

DECO 3200

**Assessment 2
Design Report**

**ANTI-PROGRAMMING
PROGRAMMING CLUB**

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PROBLEM STATEMENT

Nowadays, “**phone zombie**” has become a common phenomenon. Some pedestrians are still playing on their phones even they walking on the street. From our previous research, we found that eyes on the mobile phone might lead to a problem of missing traffic signals at traffic light pillar. Pedestrians who focus on their mobile phones cannot notice the **change** of traffic signals, especially when they are waiting for the traffic lights alone. Therefore, we aim to **replace** the behaviors of playing mobile phone on traffic light waiting area and efficiently **remind** pedestrians of the change of traffic signals.

We already have three concepts to deal with this problem previously, so we are trying to evaluate them using multiple methods like usability testing and have a final concept after analysis of gathering data. Methods we decide to use are clarified for which aspects of these concepts we expect to test out. During the process, we are also recording data that help us iterating the concept to better solve the problem.

CONCEPTS

Initial three concepts to tackle the problem



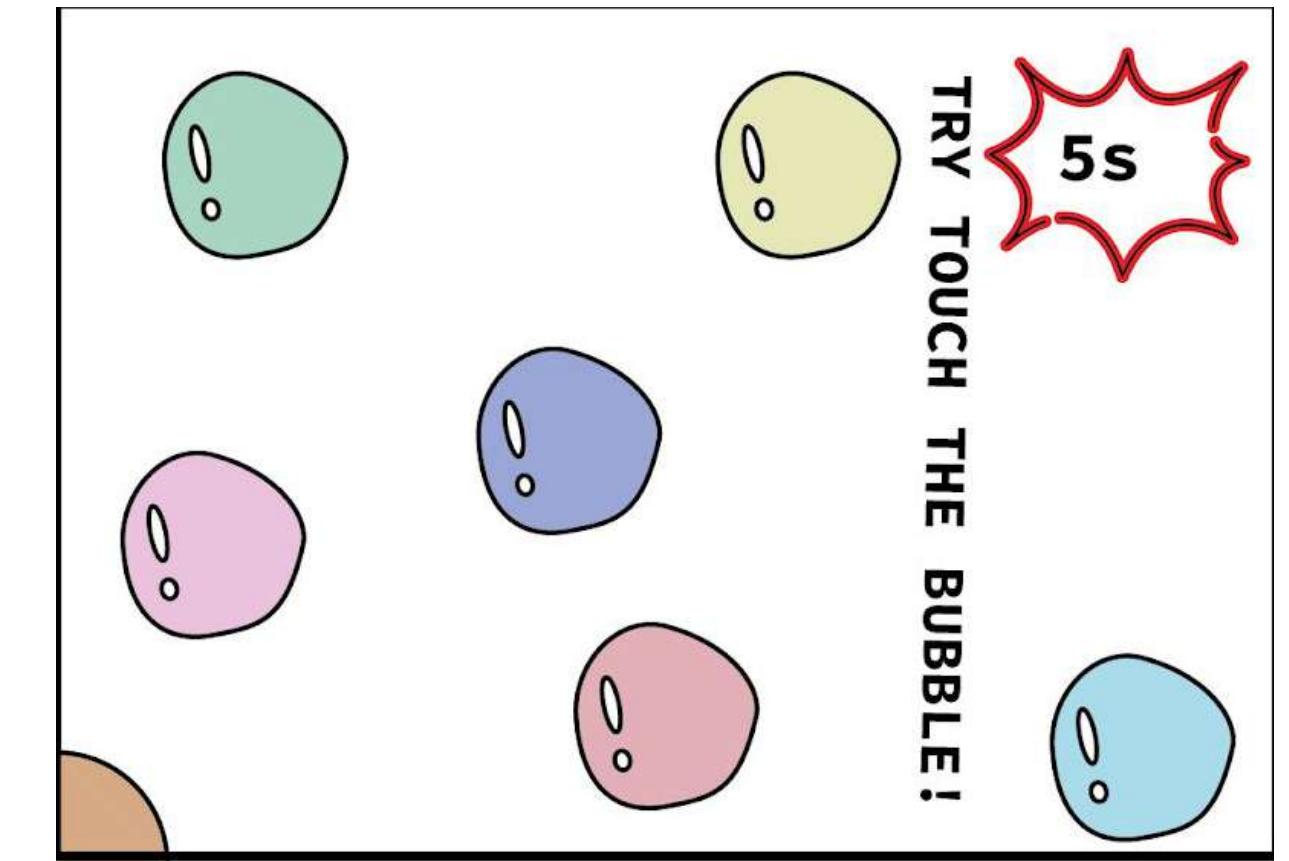
Scratch Ticket

Half transparent countdown timer until user scratch, with special effect of scratch trace.



Talking Minion

A toy which has audio features to remind pedestrians cross the road

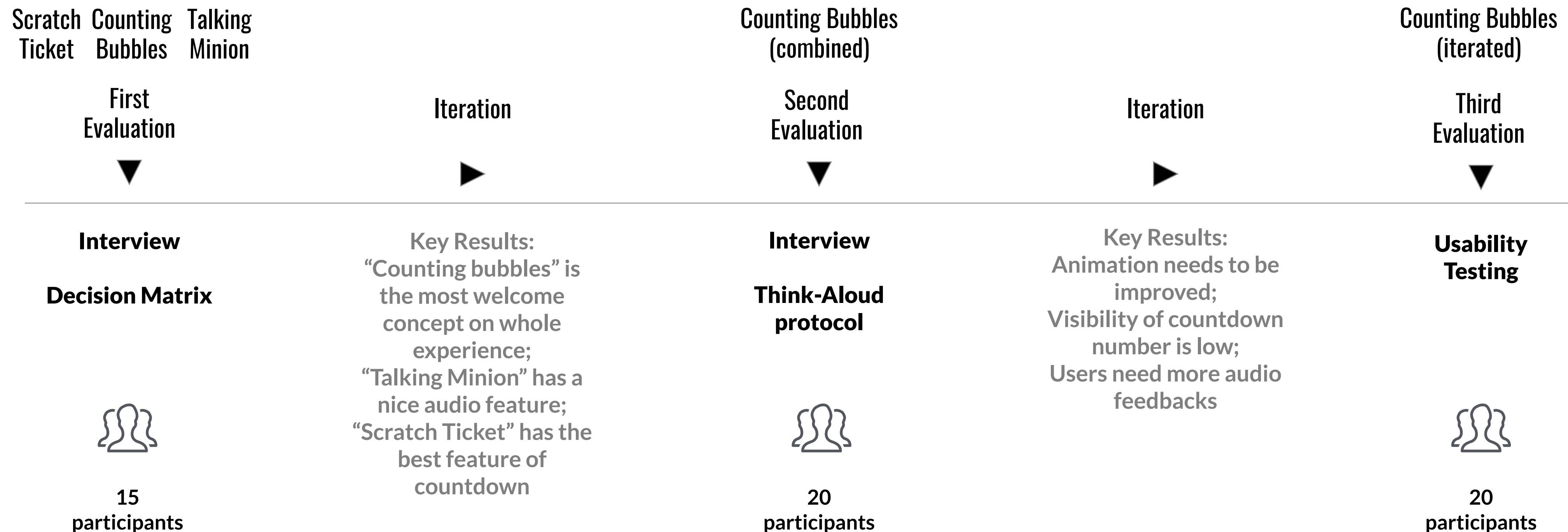


Counting Bubbles

A bubble game with a countdown number system

APPROACH

We have three rounds of user evaluation to determine final concept and iterate it



DATA COLLECTED

Qualitative data	✓
Quantitative data	✗

Chosen Methods:

- One-to-one Interview
- Think aloud protocol
- Usability testing

We chose those three above methods to **collect** qualitative data and **summarise** user needs from data.

Advantages of qualitative data:

- can be arranged categorically based on the **attributes** and properties of a thing or a **phenomenon** (Surendran, 2019)
- mainly focused on gaining **insights**, **reasoning**, and **motivations** hence they go deeper in terms of research (Surendran, 2019)
- provide the researchers with **in-depth analysis** of subject matters. (Surendran, 2019)

METHODS



INTERVIEW

Interviews give insights into what users think about a site, an application, a product, or a process. They can point out what site content is memorable, what people feel is important on the site, and what ideas for improvement they may have. (Kara Pernice, 2018)



DECISION MATRIX

A decision matrix can help you not only make complex decisions but also prioritize tasks, solve problems and craft arguments to defend a decision you've already made. The decision matrix process is best used when you're deciding on something that does not require a sense of emotion, as it is a logical tool in nature. (Skype Schooley, 2019)



USABILITY TESTING

Usability testing is the practice of testing how easy a design is to use on a group of representative users. It usually involves observing users as they attempt to complete tasks and can be done for different types of designs, from user interfaces to physical products. (Interaction Design Foundation)



THINK ALOUD PROTOCOL

We ask test participants to use the system while continuously thinking out loud – that is, simply verbalizing their thoughts as they move through the user interface. (Jakob Nielsen, 2012)

INTERVIEW

(Evaluation 1 & Evaluation 2)

Q Why do we choose the interview ?

✓ **Advantage:**

- Uncover flaws within a product's design
- Cover almost all user-related topics
- Gather information on users' feelings, motivations

✗ **Disadvantage:**

- Experiments are different from real life
- Unable to remember details

Because the benefits outweigh the disadvantages, we can more clearly understand the user **behavior** and the **reasons behind the experience** through the interview.

From the Ditte Mortensen's report said, this makes the method especially suitable for **creating insights in design projects**—they aim to **find solutions to specific problems or challenges**. (Ditte Mortensen, 2019)



Our Interview Questions

1. Which concept you like the most? Why? (Evaluation 1)
2. If I don't explain to you, can you understand how these three concepts work in real situation? Why? (Evaluation 1 & Evaluation 2)
3. Do you think this concept can prevent you playing on your mobile phone while you are waiting for the traffic light? Why? (Evaluation 1 & Evaluation 2)
4. If the concept is implemented, will you utilize it often? Why? (Evaluation 1 & Evaluation 2)

The purpose of our problem

To learn about the **knowledge and experience** that the subjects are entering testing with: their backgrounds will inform their **actions and opinions** as they interact with your product. (Hotjar, 2019)

DECISION MATRIX

(Evaluation 1)

Criteria	Weight (1-5)	Scratch Ticket (score)	Scratch Ticket (total)	Talking Minions (score)	Talking Minions (total)	Counting Bubble (score)	Counting Bubble (total)
Pre-judgment	2	3	6	2	4	4	8
Visual Reminder	4	3	12	0	0	4	16
Audio Reminder	4	0	0	4	16	2	8
Level of attraction	5	3	15	5	25	4	20
Multiple users	2	2	4	3	6	2	4
Environment adaption	2	2	4	3	6	2	4
level of interaction	4	3	12	2	8	4	16
Affordance	4	2	8	3	12	2	8
Usability	5	3	15	3	15	4	20
Time counting	3	4	12	1	3	4	12
Duration	4	2	8	1	4	2	8
		Total: 96		Total: 99		Total: 124	



Why do we choose the decision matrix?



