senior student and is bored with the playground at school.

### Player Type

**Achiever** She likes to get recognition from other people, especially her friends.

**Explorer** She likes to explore and play new games and features in a video game or in the playground.

**Socializer** She only plays games where her friends can join.

### User Needs

- I want my friends or other people to notice and compliment me when I am doing well in a game.
- I want a game where a new feature is coming up regularly. I easily get bored.
- I want to be able to invite my friends to join my game.

### Playground Activities

Favorite Playground activities:

Football Cycling Walking Sit and Chill around

### Play Areas

I prefer to play in a grass field, a skating rink, and a soccer field when it comes to playing outside.

### Game Genre

I like shooting, action/adventure, sports and Strategy games.

### Video games

Favorite video games:

GTA Fortnite Minecraft FIFA

**Lucas, 9 yo**

He belongs to a lower-income family. He only has a smartphone when it comes to playing video games. He likes to go to an internet cafe to play his favorite games (Fortnite) with his friend. He does not have a good game console at home and often uses his phone to play a game when he plays alone.

### Player Type

**Killer** He is very competitive when it comes to playing a video games. He wants to be the best

**Explorer** He likes to learn and master new skills

**Socializer** He likes to compete with his friends or even strangers.

### User Needs

- I want a game where I need to push my limits because it feels rewarding
- I want a different type of game mechanic because I like to learn new things
- I want to be able to play with my friends or other players because I don't want to feel lonely

I also discovered similar frustrations within my target group from the research that I gathered. Since these are more senior students and have been at school for a longer time it makes sense they find their school playground and any public playground boring because they have somewhat the same type of equipment and not challenging enough.

**Lucas / 9 yo**

### Frustration

- Children find semi/public playgrounds boring because there is nothing new there and they have already been playing there for a long period of time.
- Most playground equipment is no longer challenging because they grow stronger physically.**
- Limited equipment to play and need to wait for other people to finish.

**Samantha / 12 yo**

# HMW Question

Therefore this becomes my question for the design: HMW redesign the playgrounds to be more attractive and less boring to attract children to play there?

## HMW Question...

### How might we keep playgrounds challenging even when children grow physically stronger?

# 03 Ideation (Diverging and Converging)

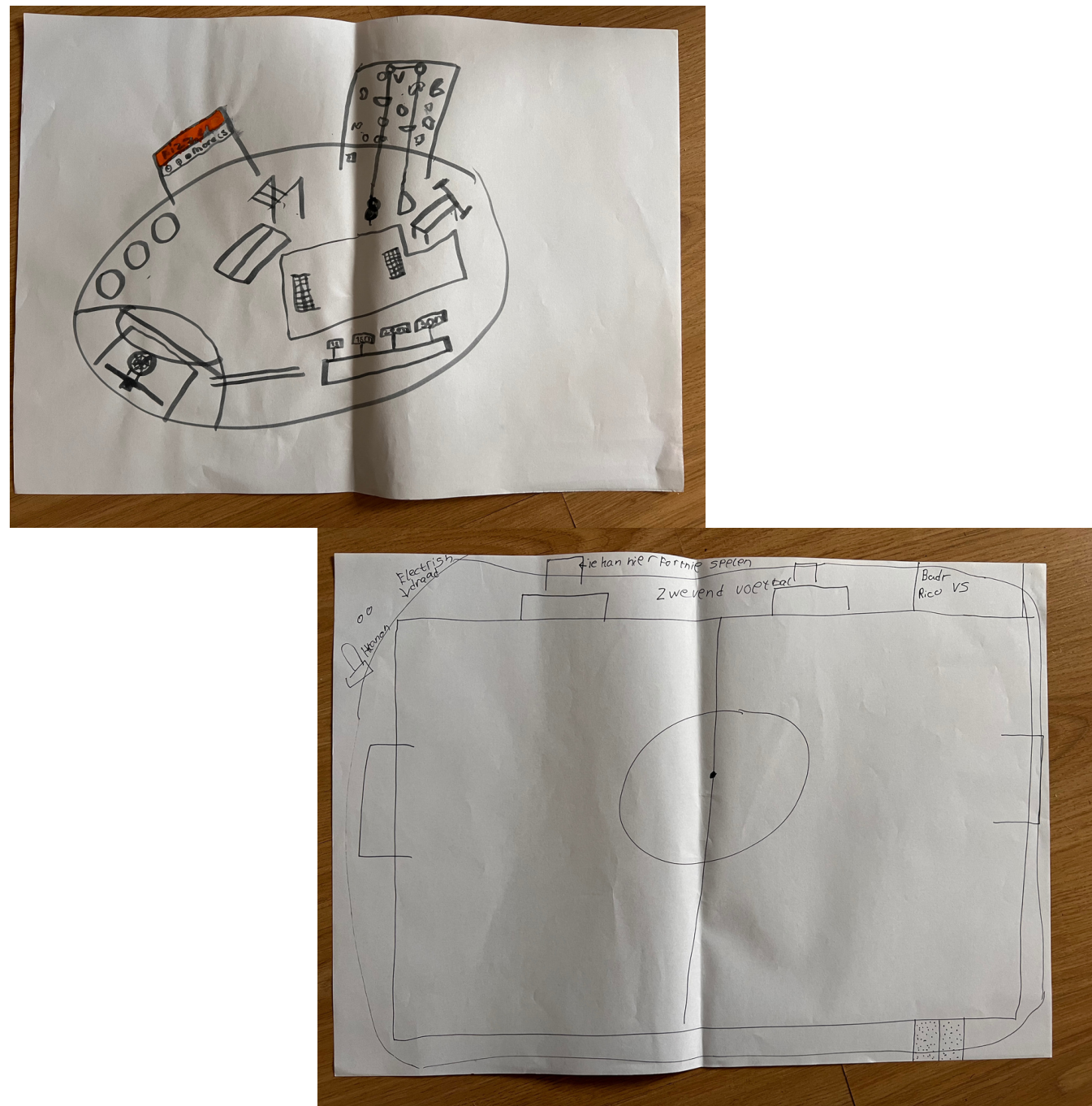
## 1st Co-creation

Next, I conducted a workshop with my target group to do diverging sessions with brainstorming methods to get more ideas to solve the HMW Questions. In this session, I did with 5 children and their school. I got insights that children like to play sports in the playground and their favorite activity was football based on their drawing and interviews.

### INSIGHT

- Sports or gymnastic activities were preferred for play in playgrounds and football was the wanted activity.
- Participants suggested features on how to make the more game challenging such as (here are a few examples):
  - score systems
  - level system (easy, normal, difficult)
  - play with strangers
  - etc

## Here are a few examples of children's ideas



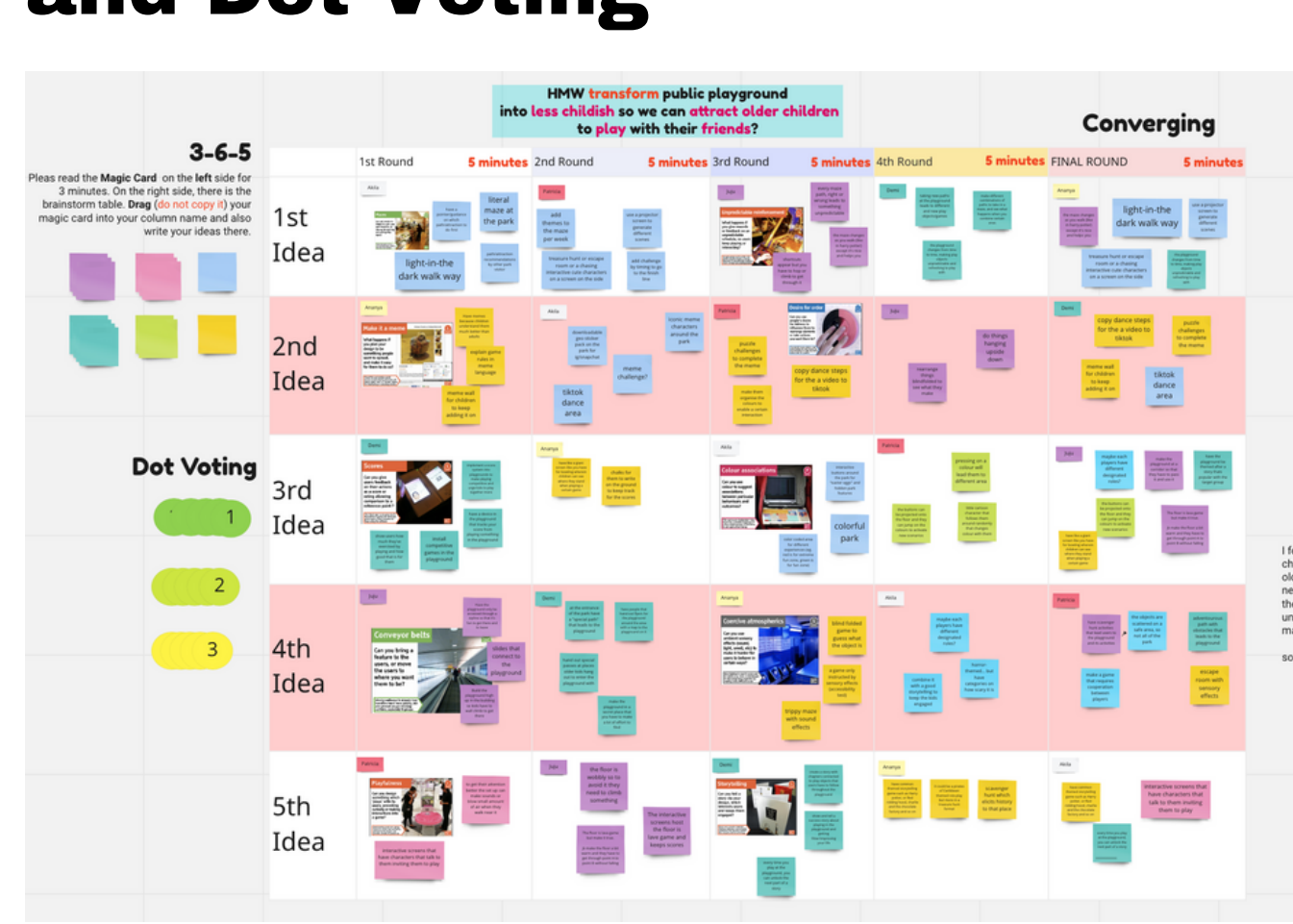
## 2nd Co-creation

I also wanted to explore more ideas to make sure that I had figured out a lot of options. Then I did some diverge and converge with 5 of my friends who are also UX designers. I chose them because they are creative people and they can produce more variety of ideas on how to solve my design challenge. This session was online because some of them were not in the Netherlands. I prepared the session using Miro Board and Google Meetings. In this session, I conducted 2-time Diverging using Braindump and the 6-3-5 Brainstorming. The reason I did it 2 times was the first method for dumping their common ideas or normal ideas. And the second method was used to help them to come up with a large number of ideas in a short timeframe by drawing inspiration from previously mentioned ones. I also used inspiration cards to make it easier for them to come up with more ideas.

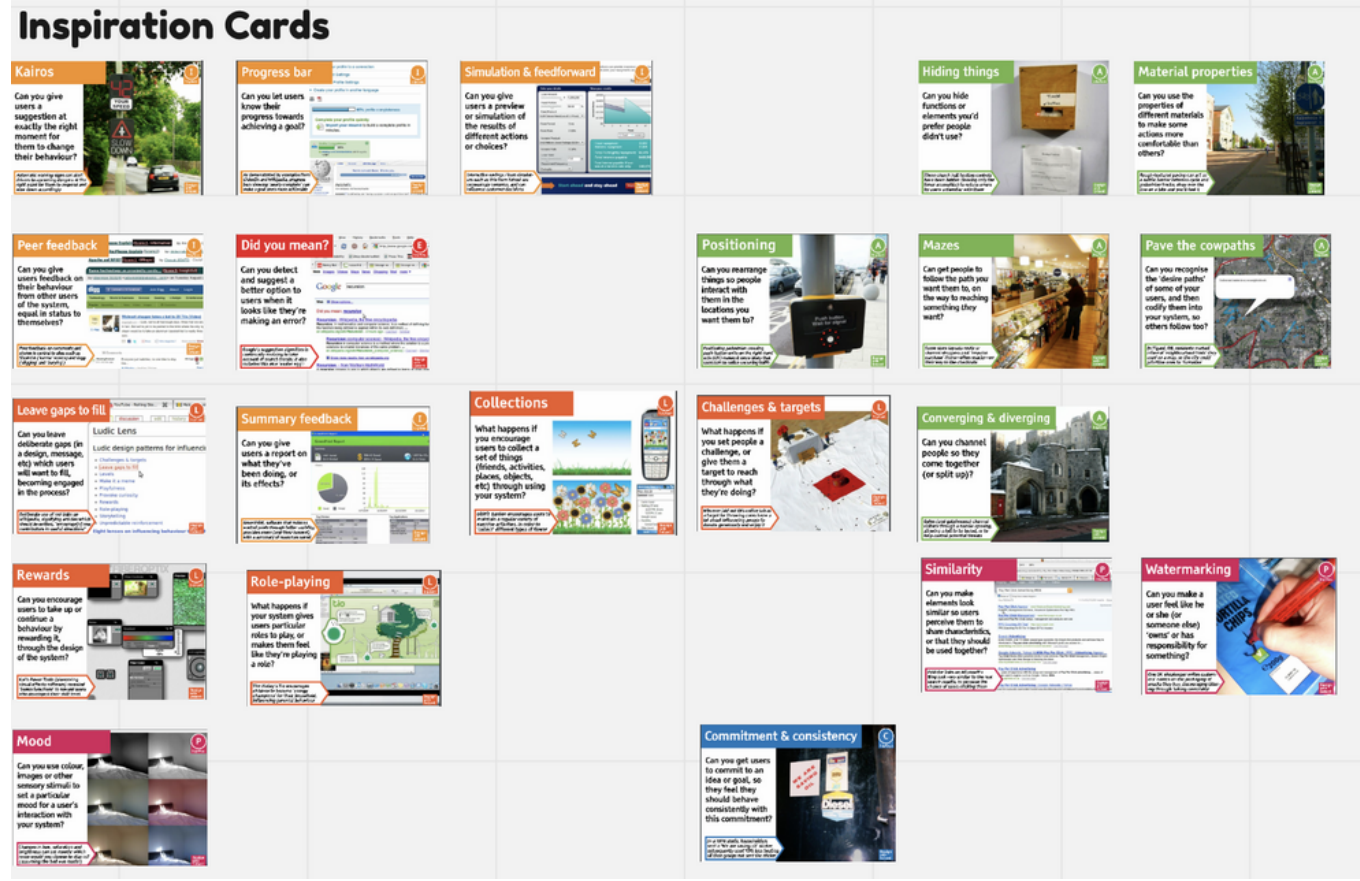
### Braindump



### 6-3-5 Brainstorm Methods and Dot Voting



## Inspiration Cards



## Concepts Creations

Based on the co-creation session, I created 3 different concepts with a storyboard to demonstrate how the concept should work to solve the design challenges. I gave a presentation of these 3 ideas to my mentor and clients to get feedback.

## Feedbacks

- 2nd concept:
- "The detective game is not applied to large audiences, only to a small audience"
- 3rd Concept:
- "I like it looks futuristic but it is very expensive to have a screen in a playgrounds"

### Monster-Ground

Context: User already downloaded the app.

**GOTTA BEAT THEM ALL!!**

**Concept Description.**  
Save your playground from invading monster. Team up with another player to kill the invasive monster and collect all weapons and armors to power-up your robot character.

Monster-Ground is an AR adventure shooting game. Player need to go to the public playground to find a monster and level up their character. The monster is only respawn in public playgrounds. Players can upgrade their weapon after killing a monster. Players can also team up with another player to kill a monster.

- They can choose a character that fits their personality
- They get a notification or alert about a monster that would appear near their playground.
- The character will ask a user to go to the playground by acting based on the personality that they chose.
- The app will show a direction to the playground and how many people there are.
- When the player arrives at the playground, on the phone they will see the monster and they need to fight the monster together.
- They need to dodge the attack from the monster and they can fire the monster by just clicking in the app
- After they kill the monster they get a reward like weapon to make their character stronger and XP to level up their character.

Amanda is a 9 year old girl who wants to relax after doing her homework. She likes to go outside with her friends because the weather is good, but her friend lives far away from her place.

Amanda gets a notification from a game that she installed at school that there is a monster appearing on a playground near her place. Duncan, a robot character that she already created notifies her and asks her if she wants to join the battle. She checks the locations and sees how many people there are. She is interested and joins the battle.

She is on the way to the playground location. She sees there are already 4 people there. She grabs her phone and starts fighting the monster together with 4 other people. She attacks the monster by pressing a shooting button.

The monster shoots a football to her. Her character tells her to dodge it by doing a squat. She does it and manages to dodge. And then she starts attacking the monster again until the monster dies.

The monster dies and she gets an experience to level up her character. She also gets a new weapon to make her robot character stronger. The game also suggests to her to add 4 other players to her friends list. She adds all of them.

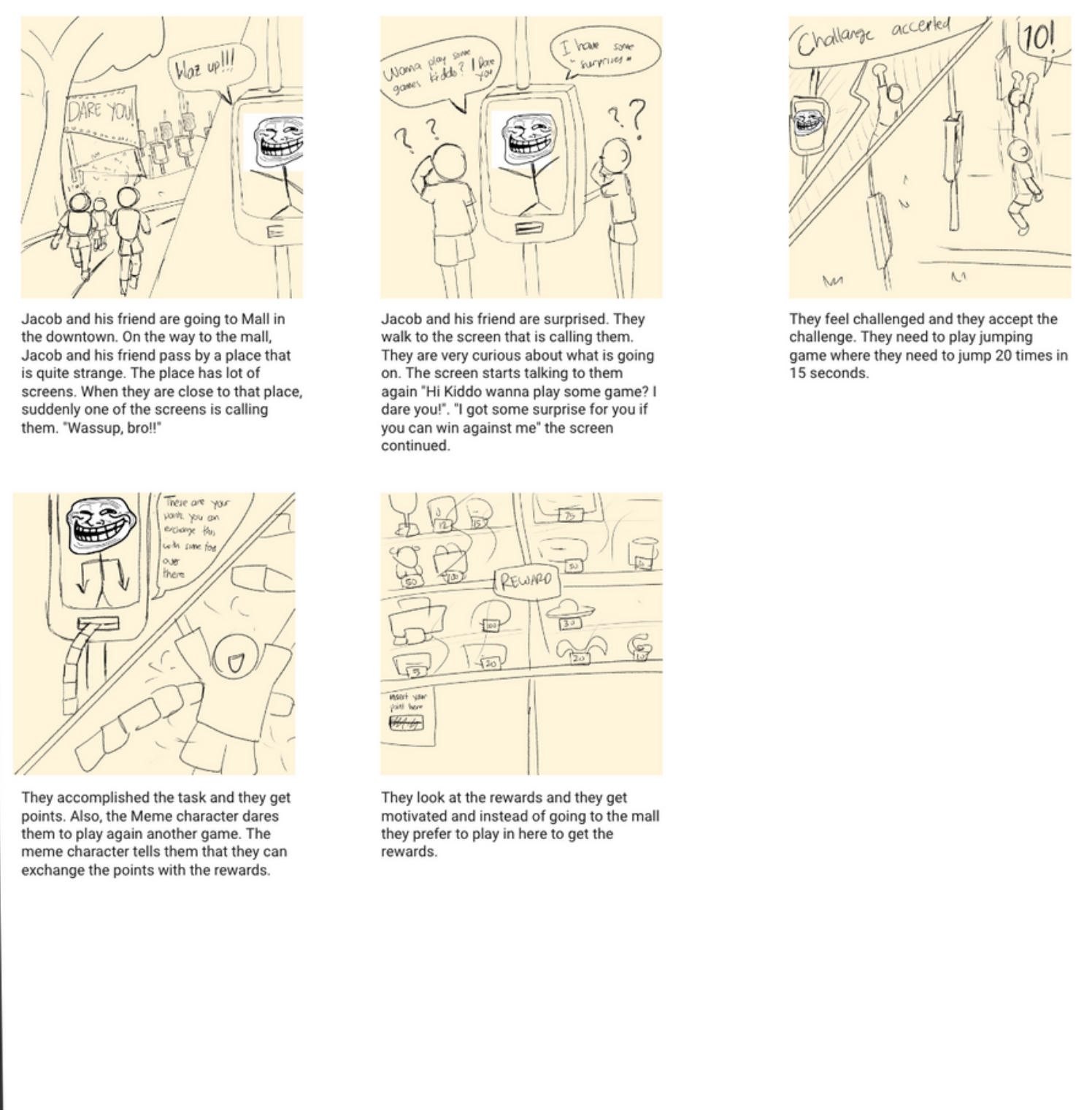
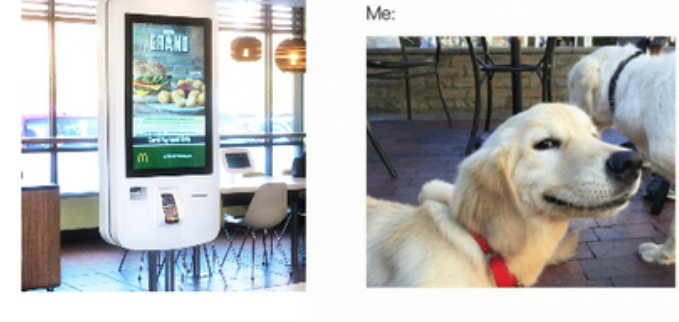
# I Dare You!