Advantage:

- Analyze complex decisions
- Craft arguments to defend a decision



Disadvantage:

- Can't make emotional decisions
- Can only solve fewer variables

The decision matrix can help us prioritize concepts. When we make different metrics and judge them by scoring, it will be more conducive to prioritization. From the Lucidchart Content Team's report, we found that the nice thing about the decision matrix is that it can apply to many different types of decisions. However, it is most effective when you or your team is comparing multiple options or criteria that need to be narrowed down to one final choice.

(Lucidchart Content Team, 2019)

METHOD

DECISION MATRIX

(Evaluation 1)



Reason for choosing a criteria

Criteria that are often used fall under the general categories of **effectiveness, feasibility, capability, cost, time required, and support or enthusiasm (of team and of others).** (PRATYUSH SEN, 2007)

(0-5)							
Criteria	Weight (1-5)	Scratch Ticket (score)	Scratch Ticket (total)	Talking Minions (score)	Talking Minions (total)	Counting Bubble (score)	Counting Bubble (total)
Cost - Time	2	3	6	2	4	3	6
Cost - Money	3	3	9	1	9	3	9
Difficulty of implementation	4	4	16	1	16	3	12
Lack of practicality	4	1	4	3	12	1	4
Technical difficulty	5	4	20	2	10	4	20
Difficulty with Material	5	4	20	3	15	4	20
* Total (expected around the average of 72)			Total: 75		Total: 66		Total: 71

- Resource aspect:

Time, Money, Material

- Technical aspects:

Difficulty of implementation, Technical difficulty, Practicality

- Product Features:

Visual, Audio, Time Counting...

- Psychology and feeling:

Interaction, Affordance, Usability...

THINK ALOUD PROTOCOL

(Evaluation 2)

Q Why do we choose think aloud protocol ?



Advantage:

- Discover what users really think about our design
- To learn why users guess wrong
- To learn why the other parts easy to use

We need to understand the **real thoughts** of users, and sometimes the **reflective thoughts** are not necessarily useful for our design. Users may misunderstand the **correct steps** and **correct usage** of our products, but we have no way of knowing. The think aloud protocol can help us understand the **user's perspective**.



Disadvantage:

- Not suitable for detailed statistics
- Lack of reflective thoughts

This allows a researcher to find out how a person **approaches a problem** or task and describes the problem solving techniques or interpretations he or she uses. Provides rich, **qualitative information** about how a person reasons his or her actions in **specific situations.** (Memo Cordova, 2003)

Finally, it can help us find better ways to improve our products.

USABILITY TESTING

(Evaluation 3)



Why do we choose usability testing?

✓ Advantage:

- Feedback direct from the target audience to focus project team
- Issues and potential problems are highlighted
- Users are better able to reach their goals
- The feedback can be more accurate and insightful



✗ Disadvantage:

- Testing is not 100% representative of the real life scenario
- Unable to get large amounts of data

Usability testing can help us understand in advance the user's **preferences** and their **dissatisfaction** with our products. It's convenient for us to decide which features we need to expand and to see where they are confused. The critical point is that the user may **use details** that we have not noticed and decide to **develop or enhance the details**.

Recognizing this potential to **highlight difficulties** and **strong points** in a design's early versions is a vital part of a designer's thought process. The broader the testing and the greater the number of matters raised, the stronger the likelihood that designers can craft more successful products. (Foundation)

The purpose of usability testing

We want to **gain insights** from our users and to check if we get user's **expectations** and our products are **related to the problem statement** and can be solved. To learn how users perceive and use our product.

PROTOTYPES

For evaluation 1

Scratch Ticket

- Screen recording from Adobe illustrator
- Paper screen



Talking Minion

- A model of toy
- Simulated sound feedbacks



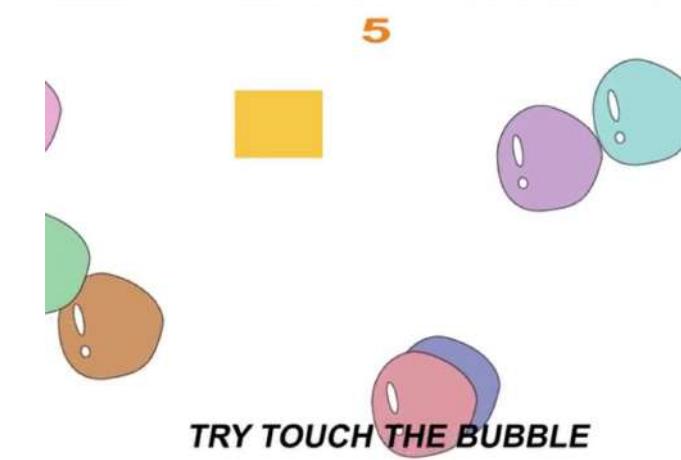
Counting Bubbles

- Paper screen
- Storyboard



For evaluation 2

Counting Bubbles (combined)



- Digital screens with animation of interactive points and audio features
- Outer shell

For evaluation 3

Counting Bubbles (iterated)



- Digital screens with animation of iterated interactive points and audio features
- Outer shell

FINDINGS



Finding from interview

through 15 participants we interview on stage one, we gained numerous of valuable feedback towards user experience about audio feedback, visual performance and interaction:

All

- the scale of design **limit number of users** at same time;

Talking Minion

- when pedestrian with mobile device on the hand, **sound effect** work more efficiently to attract their attention;
- audio feedback could be **annoying**, but worked well in terms of attracting user attention;

Counting Bubble

- the design of interface **did not attract** majority of users;
- majority of user **enjoy** the experience more than the other concepts;
- experience was **monotonous**;

Scratch Tickets

- digital countdown timer give user more sense of control;
- the sound feedback make user feel mentally uncomfortable;
- the design does not provide clear instruction, or design lack of affordance.



Finding from decision matrix

According to two type of design matrices, the design of Counting Bubble performed the best (gain highest score in user experience, and it is relative close to expected level of technical difficulty). However, due to concern about limitation of this design in terms of environment adaption and affordance, and other two design still gained number of valuable and positive feedbacks:

- **Talking Minion** scored the highest in level of attraction;
- **Scratch Tickets** display remaining time more direct.



Summary

At the end of stage one, we decide to pick the design of Counting Bubble for further development, combine with audio feature of Talking Minion, and time displaying on Scratch Tickets.

FINDINGS



Finding from interview and think-aloud protocol

According to interview and think-aloud protocol methods, there are some key findings from data collected

- Users need **more audio feedbacks** and **higher volume** of audio features
- Users need **bigger size of visual number** of time counting function
- Animation and screen graphic design needs to be **more aesthetic**
- The concept has **limit of number of users** at the same time
- **Visibility** and **audibility** might be affected in **crowded conditions**
- Users are **confused about scratch animation**
- Appearance of minion is **childish**, may not suit younger generation



Summary & Iteration

Based on the findings, we **enhanced the size of visual numbers** of time counting function and the **volume of audio feedbacks**. Few more **audio feedbacks** were added to the concept, scratch animation of clicking bubbles was replaced by **burst animation**. And a new low-fidelity prototype is created for third round of user evaluation.



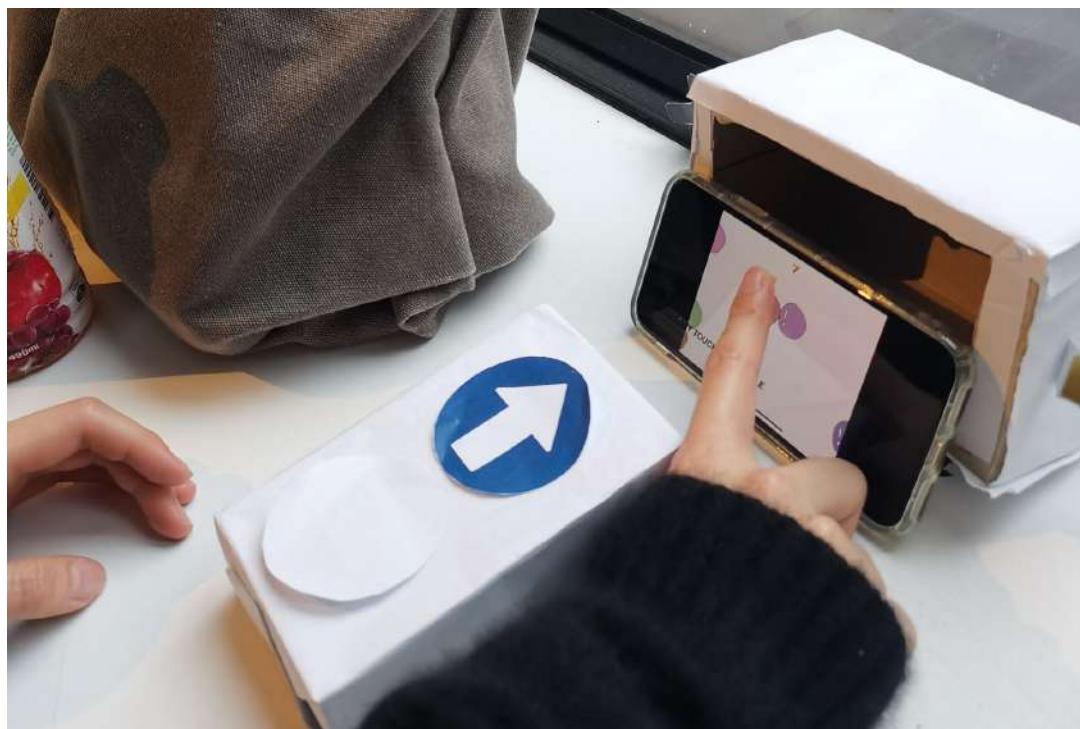
FINDINGS



Finding from usability testing

According to usability testing, there are some key findings from data collected

- It's confused that **visual number** of time counting is for pedestrian crossing or something else
- **limited elements and features**
- Usability is high , easy to follow and use
- Audio feature is valuable