**ONLY THOSE WHO DARE TO FAIL GREATLY CAN EVER ACHIEVE GREATLY.**

I Dare you is a unique game inside a playground where meme and exercise come together. Accept the dare and collect an unexpected bonus that you can get. Earn your points and collect more gacha and exchange them to get a Google voucher.

- The playground will have an interactive TV screen. On the screen it shows a meme character that will try to attract the children.
- The character will shout out or make funny remarks when someone is passing by or close to the TV screen to get their attention.
- The meme character will dare the children to play a game. If they win they get a point. They can exchange the point for rewards.
- There will be several mini-games that players can play together with their friends.
- The screen can be moved from bottom to the top.
- If they lose, the character will give a funny remark about them or make fun of them, but still encouraging them to play again. When they win, the character will praise them.



Jonathan is a 10 year old boy who is very enthusiastic about an factual event. One day he and his friends pass a playground that attracts their attention because the playground is so different in a good way. It is like a murder theme. They are curious about it because it is such a novel thing.

# Detective Ground



**THE MYSTERY THAT YOU WANT TO UNFOLD**

**Concept Description.** Help Detective Ground to solve a case in a playground by finding and connecting clues. This game is more fun than any another detective game. This game requires you to move and find clues on the playground. There will be multiple cases that you can solve so you won't get bored.

- Every playground will have a different story or mystery.
- The playground needs to be tailored to the story. For example, playground A is about a police murder and the playground needs to be tailored into that theme.
- Inside the playground there will be a QR code the user needs to scan to choose a story that they want to solve.
- There will be a QR code on every equipment inside the playground that represent the clues.
- After the player finds all clues they need to solve the case.
- The full story will be shown so the player can read about the case. The case is based on factual story.



After some time they find all the clues. Now they need to solve who is the suspect of that murder case. If they get it right they will get the full story about the case and new story will be unlocked. If not, they need to replay again the story.

# Final Concept

Then I iterated my first three concepts based on the feedback that I got. Then I presented again the improved concepts to my clients. Then we had our final design.

## ZOELMPIC (BASED ON 3RD CONCEPT)

"Together we are Number One!"

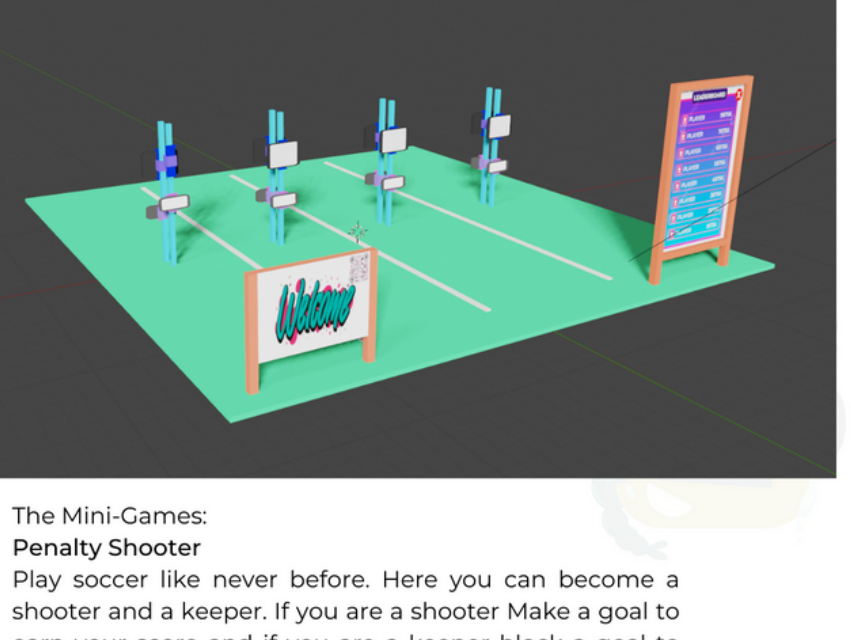
Zoelmpic is a game app where you are part of a school Olympics. Beat another school by playing sports mini-games that this app offers. Collect scores to help your school to be number one. This game can be played at home or at school. However, if you want to earn an extra score, you need complete a quest where you need to go to the playground where there are hidden stickers that potentially rewards a lot of scores.

Join your school community and help them become number one. With motion-tracking technology playing sports has never been this fun. In this game you can:

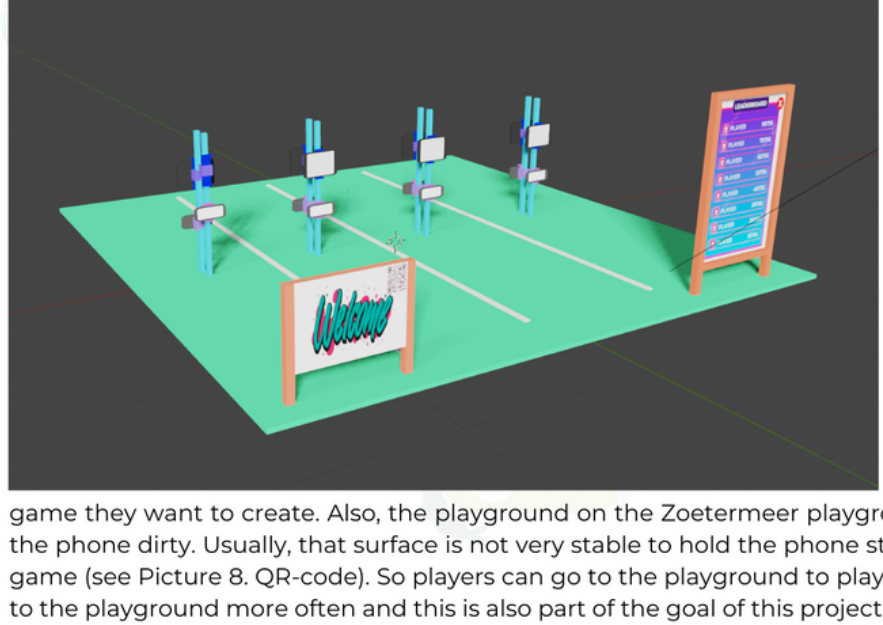
- Collect coins every time you play the game. You can exchange it with the characters skin.
- Team up with your friend to beat another team from a different community playground.
- Choose a variation of sports like the Penalty shooter.
- Improve your school's score so it can become number one and collect a special reward for it.
- Every month the score will be reset to zero so everyone can have a chance to become number one.
- If your school gets the highest score, you will be rewarded by the Municipality of Zoetermeer.
- Customize your character to your liking.
- Collect all sticker that you can find in the playground

The Mini-Games  
**Penalty Shooter**  
Play soccer like never before. Here you can become a shooter and a keeper. If you are a shooter Make a goal to earn your score and if you are a keeper block a goal to earn a score as well.

**INSIGHTS**  
Children like to play sports, and football is most played when they play outside.  
My target group likes to compete with themselves and their friends during a play because they like the sense of winning that comes from it.



## HOW IT LOOKS LIKE!



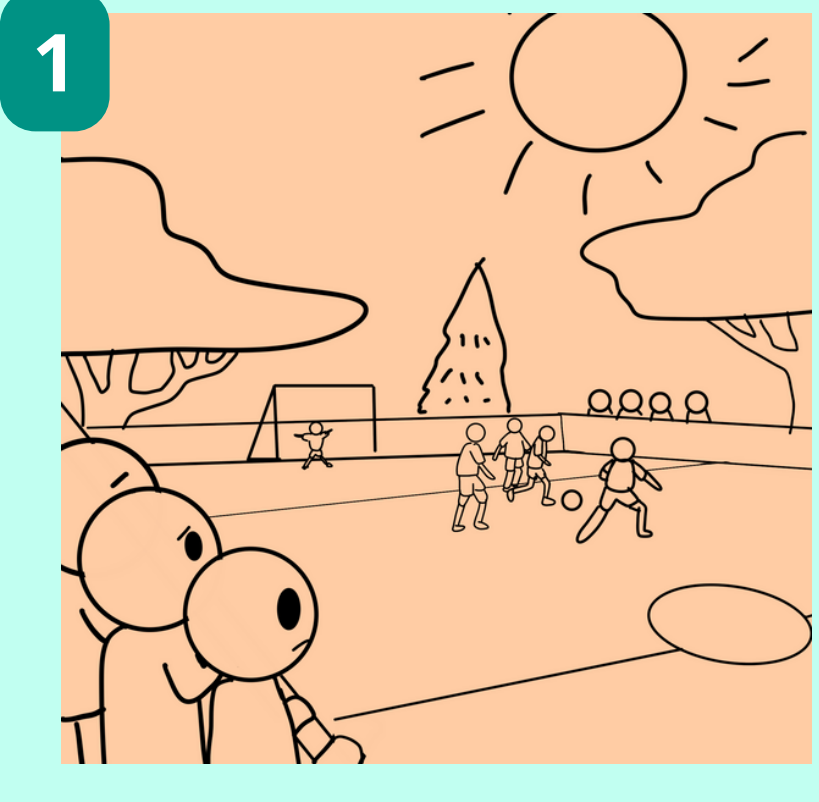
This is how the 3rd concept would look in 3D. So instead of a big screen which is quite expensive, I used a bar to which children can attach their phones and iPad. This bar should be made from steel or very strong material so that children won't easily break it. On the bar, there is an attachment where the player can

put their phone. The reason for that is that this is an active game where you need to put your phone down on the floor or you can put it on a table to play that game. Therefore, by having this tool, developers will not be limited in the kind of

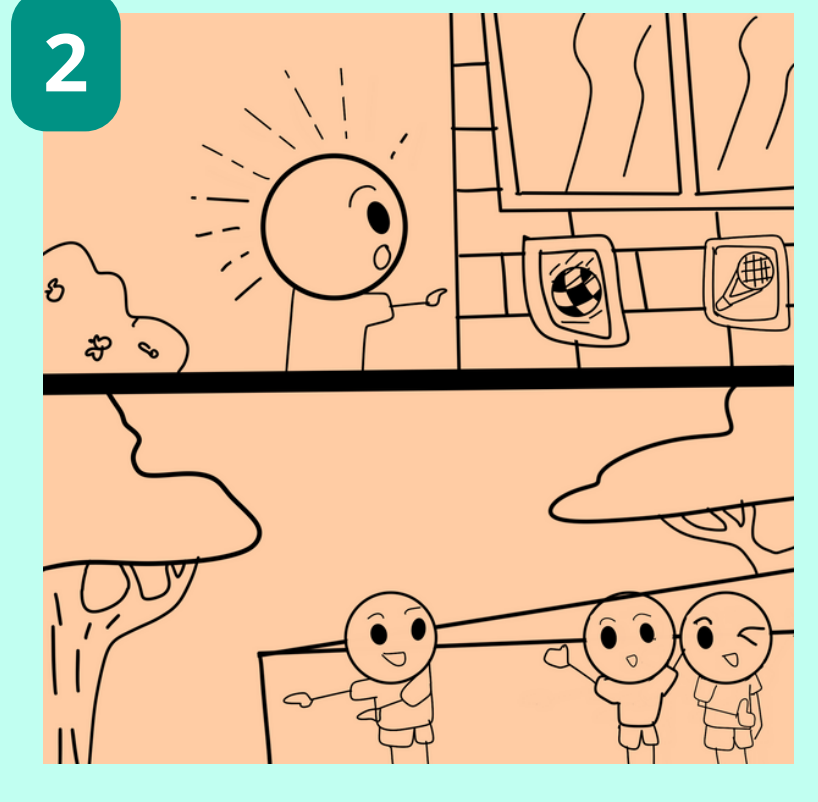
game they want to create. Also, the playground on the Zoetermeer playground is mostly grass or ground and it is not it will make the phone dirty. Usually, this surface is not very stable to hold the phone stand still. In this concept, there will be a barcode to open a game (see Picture B. QR-code). So players can go to the playground to play the game. The reason I did this is to attract children to go to the playground more often and this is also part of the goal of this project. Furthermore, by having more children to go to playground and play the game there, hopefully, many children see it and also visited their playground. If they think the game is fun to play in the playground, they might also take care of their playground.

PICTURE B. BARCODE

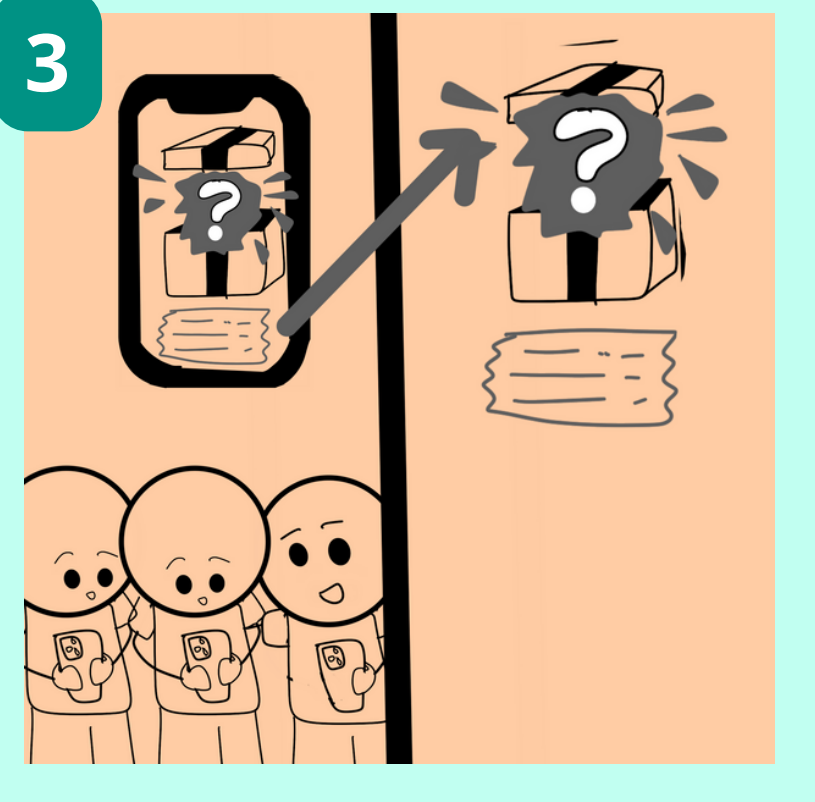
PICTURE TO PENALTY SHOOTER



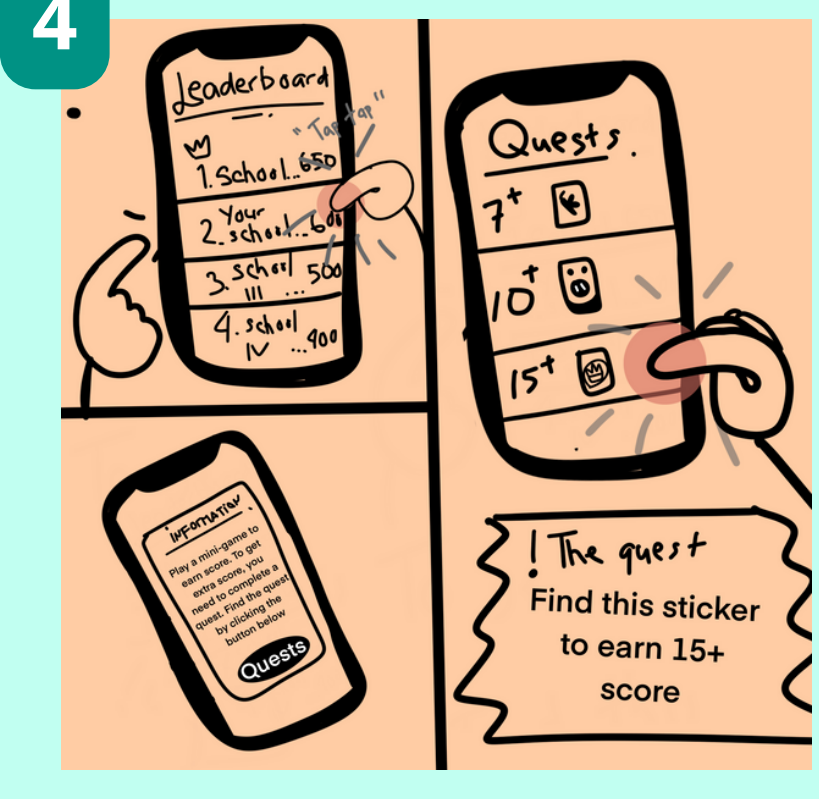
Today the weather is a bit sunny and not really windy during the second break time at Zoetermeer school. Roland and his friend wait for the people to take a change in the football field so he can play football with his friends. He and his friend really like to play football, but there is only one football field at his school and everyone wants to play football.



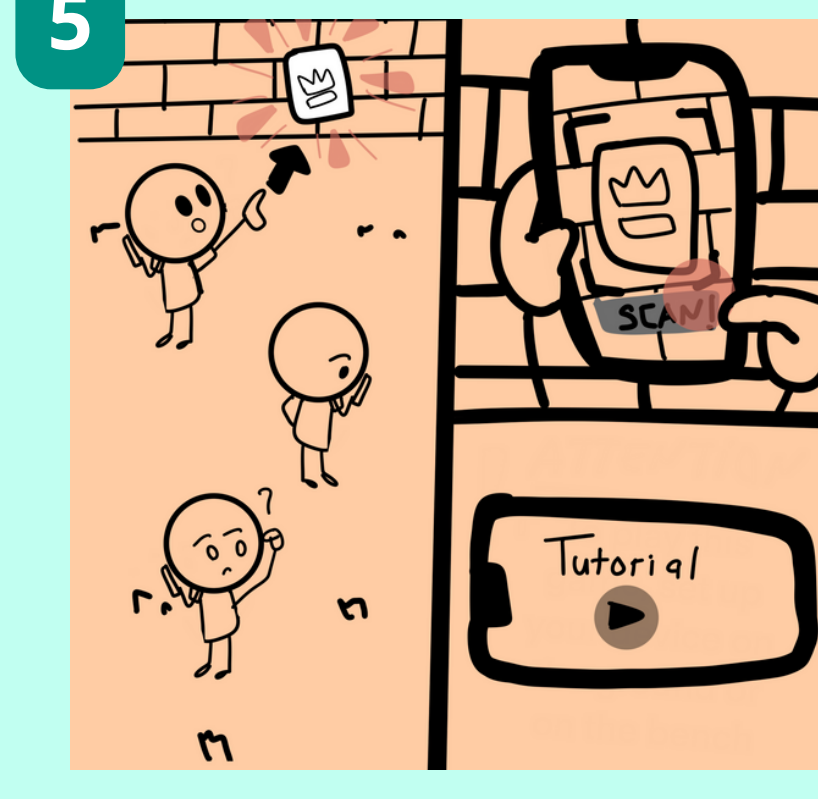
He starts to walk around and then he sees a sticker on the fence. He then remembers that there is a football game in the school phone app. He then walks back to his friend's place and invites them to play the penalty shooter instead. His friends agree.