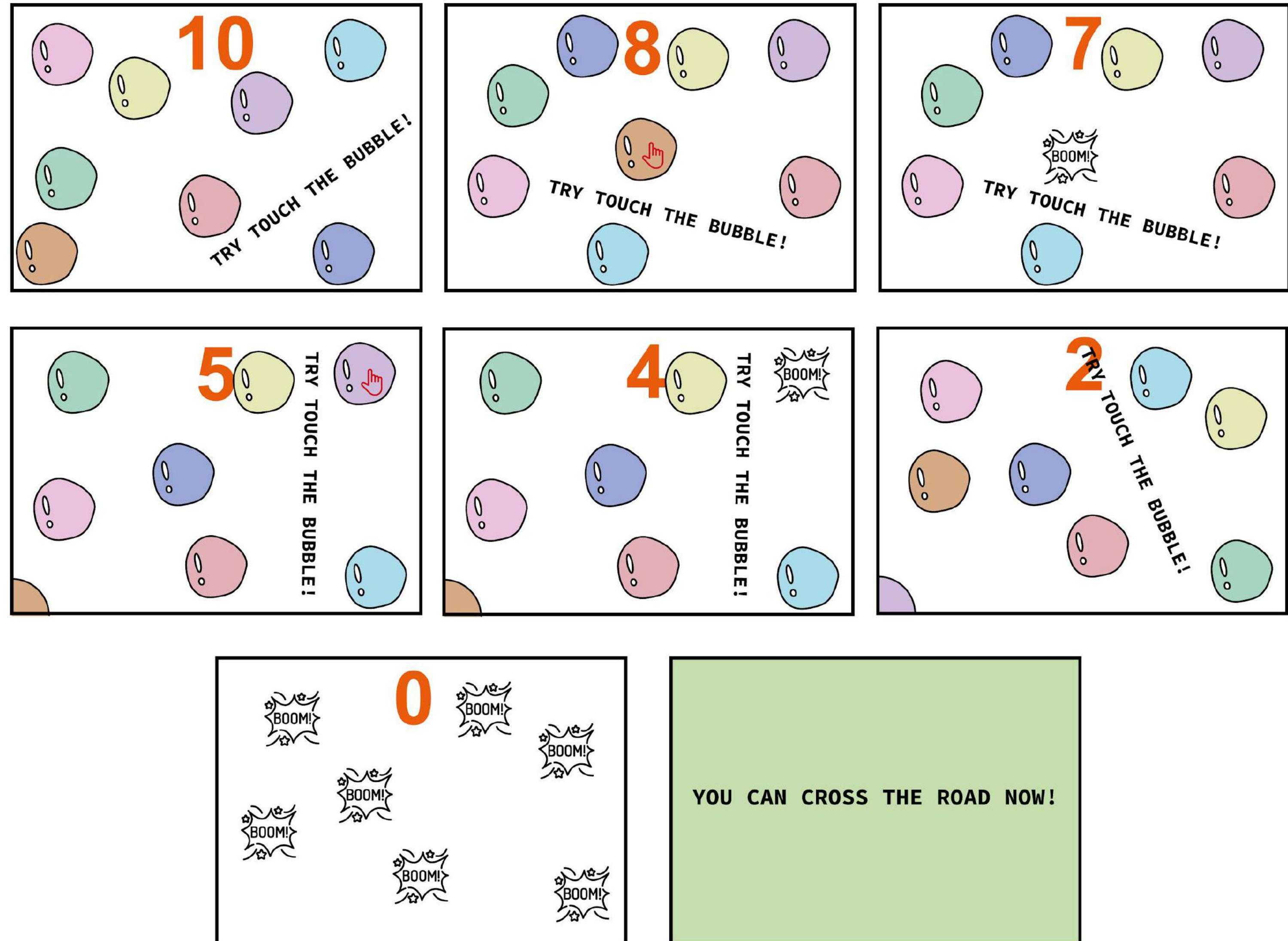
Summary & Iteration

Based on the findings, the concept is easy to understand and users have smooth experience on it with audio instruction. On the other hand, the whole experience is kind of monotonous, the concept has **limited elements and features** to interact with. One more problem is that pedestrians may be confused about the **visual number's function**. Therefore, we are going to add a **signifier** of the visual number to indicate its function of count down of traffic signal.



CHOSEN CONCEPT - Counting Bubble

- The screen will be **activated** when the traffic button was being pushed.
- There is a **sound feedback** after pushing the button, “Come to touch my bubbles!” to **attract** people join the game.
- The system starts to countdown and shows the countdown number on the top of the screen.
- Text **Hint** “Try touch the bubble~!”
- When people touch the bubble, the bubble will be broken and show an **exploded** animation effects.
- The broken bubble will explode with a **sound effect** as soon as it being touched by users.
- When the countdown number change to zero, all the bubbles will be broken at the same time.
- Each broken bubble will show an exploded **animation effects**.
- After half a second, the screen will change to green, and shows a **hint** “you can cross the road now!” with **audio**, to **remind** pedestrians cross the road.



Chosen concept

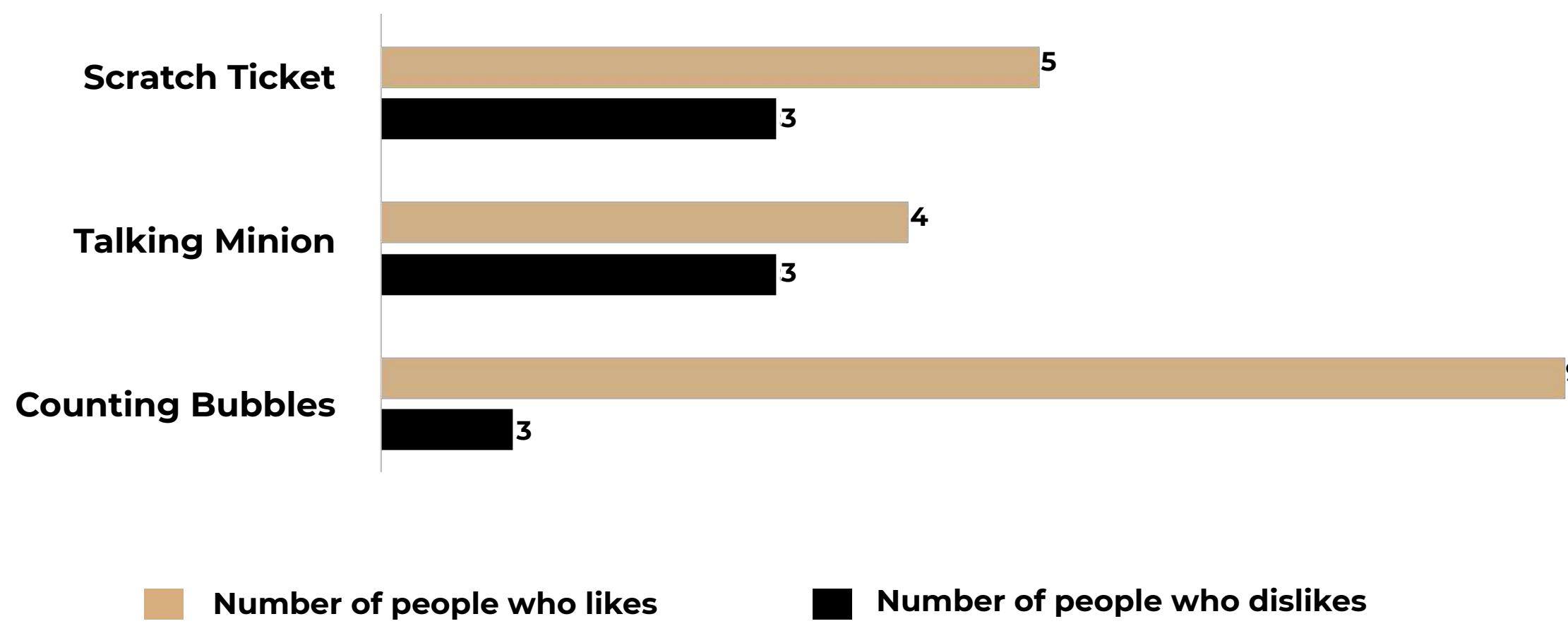
Counting Bubble [Advanced Version]

A bubble game on the touch screen with a counting number system and sound effects.



MOTIVATION

From the first evaluation, the counting bubbles get more good reviews. However, the Scratch Ticket and Talking Minion still have a few supporters, so we decided to **combine** the advantages of these two concepts to the Counting Bubble.



Problem:

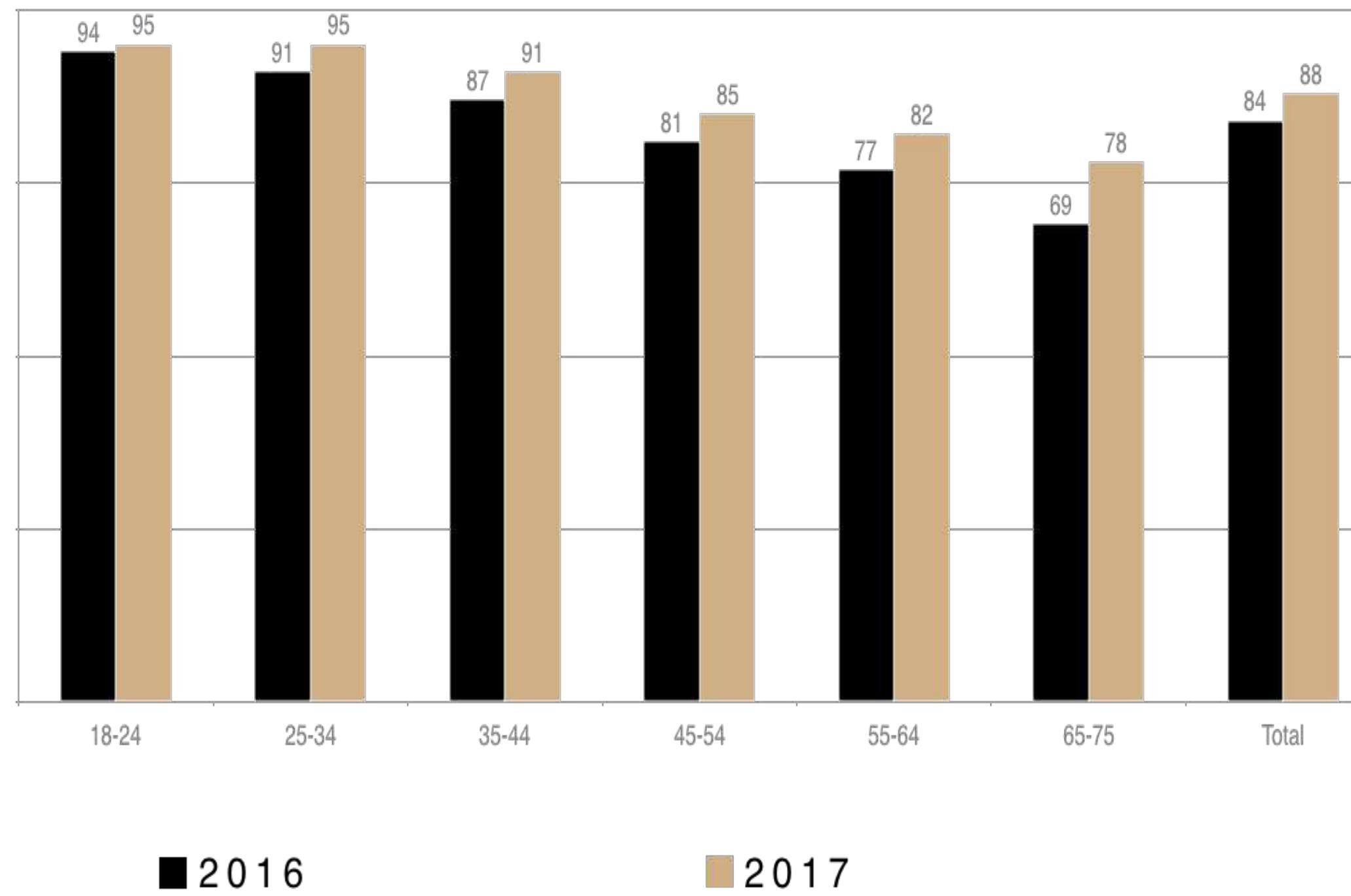
- **Replace** the behaviour of playing phones while they are waiting for the traffic lights.
- **Remind** the pedestrians to cross the road when traffic lights have changed.