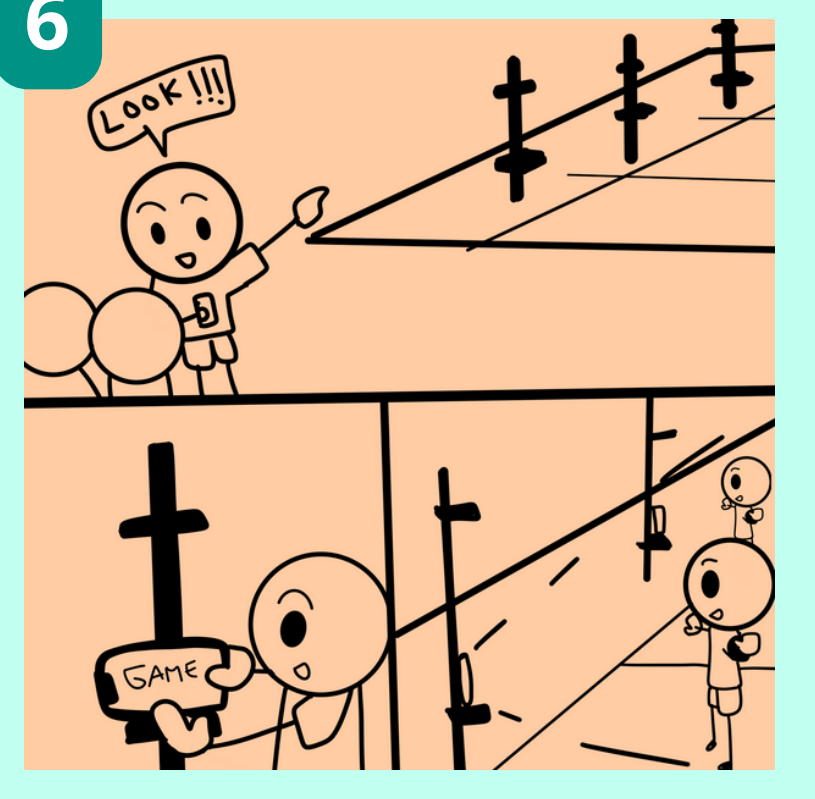
All of his friends open the app. When he opens the app, he and his friends see the announcement that there is a competition that one school and the people who have the highest score will get rewarded by the Gemeente of Zoetermeer. Roland and his friend get excited about this announcement



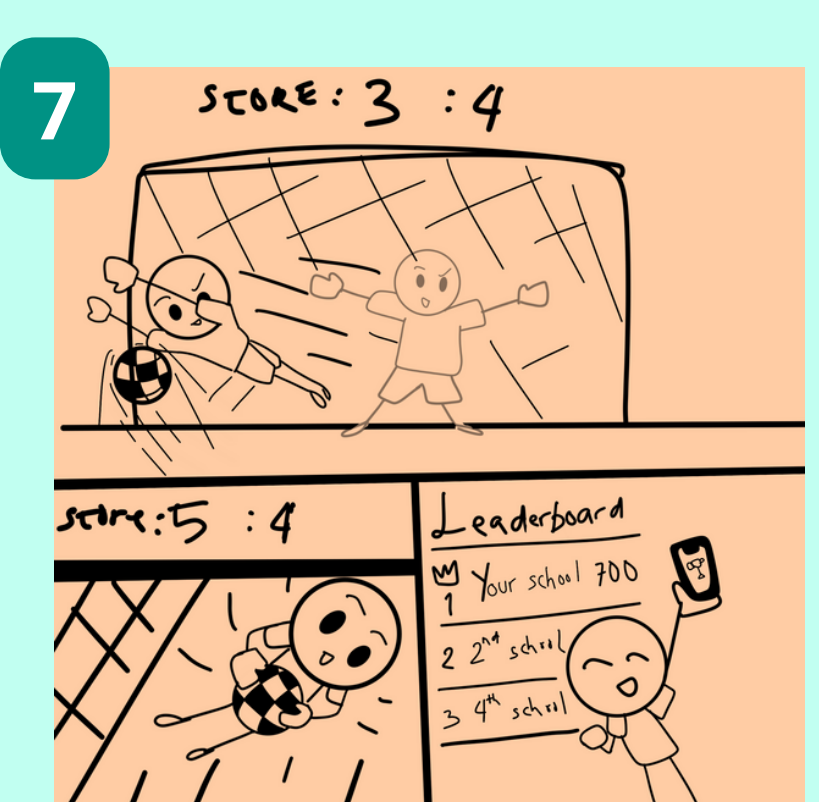
He sees that his school is already in 2nd rank. He taps his school score and a new page pops up. It says that in order to earn a score they need to play a mini-game and if they want an extra score they need complete a quest. Then they tap the quest, and the page shows a list of quests that they can choose.



He and his friend try to find this specific sticker. After a few minutes of looking around, they finally found it. Then they scan it. After that, a video tutorial pops up on how to set up a device and how to play the game.



"Oh, luckily there is a pole where you can put your phone so our phone won't get dirty or get stepped on by other children". Said one of Roland's friends. Then he and his friends go to that place to put their phones over there and start playing the game. The game is about penalties in football. They need to get points blocking the ball from entering their goal. In this game, whoever gets 5 points first wins the game.



Roland plays this game with his friend. The game starts. He tries to catch every ball and he finally gets the highest score. He wins the game, and he finally can bring his school to first place for now before another school will surpass their score.

## Feedbacks

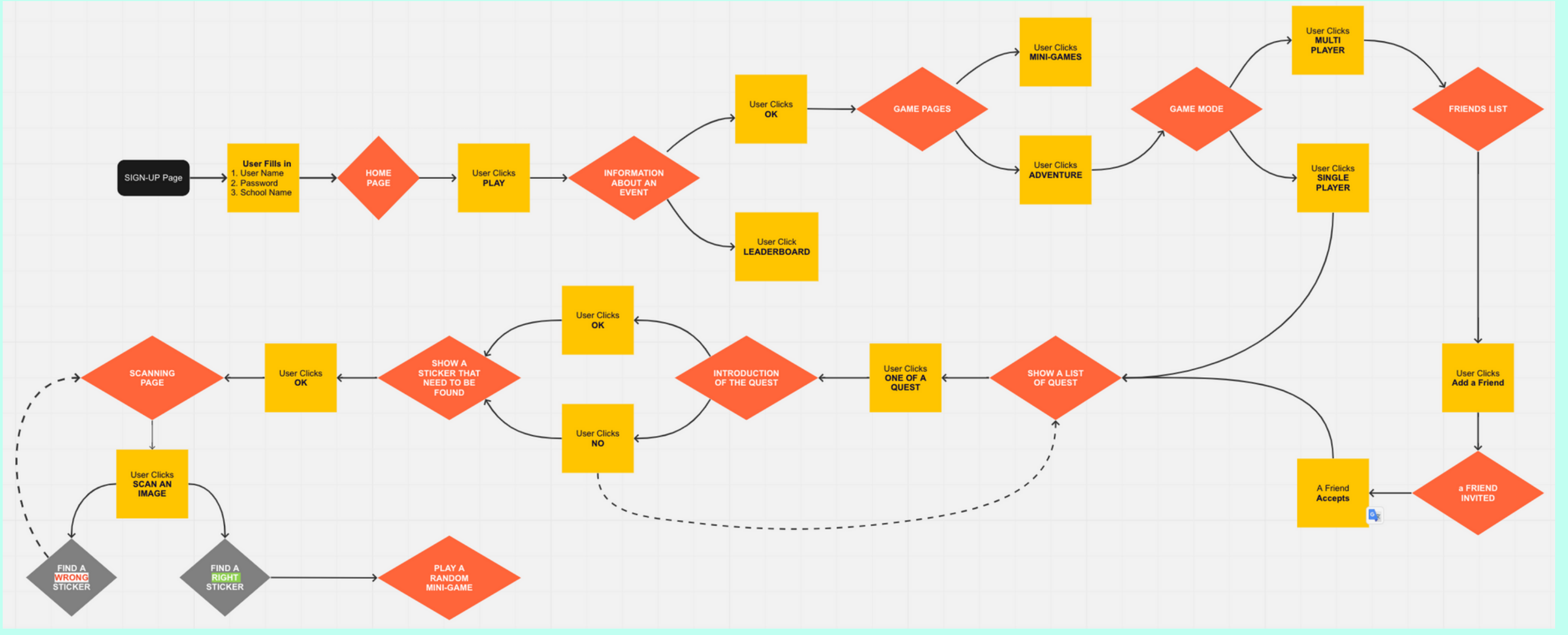
- It would be great if children collect a sticker to unlock a new character or a new mini-game.
- A pole is still expensive maybe try another option that is more affordable to apply in broader scale

# 04 Prototype

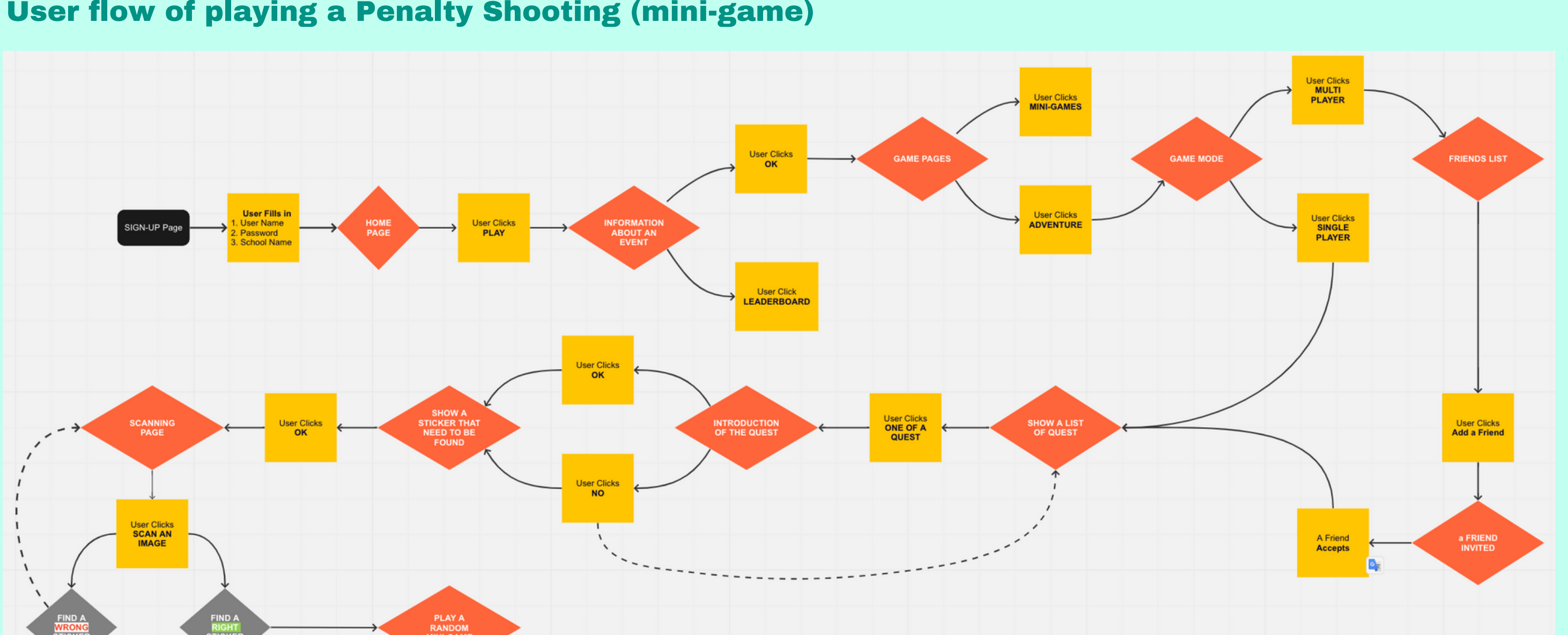
## User Flow

Before making a low-fidelity prototype I started with the User Flow. Therefore, I know what kind of pages I needed to create. This user flow is showed a task on how to complete a quest to get a sticker and also how to play a Penalty Shooting.

### User flow of getting a new sticker



### User flow of playing a Penalty Shooting (mini-game)



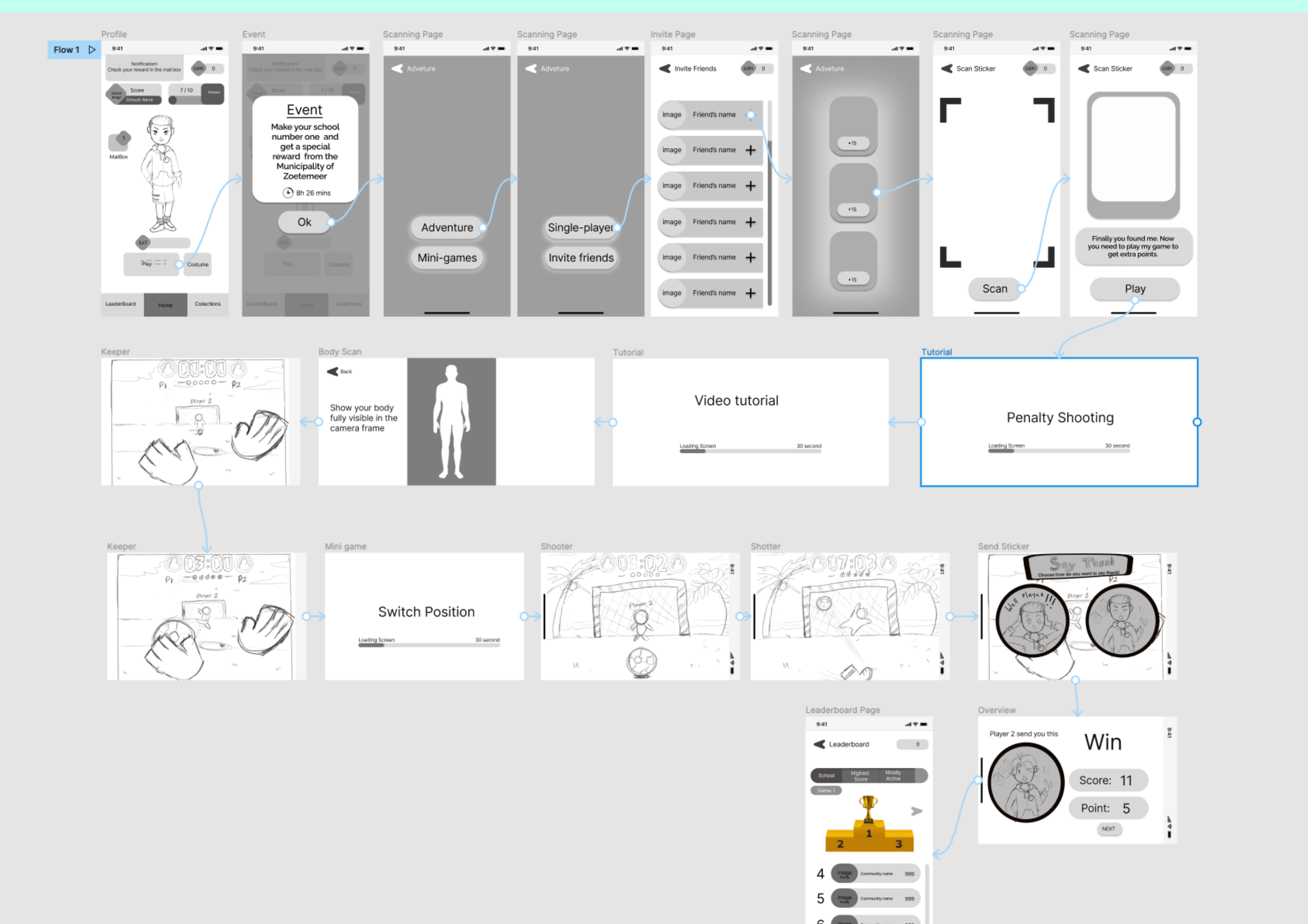
## Lo-fi Prototype

Then I created a black-and-white sketch so I can check and test the functionality of my concepts without focusing too much on the visual part.

Then I showed and tested it to the company mentor to get feedback. Here is the feedback that I got:

## Feedback

- Make the tutorial more clear. It is a tutorial for playing the game or for setting up a phone."
- "For the leaderboard try to make more categories like people who are not very skilled or who cannot get a lot of scores but play more often. So try to create more categories."
- "Leaderboard needs to be reset every month so everyone could have a chance to win"

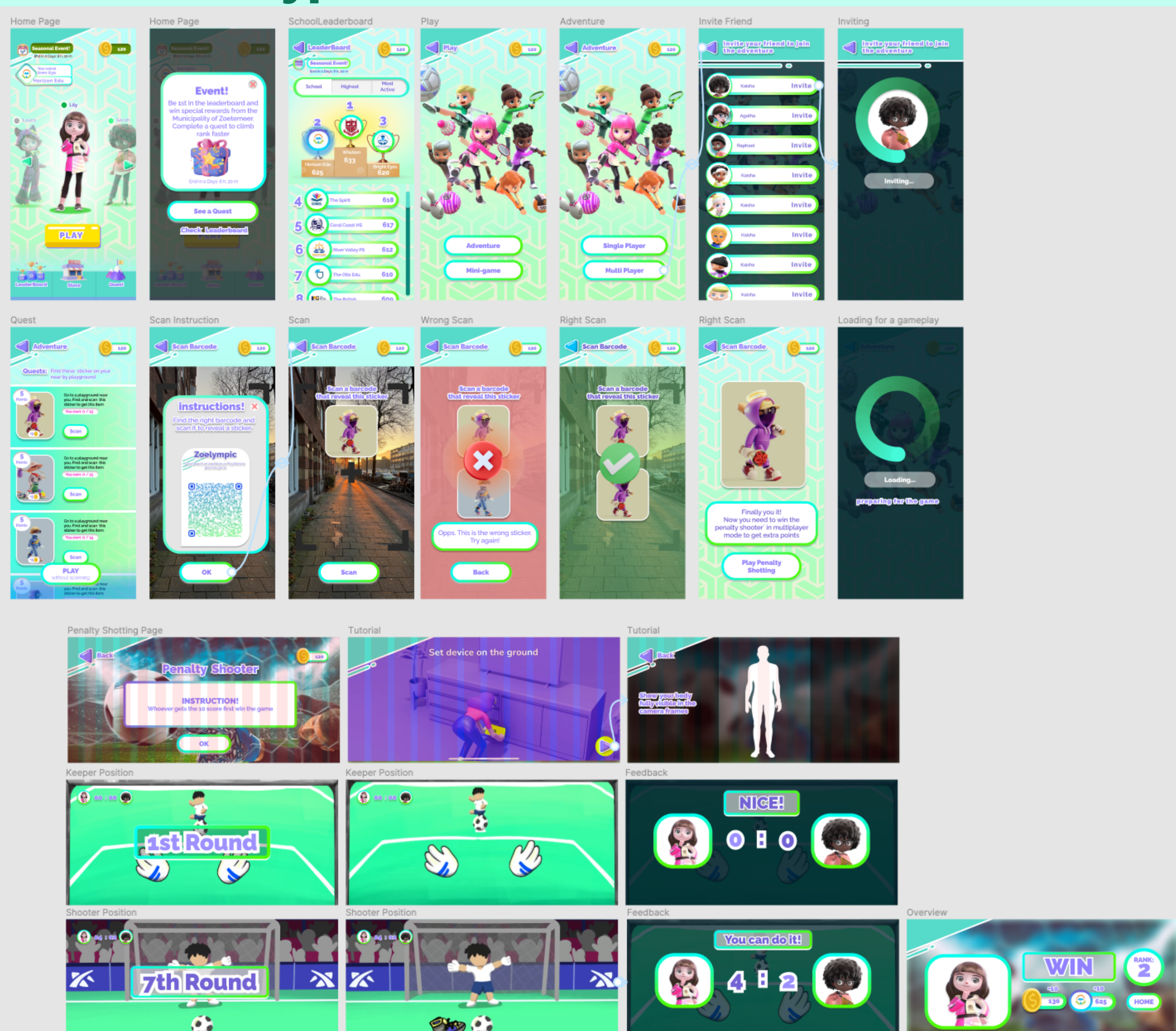


# STYLE TILE

Before creating the Hi-Fi, I created style tiles to communicate how the visual would look to match the art style that my target likes which was colorful and 3D. Therefore, I wanted to create an energetic atmosphere because the game will be played in a playground and it is about sports games. To achieve an energetic atmosphere I used bright colors. I also did not want the style to be very active so I chose cool colors such as light green, blue, and purple to balance it out. Hence, I did not choose colors like orange or yellow which are known to be very activating. By using bright blue, green, and purple I could achieve an energetic atmosphere that could be very soothing to look in the eyes.



# Hi-Fi Prototype



# 05 Testing and Improvement

After creating Hi-Fi it was time for me to test the prototype with my target group. However, for the test I had only 2 subjects available who matched the target group, therefore, to compensate I tested my prototype on 3 teacher interns and 2 UX designers. I did usability testing, observation, and a questionnaire to know if my game was fun and whether it makes them move more. Then, I found 3 major improvements:

## 1. How to increase movement during the gameplay of the penalty shooter

During the test, I found that my participant did really feel tired after playing the game. Therefore, I increase the duration of the game.

**Before:** The player who could get a score of 5 first, would win the game.

**After:** The player who could get 10 scores first, wins the game. And if their score is like 9:9, then the gameplay will be extended until a player leads by a 2-point margin. So every time they get a tight score, then the game will be extended.

## 2. How to make it challenging and increase movement during finding a sticker

Besides the lack of movement, my participant also did not find it challenging when finding a sticker.

**Before:** Using image tracking, users need to find an image that the system told them to and they need to scan it to get extra points.

**After:** Instead of using image tracking, I changed to barcode scanning. Before the image sticker was spread and hidden in the playground and now it will be a QRcode sticker. The system still tells them to scan specific images in the playground, but this time the player needs to scan the QRcode. And after they scan it, the QRcode will show an image. If the image does not match the image that the player needs to scan, then they will not get a point. They will get extra points if they scan the QR code that shows the same image that they need to scan.