Tackling:

- Touching Bubbles game - Decompression game to **replace** the interactive behaviour of playing mobile phones.
- Audio effects - **remind** pedestrians it is time to cross the road.
- Countdown numbers - For telling pedestrians when will the traffic lights change.

Chosen concept

TARGET USER GROUP



■ 2016

■ 2017

Australian findings are

based on a nationally representative sample
of over 2000 consumers aged 18-75.

From our research, the users of 18-24 age group use mobile phones times most. So our target audience is **younger generation** because they are very likely to play phones while they waiting for the traffic lights.

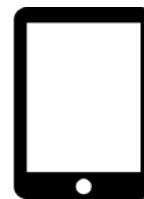
Suitable:

- people between 18-24 age group

Not suitable

- handicapped people (operation)
- children (heights)

HARDWARE AND SOFTWARE REQUIREMENT



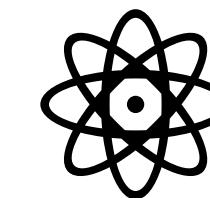
Terminal

Tablet computer/touch screen with **Windows** system.



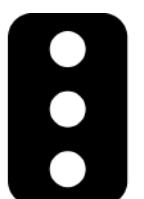
System

OS: Windows 7 SP1+
 Processor: 1.2 Ghz
 Memory: 512 MB RAM
 Graphics: Graphics card with DX10 support
 DirectX: Version 9.0
 Storage: 71 MB available space



Software

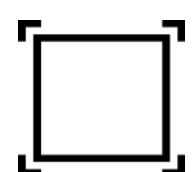
Currently decide to use **Unity** as developing engine, second choice is Openprocessing.



Placement

Device placed above the pedestrian crossing button approximately 165.5 cm above the ground:

the number got from divide the number of average height for Australian people between age 18 - 24, 178 cm and 163 cm for male and female respectively, and subtract by 5 cm. (*Australian Bureau of Statistics, 2012*)



Frame

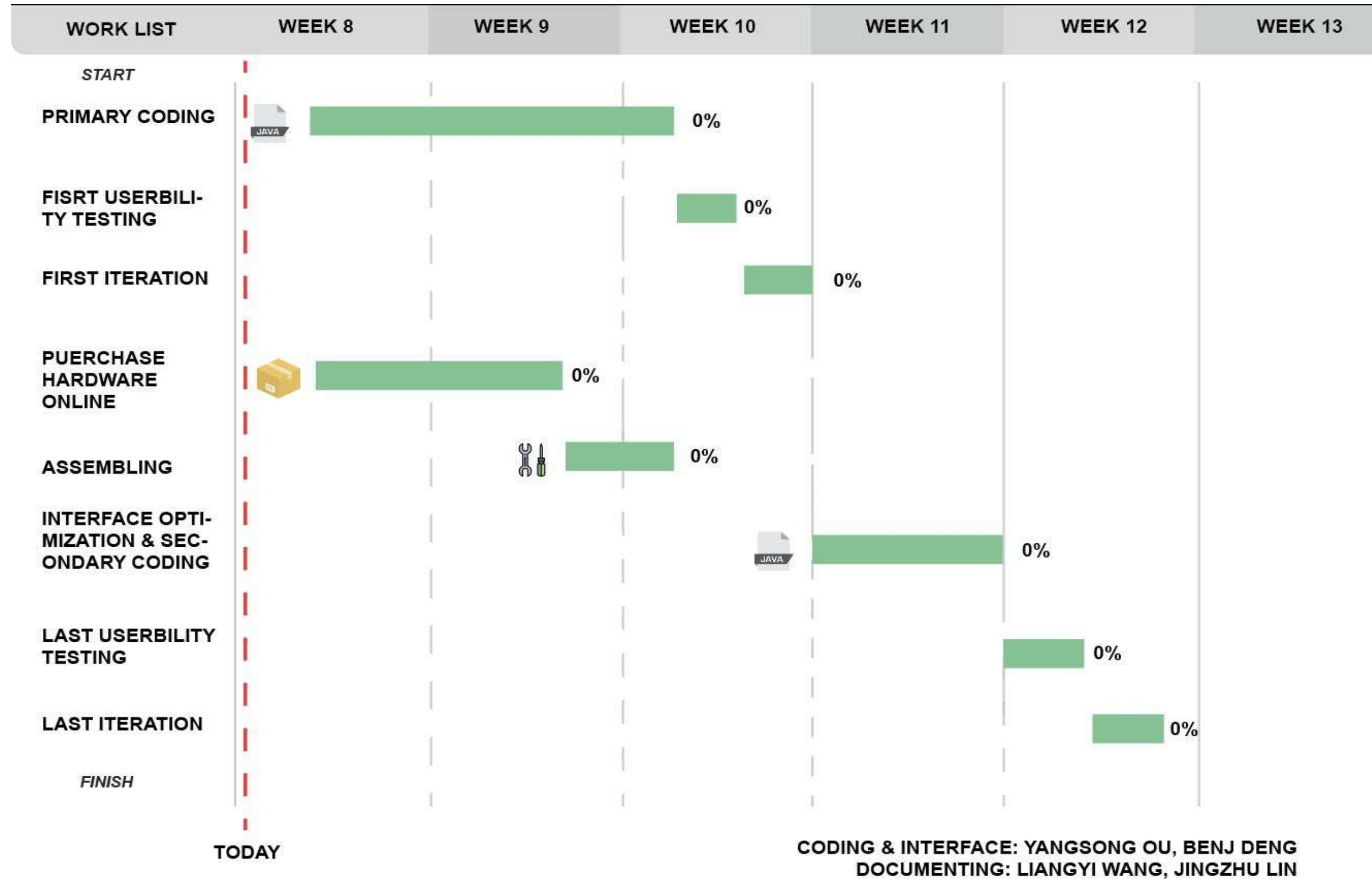
- Size of the frame over **12 inches**;
- Outer Acrylic Board Frame has to be waterproof, sun-proof, with higher level of hardness and durability;
- It is supposed to cover the device with shape of triangle (cover from top to bottom).

<https://www.microsoft.com>

Implementation plan

IMPLEMENTATION PLAN

TOUCHING BUBBLES



Purchase Hardware from

primary choice:

Ebay

secondary choice:

local wood shop/wilkinson dmaf (if expected day of shipping exceed 100%)

*usability test run together of full group

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Appendix

interview transcript

Interview 1

Q: Which concept you like the most? Why?

A: Three concepts are ok, I prefer the talking toy. The concepts of scratch ticket and counting bubble can't be served to everyone in one waiting period if there are several pedestrians, but the talking toy only needs to be simply touched so everyone got a chance to interact with it. Also, the repeat of "Touch me please" is annoying but I like this trick.

Q: If I don't explain to you, can you understand how these three concepts work in real situation? Why?

A: The concept of talking toy is easy to be followed because his audio feedback tells everything. I will be confused of other two concepts at first sight.

Q: If the concept of talking toy is implemented, will you utilize it often? Why?

A: Not necessarily, I would be interested in it at an early time.

Q: Do you think this talking toy can prevent you playing on your mobile phone while you are waiting for the traffic light? Why?

A: Yes, but in a short time, because there is no more interaction I can do with it in a long period. Other two concepts would be better to prevent playing cell phone because I have to focus on them continually while using them.

Interview 2

Q: Which concept you like the most? Why?

A: I prefer the concept of scratch ticket if there is more entertainment interaction on it.

Q: Which concept you hate the most? Why?

A: The talking toy, because if I only want to play on my phone, the toy keeps talking will be really annoying. And if there are lots of pedestrians waiting for the traffic light, pedestrians far behind the toy can't hear it.

Q: If the concept of scratch ticket is implemented, will you utilize it often? Why?

A: The concept needs to update more and has more fun to use, so I might use it often.

Q: Do you think this concept can prevent you playing on your mobile phone while you are waiting for the traffic light? Why?

A: No, I think my smart phone is more interesting to play with at that time, but I think as long as this can reminds pedestrians when the traffic light turns, it is valuable.

Appendix

interview transcript

Interview 3

Q: Which concept you like the most? Why?

A: I like the talking toy the most because this toy keeps talking and it can attracts my attention the most even though it's annoying. Other two concepts have no sound to attract me.

Q: Which concept you hate the most? Why?

A: Other two concepts are quite similar, both using fingers to interact with and I am not engaged to do simple interaction on the screen.

Q: If I don't explain to you, can you understand how these three concepts work in real situation? Why?

A: The talking toy is easy to understand because it keeps talking if no one touches it. Other two concepts have no instruction or signifier of how it works

Q: If the concept of talking toy is implemented, will you utilize it often? Why?

A: I will, because I can't help myself to touch it when it keeps saying "Touch me please".

Q: Do you think this concept can prevent you playing on your mobile phone while you are waiting for the traffic light? Why?

A: To some extend this can, because I am distracted by it when I am playing on my cell phone, the audio feedback is not like background music, I can't play my cell phone with that background sound. At least, I won't play my cell phone when the traffic light turns because it has audio feedback to remind me of crossing the street.

Interview 4

Q: Which concept you like the most? Why?

A: The talking toy is more simple to me, other two are kind of complex to me when I'm at traffic light because I'm distracting, they are sort of fancy, but the talking toy has audio features and you have to realize what's going on on the street when hear it.

Q: If I don't explain to you, can you understand how these three concepts work in real situation? Why?

A: Maybe after I touch them and explore more I can understand what is going on.

Q: Do you think this concept of talking toy can prevent you playing on your mobile phone while you are waiting for the traffic light? Why?

A: Maybe, if you got visual attraction, it does attract you but I'm not sure would it be stronger than cell phone.

Appendix

interview transcript

Interview 5

Q: Which concept you like the most? Why?

A: I like the counting bubble the most, because the concept of scratch ticket is kind of monotonous, talking toy is too annoying, moving bubbles on the screen is interesting and lovely to me and I would like to touch it.

Q: you said the concept of scratch ticket is boring to you, is it about the interaction or the interface?

A: The interface is boring, interaction is ok but the interface cut off my interest to interact with it.

Q: If I don't explain to you, can you understand how these three concepts work in real situation? Why?

A: I think they are not clear enough to understand, even though there is a digital screen upon the button, I won't touch it actively. The counting bubble might attract me to touch it but I dont think everyone will be attracted by it, if they are not attracted to do first touch, they can't know the rest functions.

Q: Which concept you hate the most? Why?

A: The talking toy, if I don't need time counting or I'm talking to my friends, his talking will be really annoying.

Q: Although you don't like it, will you touch it when you are talking to your friends?

A: Of course, I want it stop talking, it will drive me crazy.

Q: If the concept of counting bubble is implemented, will you utilize it often? Why?

A: I think I will, because I like the bubbles and I would like to click it several times everytime I see it.

Q : Do you think this concept of talking toy can prevent you playing on your mobile phone while you are waiting for the traffic light? Why?

A: I think it can not, because I would like to click several times but I won't keep clicking it until the traffic light turns, it would be too humdrum, it is better if there are diverse interactions.

Q: Which concept can remind you to cross the street the best?

A: It is absolutely the talking toy though it is annoying, audio reminding is the best way to be noticed.

Appendix

interview transcript

interview 6

Q: Which concept you like the most? Why?

A: The counting bubble, talking toy is annoying and scratch ticket would make me a little bit confused.

Q: If I don't explain to you, can you understand how these three concepts work in real situation? Why?

A: In compare of these three concepts, the talking toy and counting bubble is easy to understand for me and I think crossing street should be as simple as possible, another concept might be confused to me at times to use.

Q: Which concept you hate the most? Why?

A: The talking toy, it's too annoying, feels like it forces me to touch it.

Q: If the concept of counting bubble is implemented, will you utilize it often? Why?

A: I will, because I would like to know how many seconds left to cross the street often when I'm waiting for the traffic light.

Q: Do you think this concept of talking toy can prevent you playing on your mobile phone while you are waiting for the traffic light? Why?

A: I don't think so, I will only click it when I want to know how many seconds left and then keep playing on my phone.

Q: Which concept you think can remind you to cross the street the best?

A: The talking toy because it has audio feature which other two concepts don't have. Also, the best part I like the counting bubble is that there is a visual time counting on the screen. And I think if it is always showing on the screen would be better for pedestrians because that every pedestrian can know is this push button being pressed and how many seconds left when there are numerous pedestrians.

Appendix

interview transcript

Interview 7

Q: Which one do you like best?

A: Counting Bubble, but without description, I wouldn't know how this works.

Q: would you prefer to add audio as well?

A: no, I think people might have a negative physical reaction towards the sound of something broken, if there is sound, I would like a softer sound.

Q: if the product goes into actual production, would you like to use it.

A: just play for a second when I feel bored.

Q: while you are waiting for a traffic light, will you think this design attracts your attention from your mobile device?

A: no, the phone is more interesting.

Interview 8

Q: Which one do you like best?

A: Counting Bubble

- How would people know the function of the digital screen?

(after seeing one-sentence description)

Q: would you understand how to interact with it by this description?

A: but I can't understand by this one sentence, I might be curious.

Q: do you like sound adding to it?

A: nevermind

Q: if the product goes into actual production, would you like to use it.

A: I might use it for a few times since it is new, after a few times, I would get bored.

Q: while you are waiting for the traffic light, will you think this design attracts your attention from your mobile device?

A: no, I don't think so. After I think a remaining time roughly, I will just keep using my phone.

Appendix

interview transcript

Interview 9

Q: Which one do you like best?

A: Counting Bubble

Q: do you like sound adding to it?

A: yes, that way it is more interactive and interesting to me, without sound I feel like that its fake bubble.

Q: You like the interface design?

A: the transparent background is good, it would even be more interesting if the graphic is 3-dimensional.

Q: would you understand how this design is supposed to work without description?

A: no, better add a description before the game started, or paste a sign or description.

Q: are you satisfied with the overall experience?

A: it is fun, I would like to play with it.

Q: if the product goes into actual production, would you like to use it.

A: yes, if this is interesting, I will. But only one person could use it at one time, or with friends, not ok for two strangers.

Q: will you keep playing with it while you are waiting for the traffic light?

A: I definitely will spend few seconds playing with it, however, keep doing it is wired.

Appendix

interview transcript

Interview 10

Q: Which one you like the best?

A: I like the toy, it is interesting if the toy and speak more words.

- Is this bubble design display time directly? (no) so if I hurried or stand in a distance with the design, I just want to know how many seconds remain, this is not a good choice.

Q: if the product goes into actual production, would you like to use it.

A: yes

Q: while you are waiting for the traffic light, will you think any design attracts your attention from your mobile device?

A: no, not until there is a camera that tells me I will be fined for playing with my phone, the phone is way more interesting. These might attract me for a second.

Q: would you understand how to interact with it without description?

A: I think people will be curious if any of these being placed on the pillar, doesn't this toy keep speaking?

(no, only after you had pressed the pedestrian crossing button, but if you don't touch it

after that, it keeps seeing: touch me please)

A: that is a bit annoying...

- I really think the sound effect of breaking glass is scared, makes me physically uncomfortable, people might have thought that there is something dropped, and will step away. But the scratch is fun.

Appendix

interview transcript

Interview 11

Q: which one you like the best?

A: the scratch ticket, it is more interesting and interactive.

Q: would you understand how to interact with it without description?

A: I think if this is being placed, people will be curious and will figure out what is going on.

Q: How would you think it could be improved?

A: only one person can interact with it, and people cannot notice it if on one press the bottom. The default screen is not that visible.

Q: if the product goes into actual production, would you like to use it.

A: might be curious at first, not after a few times.

Q: will you keep playing with it while you are waiting for the traffic light?

A: same, only at first.

Interview 12

Q: which one you like the best?

A: The talking toy, its funny with that annoying repeat words.

Q: would you understand how to interact with it without description?

A: I think the “touch me please” audio feedback is clear enough and its interaction is simple, so I can easily understand it.

Q: if the product goes into actual production, would you like to use it.

A: Yes, I would be very pleased to touch it when I’m waiting for the traffic light.

Q: while you are waiting for the traffic light, will you think any design attracts your attention from your mobile device?

A: The audio features of it absolutely attract my attention, I will move my eyes away from the phone when hear it.

Q: will you keep playing with it while you are waiting for the traffic light?

A: Probably not, the interaction is limited, I won’t keep interacting with one feature in such a long time of waiting traffic light.

Appendix

interview transcript

interview 13

Q: Which concept you like the most? Why?

A: The counting bubble, I like it because it is interactive.

Q: If I don't explain to you, can you understand how these three concepts work in real situation? Why?

A: In compare of these three concepts, the talking toy is easy to understand. Because the talking toy has an audio reminder, but the other two concepts may not remind me if I didn't notice the screen.

Q: If the concept of counting bubble is implemented, will you utilize it often? Why?

A: I may be attracted to it a few times, after that I will choose to continue playing with my phone.

Q: Which concept you think can remind you to cross the street the best?

A: The talking toy because it has audio feature which other two concepts don't have. Also, the best part I like the counting bubble is that there is visual time counting on the screen. But the number shown on the screen of the counting bubble is too small, I might not notice it.

interview 14

Q: Can you talk about your overall experience.

A: The overall experience with these two (scratch ticket and counting bubble) is ok, but I was confused about the cartoon one.

Q: what makes you confused?

A: I kind of not understanding if this appear on the street, it does not make sense.

Q: which concept did you like the best?

A: I like the scratch one, it tells me how many times remain directly, but people might not understand how to use it at first, it might need more instruction.

Q: while you are waiting for the traffic light, will you think any design attracts your attention from your mobile device?

A: yes, I will definitely give a try, but might get bored after a few times, there are not many I can interact with.

Appendix

interview transcript

Interview 15

Q: Which one do you like the best?

A: I like the two screens both, but I don't like the talking toy. Because it is too noisy.

Q: Why do you like the counting bubbles and scratch ticket?

A: Because it seems like playing ipad games, and I did love ipad

Q: Do you think the counting bubble and scratch ticket can remind you to cross the road?

A: I don't know, because those two concepts have no voice, so it is hard to say.

Q: Will you use the counting bubble and scratch ticket for a long time if it sells on market?

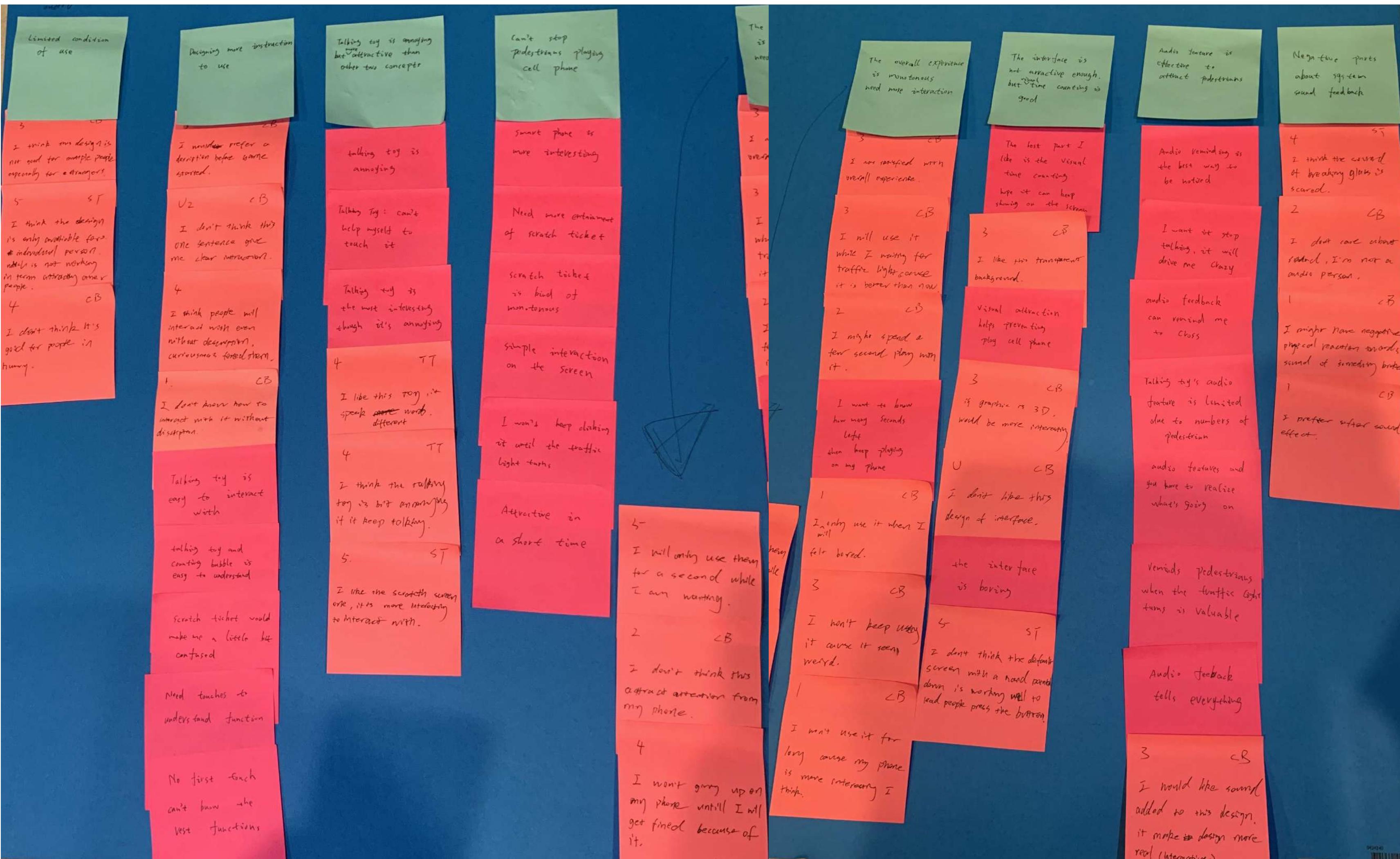
A: Of course, I like playing games.