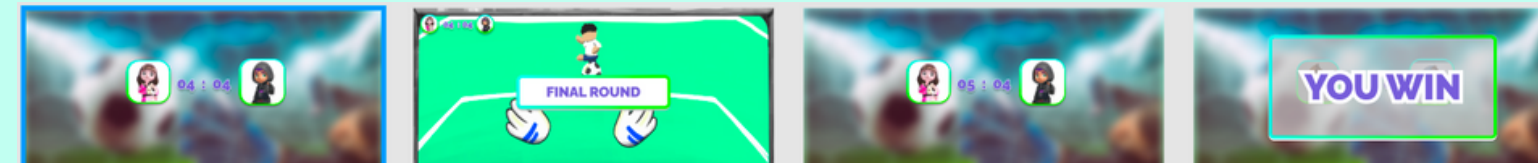
## 3. Make the ball animation smoother

4 out of 7 participants were really bothered by the unsmoothed or laggy animation during the gameplay. I agreed with the participants that the laggy animation really influences the experience of the game negatively. Therefore, to smoothen the animation I needed to increase the frame rate.

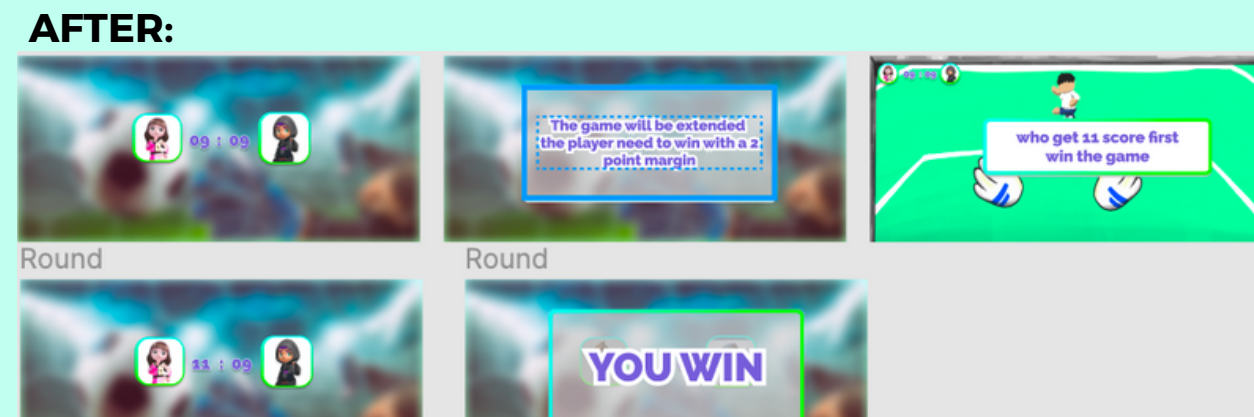
**Before:** I used 2 frames per second and 7 layers (see the red circle on the picture below).

**After:** Now I used 11 frames per second and 18 layers (see the red circle on the picture below).

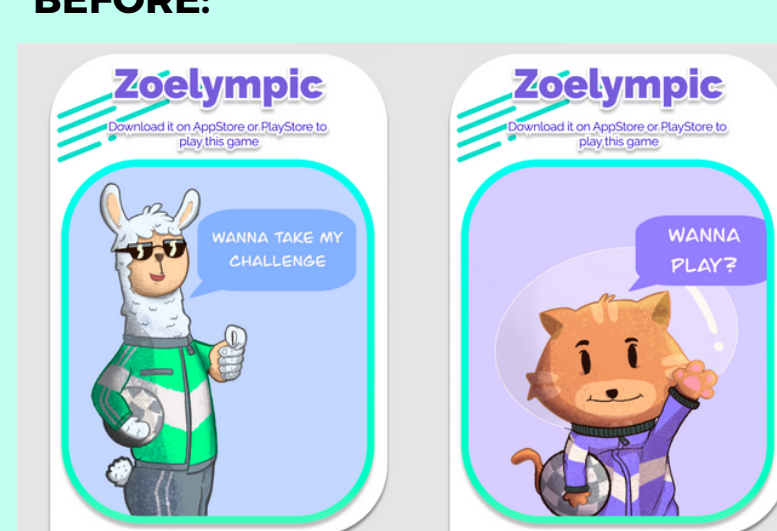
### BEFORE:



### AFTER:



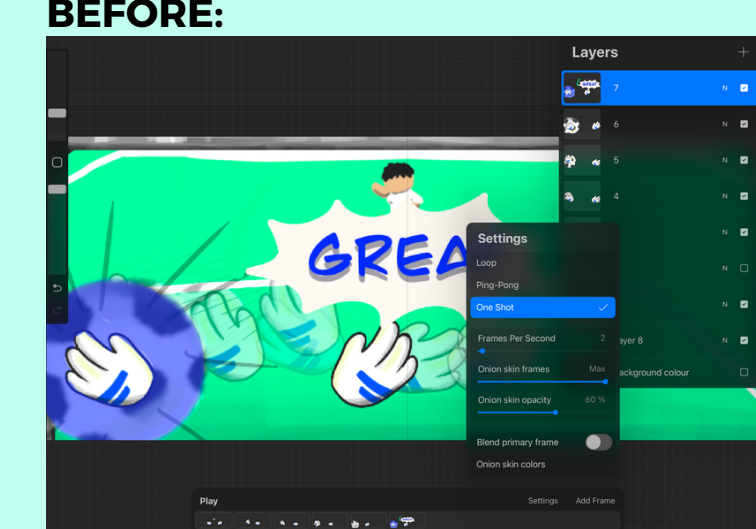
### BEFORE:



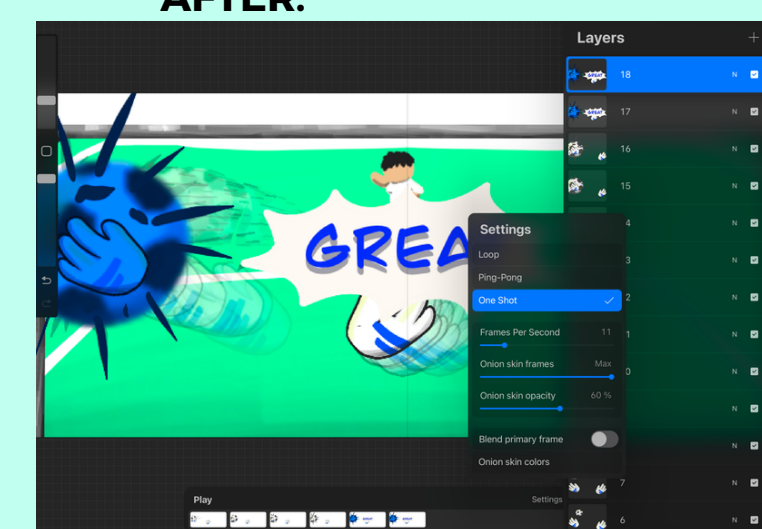
### AFTER:



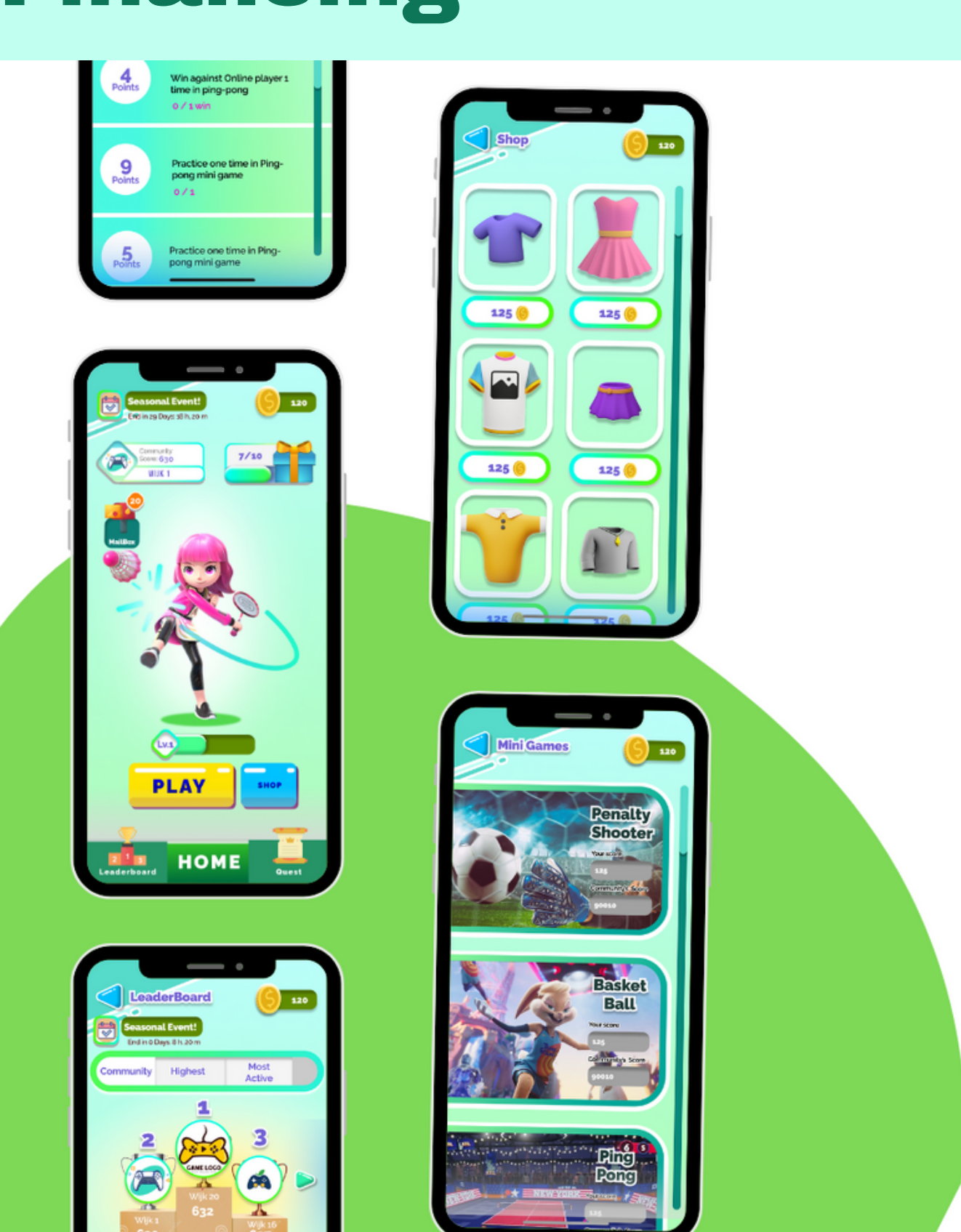
### BEFORE:



### AFTER:



# Finalising



# Zoelympic

## What is it?

Together we are Number One!