Q: If I did not explain to you, will you know how to play the game?

A: I think I cannot understand.

Appendix

affinity diagram



Appendix

interview transcript

Interview 1

Q: Do you have any comments about our audio or visual design?

(You mean the sound feedback when I click the bubbles?)(Yes)

A: It's kind of interesting, I like it.

Q: How about visual design? it could include font size, background pics or other things.

A: The size of the number of time counting should be bigger to be noticed.

Q: Do you like the appearance in minions of the concept?

A: It depends on personal preference, for me, it's ok.

Q: If I don't explain to you, can you understand how this works in real situation?

A: I would be curious when I see it and try to explore more about it, during this process, I might understand it.

Q: Do you need audio instruction like "come to touch my bubble" to help you use it?

A: Yes, audio instruction can help me use it efficiently at first time.

Q: If this concept is implemented, will you utilize it often?

A: I probably do.

Q: Do you think this concept can prevent you playing on your mobile phone while you are waiting for the traffic light?

A: It can achieve this goal at early time because I would be curious about it, but after I use it several times, I will lose the interest of it and play on my cell phone.

Q: Even though you don't play it, will you often watch the time counting on it?

A: Yes, I will.

Appendix

interview transcript

Interview 2

Q: Do you need audio instruction like “come to touch my bubble” to help you use it?

A: No, that could be annoying.

Q: Do you prefer other kind of animation of bubbles disappear after you click it, like the bubbles explode and become liquid penetrating into background color?

A: I like current one better because the background of minions is more related to the outer shell.

Q: If this concept is implemented, will you utilize it often?

A: I might play it twice then ignore it.

Q: Do you think this concept can prevent you playing on your mobile phone while you are waiting for the traffic light?

A: If there is someone else playing on it, I can't use it then I'll still play on my phone.

Interview 3

Q: Do you have any comments about our audio or visual design?

A: The volume of the audio feedback is too low to be noticed and white background color at first is kind of weird, the whole thing is like game for kids.

Q: Do you like the appearance of minions?

A: Yes, I like it and the shaking hands but I didn't realise this outer shell is a minion.

Q: If this concept is implemented, will you utilize it often?

A: No, because there is no point to attract me at first glance.

Q: What if there is audio feedback like “Come to touch my bubble” after you push the button?

A: That could be fun and I may use it.

Q: Do you think this concept can prevent you playing on your mobile phone while you are waiting for the traffic light?

A: I don't know. It probably can because I will check the seconds on the screen, by the way, the visual number of time counting needs to be bigger.

Appendix

interview transcript

Interview 4

Q: Do you have any comments about our audio or visual design?

A: It do attract my attention and I like the time counting function because australia's traffic light won't tell how many seconds left. The animation of bubbles disappear is weird, replace it with explode animation could be better.

Q: If the screen lights up after you press the button, will you play it?

A: Yes, I will, the audio feedback may not work with noisy surroundings but a light up screen will catch my attention.

Q: If I don't explain to you, can you understand how this works in real situation?

A: No, I would be confused about what is it for.

Q: If this concept is implemented, will you utilize it often?

A: No, I will be curious about it at first and use it maybe twice then continue playing on my phone.

Q: Do you think this concept can remind you to cross the street while you are playing on your phone?

A: Yes.

interview 5

Q: Do you have any comments about our audio or visual design?

A: You can have better audio feedback when the traffic light turns.

Q: If I don't explain to you, can you understand how this works in real situation?

A: Yes, if there is audio instruction remind me how to play it.

Q: If this concept is implemented, will you utilize it often?

A: Yes.

Q: Do you think this concept can prevent you playing on your mobile phone while you are waiting for the traffic light?

A: No, I think my smart phone has much more fun than it.

Q: Do you think this concept can remind you to cross the street while you are playing on your phone?

A: Yes, the audio reminding function is valuable.

Appendix

interview transcript

interview 6

Q: Do you have any comments about our audio or visual design?

A: I can't even hear the audio feature indoor, it needs to be louder. The concept may not interest everyone from different age group. The product may not suit every region in the city, like CBD, people in rush may not use it.

Q: If there is audio feedback like "Come to touch my bubble" after you push the button, will you be attracted?

A: Yes, I think everyone would be attracted by audio feature unless its volume is too low to be noticed.

Q: If this concept is implemented, will you utilize it often?

A: I think things like this would be very popular when it faces to the public at early time, but maybe half year later, everyone is familiar with it and then not play it anymore because it has only one interaction that clicking the bubble.

Q: Do you think this concept can prevent you playing on your mobile phone while you are waiting for the traffic light?

A: Not really, this can only be used by one person, pedestrians who are not using it will still play their phone.

Q: Do you think this concept can remind you to cross the street while you are playing on your phone?

A: Yes, and this can be beneficial for every pedestrian.

Appendix

interview transcript

interview 7

Q: Do you have any comments about our audio or visual design?

A: The audio feature is good especially for disability group like blind people, but the volume needs to be louder.

Q: If there is audio feedback like “Come to touch my bubble” after you push the button, is that better?

A: Yes, it helps me notice it.

Q: If I don't explain to you, can you understand how this works in real situation?

A: No, I would be confused about the yellow part of the animation after clicking bubbles.

Q: How about another animation of bubbles disappear after you click it, like the bubbles explode and become liquid penetrating into background color?

A: I prefer previous one in my personal opinion.

Q: If this concept is implemented, will you utilize it often?

A: I will use it several times early, then lose interest of it due to its single interaction of clicking bubbles.

Q: Do you think this concept can prevent you playing on your mobile phone while you are waiting for the traffic light?

A: No, it's not interesting enough to beat my cell phone.

Q: Do you think this concept can remind you to cross the street while you are playing on your phone?

A: Yes, the audio reminding can achieve this.

Appendix

interview transcript

interview 8

Q: Do you have any comments about our audio or visual design?

A: The visual part is not attractive enough, audio is not loud enough.

Q: If there is audio feedback like “Come to touch my bubble” after you push the button, is that better?

A: Yes, it would be more interactive.

Q: If I don't explain to you, can you understand how this works in real situation?

A: No.

Q: How about another animation of bubbles disappear after you click it, like the bubbles explode and become liquid penetrating into background color?

A: They are on the same level of attraction to me, not very outstanding.

Q: If this concept is implemented, will you utilize it often?

A: Maybe, but I must be bored with it after ten times of use.

Q: Do you think this concept can prevent you playing on your mobile phone while you are waiting for the traffic light?

A: Yes, but it would be better if the playing mode keeps updating like there is different interaction after I played it several times.

Appendix

interview transcript

interview 9

Q: Do you have any comments about our audio or visual design?

A: If there are different modes of playing games and I can choose from them, it would be more interesting. And the color of background could be more bright like turning to full red when the traffic light turns, it can remind pedestrians better.

Q: If there is audio feedback like “Come to touch my bubble” after you push the button, is that better?

A: Yes, a little bit better, but not very essential to me.

Q: How about the shaking hand of the outer shell?

A: This is cute, I like it.

Q: If I don't explain to you, can you understand how this works in real situation?

A: No, I will be confused about what is it for and where to start.

Q: If this concept is implemented, will you utilize it often?

A: I may use it, but not often, if it has more interesting content.

Q: Do you think this concept can prevent you playing on your mobile phone while you are waiting for the traffic light?

A: I'm not sure about it, personally, I don't play on my phone often when I'm waiting for the traffic light.

Appendix

interview transcript

interview 10

Q: Do you have any comments about our audio or visual design?

A: I need a start audio feature to make me realize the game has begun after I click the screen. Visual pics and background colors are ok, relevant to the topic of minions.

Q: If I don't explain to you, can you understand how this works in real situation?

A: I can understand it, I think it's clear enough how to play.

Q: How about another animation of bubbles disappear after you click it, like the bubbles explode and become liquid penetrating into background color?

A: This one is better, it's a good way to release pressure when watching the bubbles explode.

Q: If this concept is implemented, will you utilize it often?

A: No, I may use it when I'm under big pressure and clicking the bubble to release.

Interview 11

Q: How did you feel about this design?

A: I felt this is interesting, but isn't it too small? Not everyone can see it until someone pressed the button. If I stand besides, how would I notice this screen?
(there would be sound feedback after you pressed the button.)

A: so, is there still pedestrian crossing sound effect? and today is raining, it's noisy, I might not hear it.

Q: how about the interface design?

A: it might need to be more realistic, not too cartoon for everyone.

A: by the way, this might not visible for elderly or too high for children.

Q: did you find it is attractive?

A: no much, I might play it at first, I think it can be improved, maybe through making it attractive for multiple pedestrian.

Appendix

interview transcript

Interview 12

Q: what is your thought towards this design?

A: I don't understand the yellow rectangular animation there, I like this feedback of breaking bubble.

Q: how did you feel about this sound effect of breaking bubble?

A: I felt it is cute. The graphic is kind of simple.

Q: do you enjoy using it?

A: yea, kind of, it is good for spending time while I am waiting for traffic light.

Q: if there is a hand of Minions waving after you pressed the button, how would you feel about it?

A: it actually can grab my attention, but someone might break a physical hand like this...

Q: do you think this can remind you crossing road?

A: yes

Interview 13

Q: how would you think this design can be improved?

A: I think the sound effect has to be more obvious, there is too many sound in the environment, and the road is noisy. And, it would be better if multiple people could play together, making it big size using cheap LED screen.

Q: how would you feel about the design of interface?

A: the bubble is ok.

Q: would you be able to understand the function without description?

A: yea, it is all about poke, I think people would understand.

Q: if the product goes into actual production, would you like to use it.

A: obviously, it is better than now, yes.

(the user did not notice the countdown timing)

A: I think it is not necessary

A: I felt like it can be color change on the screen for red to green, or make a background, the number of timing is obviously too small.

Q: while you waiting for the traffic light, will you think this design attracts your attention from your mobile device?

A: if I spend 15 seconds testing massage, I might spend the rest of time play with it, but I think I would not spend all the time with it, unless I was super boring.

Appendix

interview transcript

Interview 14

Q: what is your thought towards this design?

A: I think it's amazing that it displays a random layer of the background after I broke a bubble. But I felt like the screen is too small for a design in public place.

Q: what else have notice?

A: cause the waiting time is long, the game might be finished quickly (the background is displayed fully after few seconds) there is nothing to do after this.

Q: how do you feel about sound effect?

A: I did not hear it, but I think it will not affect that much, if it is too loud, it might have potential safety issue for driver.

Q: if there is a sound effect after you press the bottom, how would you feel about it?

A: it is acceptable for me, I think it is easier to use. Without description or audio reminder, the bubble is bubble.

Q: while you waiting for the traffic light, will you think this design attracts your attention from your mobile device?

A: at first, yes, after a few times, I might get boring.