Zoelympic is a fresh approach to playing your favorite sports together with your community neighborhood and your friends. With the help of AR and motion tracking, now you can use your body as the controller. Exercise has never been this fun.

Go to your neighborhood playground and play there with your friends to increase your community score. Help your community to become number one in Zoetermeer. And win a special reward from the Municipality.

# Zoelympic

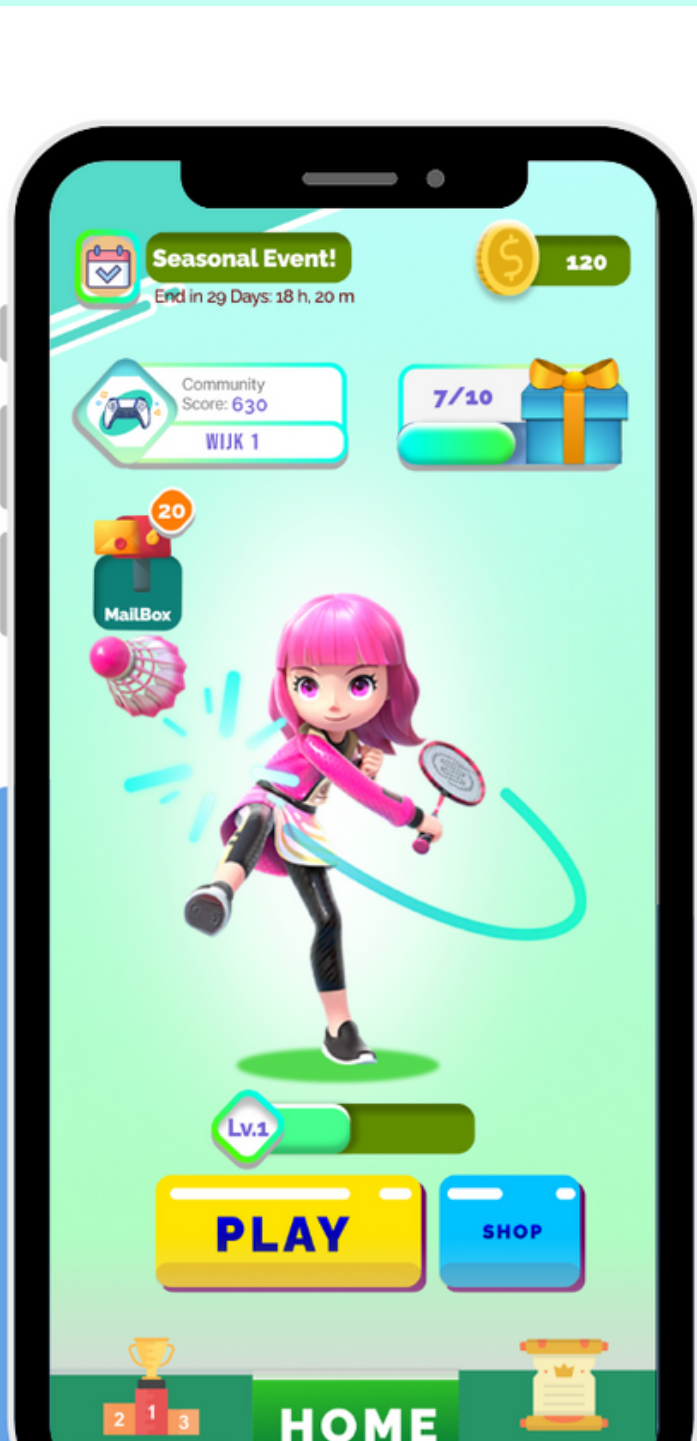
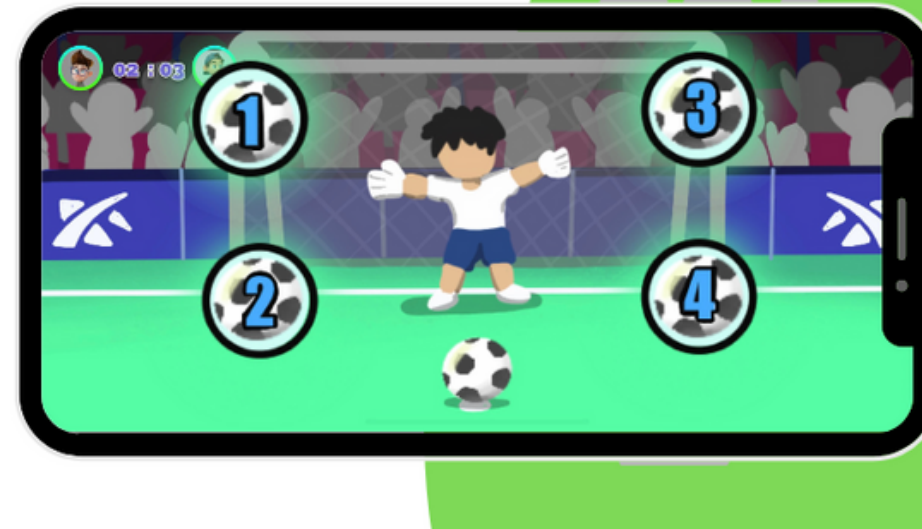
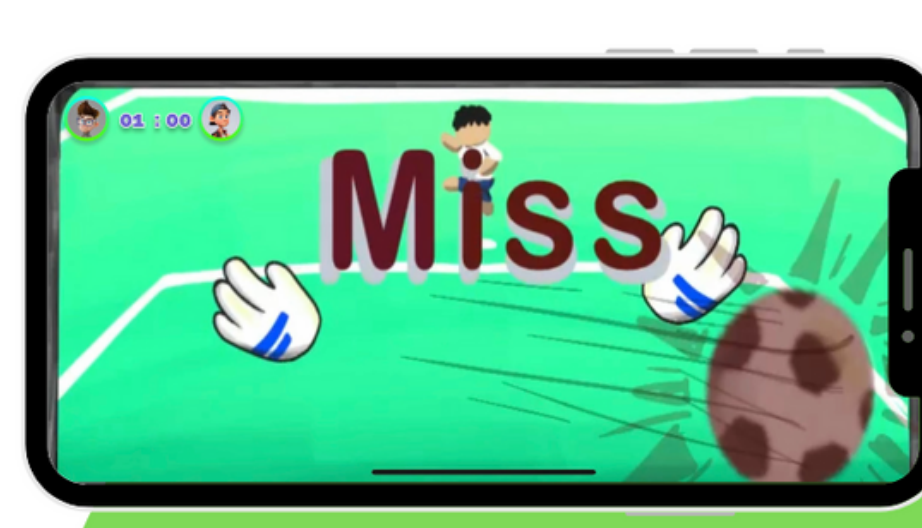
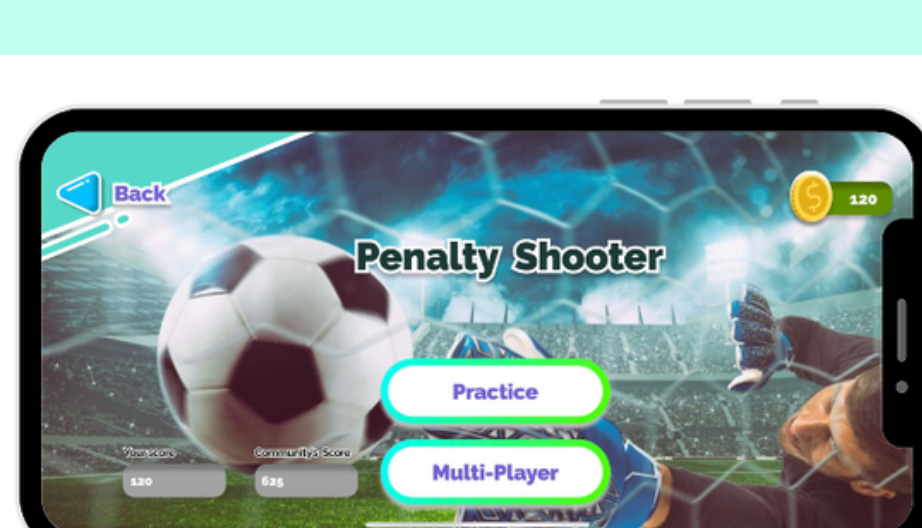
## Why is it a good solution?

**Community**  
A game that children can play with their friends and compete with people in different neighborhoods.

**Playfulness**  
A game that children will not even realize that they are exercising while playing it because it is fun and entertaining.

**Challenging**  
A game that is encouraging them to become the best player and push their ability beyond boundaries.

**Exploration and Discovery**  
A game where users can explore and discover their interests in sports.



# Wanna try!

Please scan this barcode!

[khrisna\\_viveka@yahoo.com](mailto:khrisna_viveka@yahoo.com)



Homepage



The Gameplay

# Impacts

- Hopefully, if my design gets developed further and turned into a successful game it will give a positive impact on the semi/public playground that is currently only being used occasionally. And also provide the less unfortunate children who don't have fancy video consoles and who have small places to live a good quality game that they can play outside in the playground. Furthermore, as more children play in the playground they can finally start to have a real social life and not only at home behind a screen.
- This game is not a replacement for the playground but can be seen to add value to the playground so the playground can have more variety of games to play and not only be stuck in a traditional way since children are attached to their smartphone.
- Last but not least, I hope this game makes them become healthier since the intention of the game is to make them be more physically active in a fun way.

# Testimonials



### Emellie, 11 yo Student

It is creative and it is about soccer and I love soccer.



### Fee, 12 yo Student

The visuals are very appealing and catching the ball is very fun.



### Daniel (Client GLSO)

Designing is something where Ve definitely stands out. Presenting them vocally could be improved, but the prototypes looked amazing every time. Sometimes more than necessary to get the idea across.



### Maria (Client GLSO)

It has been a fun project where Ve contributed in a very nice way. We have gained a lot of input from his work. In a place where he is enthusiastic about the work he shows the creative talent that he has.

# 06 My Learnings

- It was quite a challenging project for me because I did this project by myself and my target group, mostly children around 9-12 years, almost exclusively speaking Dutch only, which I do not understand very well yet. It was a very tedious and bureaucratic process to find the participants for an interview and do some observation in their school. I also had no connection with children, but gladly I managed to get information from my client. I learned that sometimes you just need to be pushy to accelerate the process because you work with a timeline.
- I also learned new features and tricks in Figma to create the game prototype that I thought was impossible to do. Eventually, I could find a way to prototype the game with the app.
- Looking back at my research phase, especially the interviews, I see what questions could be improved to get a deeper understanding of my target group problem. I know that working with children you really need a different approach on how to ask them questions.

# Contact me!



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