Interview 15

Q: how would you think this design can be improved?

A: isn't this too small? It could be bigger scare. And I think the interface is bit complex.

Q: how did you feel about the sound effect.

A: I did not hear it, it would be better if I get sound feedback after I pressed the bottom. Or wrote a description.

Q: while you waiting for the traffic light, will you think this design attracts your attention from your mobile device?

A: I might use it for first time.

Appendix

interview transcript

Interview 16

Q: how did you feel about the design? (sound effect, interface)

A: firstly, I did not quite get what does this yellow rectangle do, I might think it is a puzzle game.

(what if the animation goes explore just like a bubble broken?)

A: I feel it is hard to make.

A: I feel like it would be better if you create a cartoon character, and it is only for one person to use at a time.

Q: can you hear the sound effect?

A: no, it might need to be bigger, like play through a speaker.

Q: would you be able to understand how to interact with it?

A: no, I did not even know what it is about. It might need an audio description.

Q: while you waiting for the traffic light, will you think this design attracts your attention from your mobile device?

A: I might be curious at the first, but after few times, I get bored.

Interview 17

Q: would you be able to understand how to interact with it?

A: I can notice it when there are not many people.

Q: how did you feel about the design of interface?

A: the interface is cute, I think people will want to touch it when they see the bubble.

Q: would you be able to hear the sound?

A: the sound is ok, but I think the screen is too small.

Q: if the product goes into actual production, would you like to use it.

A: yes, but if I already know what the game is about, I might not want to use it again, I might back to see how much time remain.

Q: while you waiting for the traffic light, will you think this design attracts your attention from your mobile device?

A: not sure about that.

Q: how would you feel about if there is a sound effect after you press the bottom?

A: actually, it is better, it can grab my attention.

Appendix

interview transcript

Interview 18

Q: how would you think this design can be improved?

A: there could be more background beside the Minions.

Q: comparing an actual broken animation with color painting, which one do you prefer?

A: I prefer more impressive feedback.

Q: do you like the Minions character at the end?

A: kind of, but it would be better if it is not flat.

Q: if there is a sound effect after you press the bottom, how would you feel about it?

A: I will, but there is problem that only one person can use it.

Q: while you waiting for the traffic light, will you think this design attracts your attention from your mobile device?

A: it will do to a large extend, but I feel like the timer is too small. The audio, as well, it is not audible in a noisy environment.

Interview 19

Q: how would you think this design can be improved?

A: I did not hear the sound, but the interface is cute. The sound feedback could be more.

Q: would you be able to understand the function without description?

A: no, but it should be easy to use with audio feedback.

Q: if the product goes into actual production, would you like to use it.

A: yes

Q: while you waiting for the traffic light, will you think this design attracts your attention from your mobile device?

A: yes, if it keeps updating, I would want to use it frequently.

Appendix

interview transcript

Interview 20

Q: how would you think this design can be improved?

A: I felt like the timing is too small.

(what if it reminds you through sound)

A: I would prefer to see it; the sound is bit annoying.

A: the interface is fine, I like the cartoon character.

Q: would you be able to understand the function without description?

A: not at first, but I can understand after the game finished, the bubble can be bigger size. The yellow rectangle, I kind of not understand what it is about, it might need refine better.

Q: if the product goes into actual production, would you like to use it.

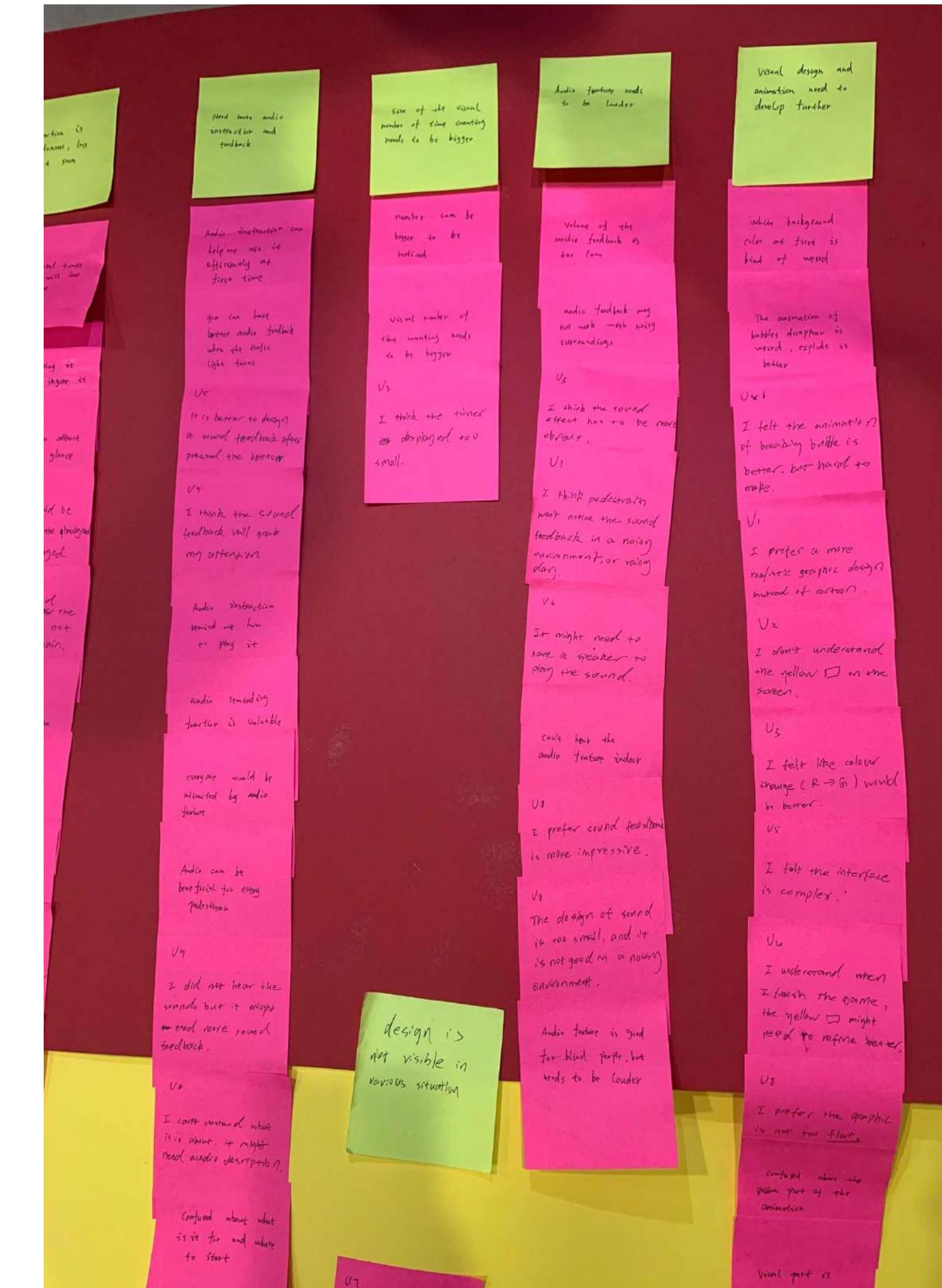
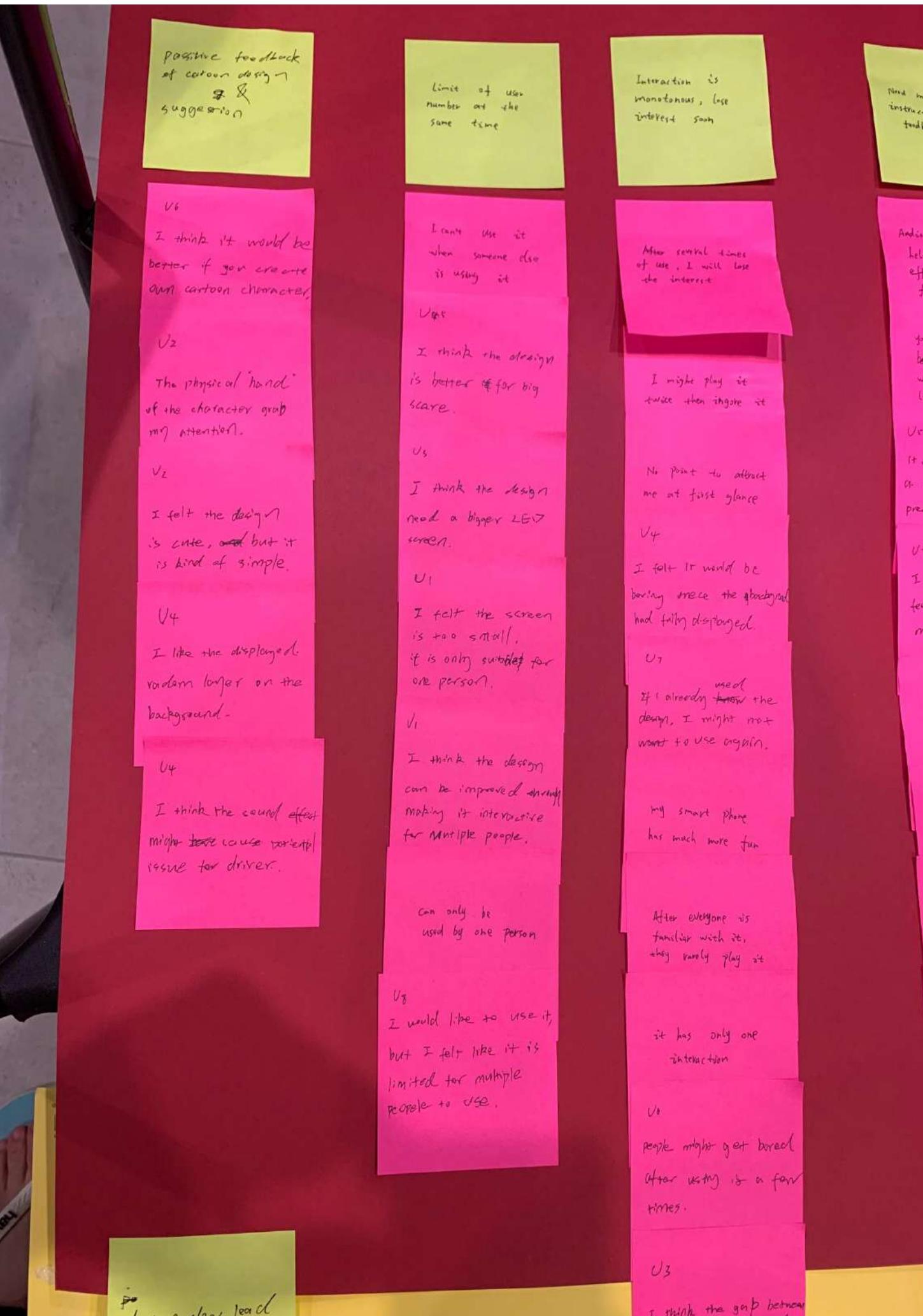
A: yes

Q: while you waiting for the traffic light, will you think this design attracts your attention from your mobile device?

A: kind of, maybe be at first.

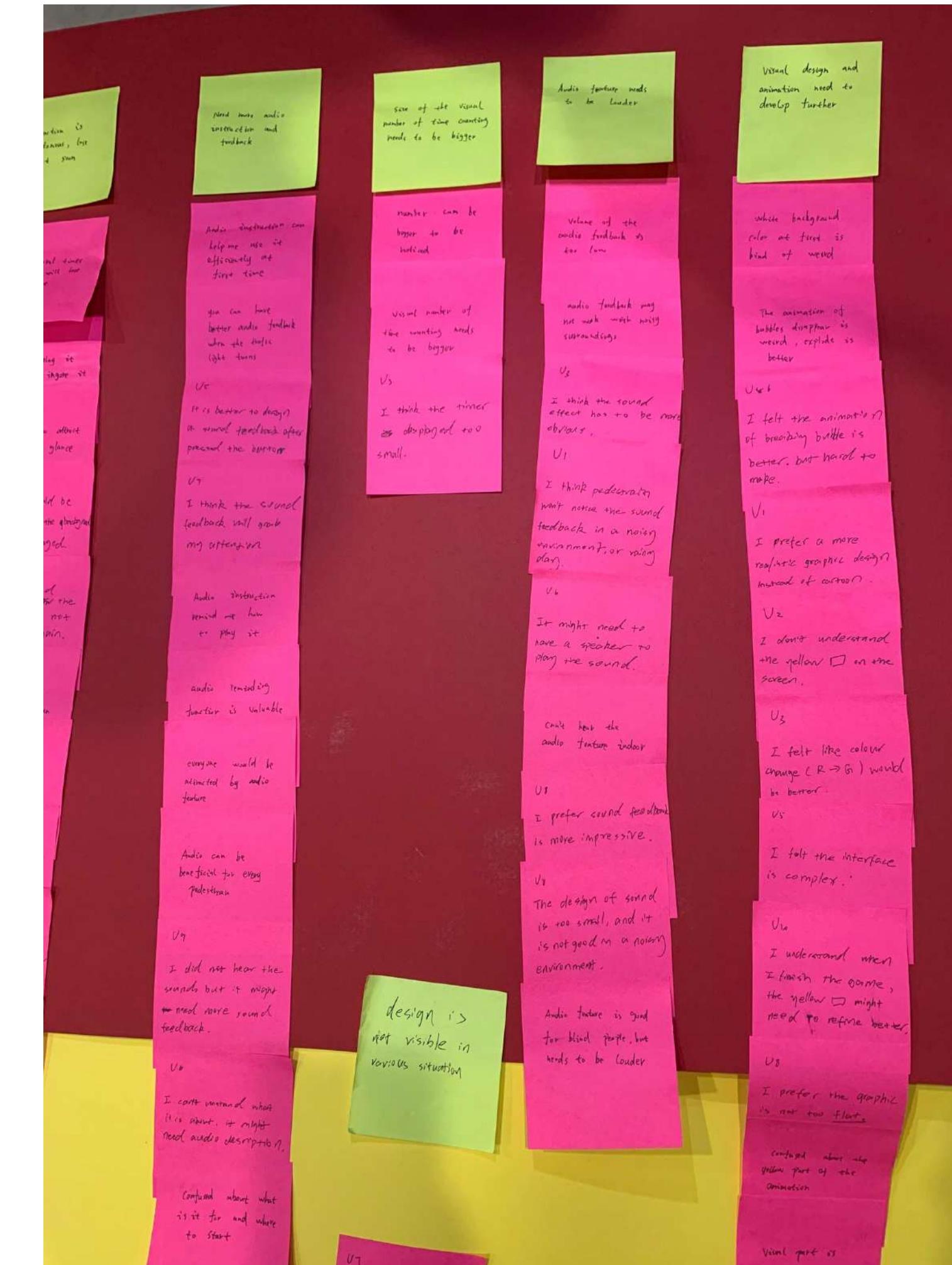
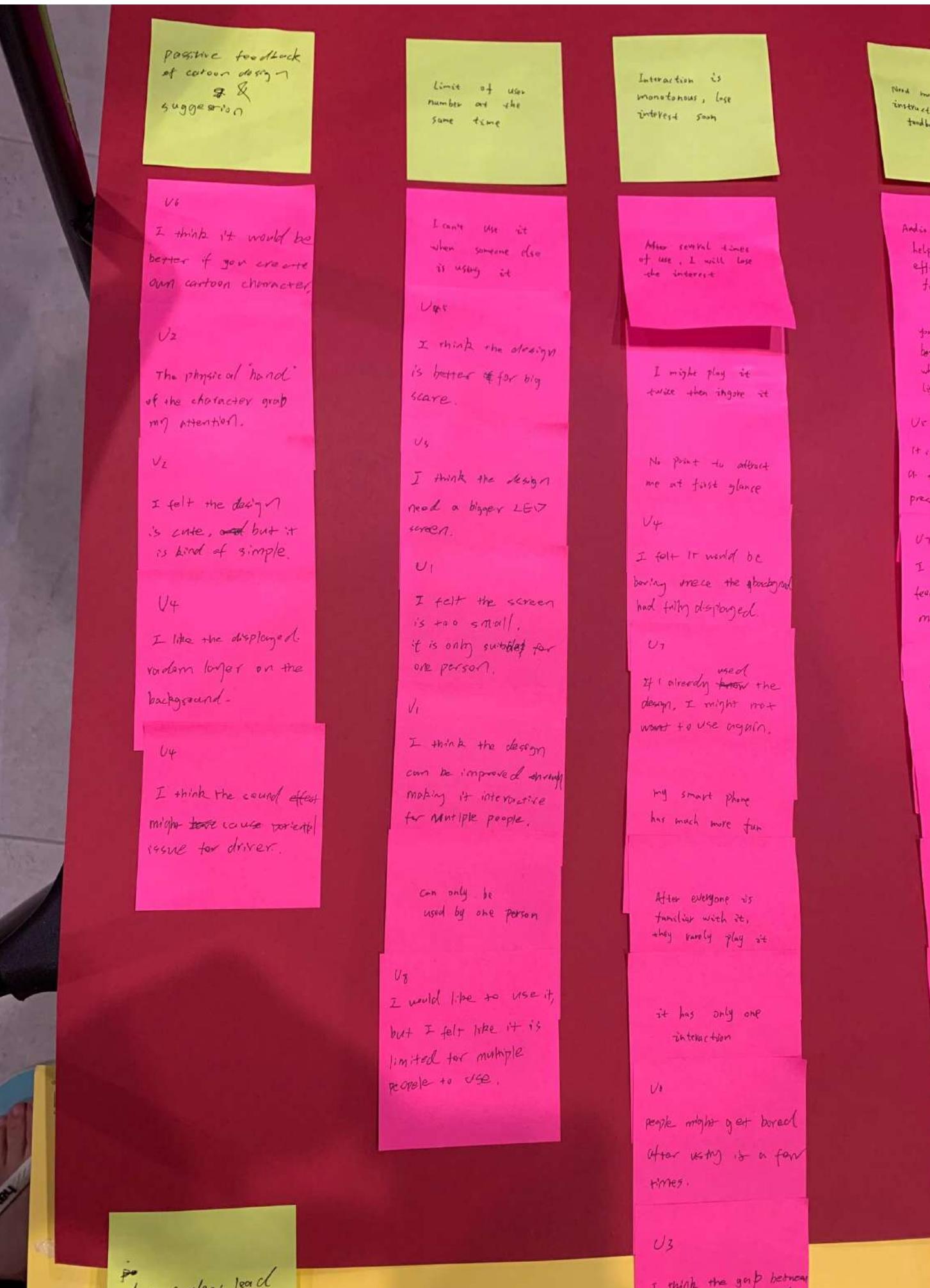
Appendix

affinity diagram



Appendix

affinity diagram



Appendix

Think-Aloud

USER GOAL / TASK	INTERFACE PART / LOCATION	VERBAL PROTOCOL
Experience the prototype until pedestrian crossing sound effect appears	- waving hands - bubble animation - crossing interface	- Haha, this is cute. - So, what does this yellow rectangle do? - Oh, so this means the light has turned to green.
—	- bubble animation - bubble exploring - crossing interface	- the animation is nice, should I move the bubbles? - Am, oh, it turns to yellow. - Ok, this Minion seems flat.
—	- bubble animation - number countdown - crossing interface	- this is simple - what does this number means, oh it's how many time remain - is that all?
—	- physical hands - number countdown - crossing interface	- this is easy to break. - is this timing? - it's too small for me. - Am... I can cross the road, ok, finished?
—	- bubble animation - back ground display - crossing interface	- isn't this too cartoon? no sound? - what is this? (the yellow rectangle) - OK, is that all?

USER GOAL / TASK	INTERFACE PART / LOCATION	VERBAL PROTOCOL
Experience the prototype until pedestrian crossing sound effect appears	* Start screen * Moving bubbles * Scratch animation * sound feedback * background of minion	* What's the number for * These bubbles are cute * I don't know what's the yellow plate * Did I hear some sound * I like the picture of minion
—	* Shaking hand of outer shell * Moving bubbles * Scratch animation * number of time counting * Final screen	* The feature may be welcome for kids. * Clicking bubbles reminds me of screensaver * Why there is yellow block after bubbles disappear * I guess this number is for time counting * My guess is right, nice way to remind for crossing
—	* Touch Start Screen * Try Touch the bubble * Scratch animation * number of time counting * background of minion	* What happened * I understand, I got to touch the moving bubble * What's the yellow part after I click bubbles * Is the number counting for crossing * The minion is surprised
—	* Start screen * scratch animation * Final screen	* Touch the bubble is like a kid game * What's the yellow square * It's time to cross the street? funny way for reminding
—	* Shaking hand of outer shell * Moving bubbles * Scratch animation * number of time counting * Final screen	* The shaking hand is funny, but seems not suit for adults * The bubbles are beautiful * The yellow block is weird and I can't get it * Is the number for time counting, can't really understand it * Time to pass, good reminding

Appendix

Think-Aloud

USER GOAL / TASK	INTERFACE PART / LOCATION	VERBAL PROTOCOL
Experience the game types. Sound effects	bubble broken - On! Yellow. - What's this? last picture. - I don't understand	I don't know. What the yellow part means. Is it can be touched
	bubble broken - On. Yellow - What's this? Last picture - I don't understand	I don't know. What the yellow part means. I can hear them.
	bubble broken - On! Yellow - What's this? last picture. ? I don't understand one	It's same interesting. Sounds. It's so cute. How Is it can be touched?
	bubble broken - On! Yellow - What's this? last picture - I don't know we the new	I don't like onion. I can hear onion. How Can you change the picture of onion?
	bubble broken - On! Yellow. - What's this? last picture - I don't know	It's so cute. I like it but will it cost money? On I will try it definitely

USER GOAL / TASK	INTERFACE PART / LOCATION	VERBAL PROTOCOL
To complete the part of game	④ bubble broken - On! Yellow - What's this? last picture - I don't understand	I don't know what the yellow part mean totally. Is it can be touch
	bubble broken - On! when! Yellow - ?? last picture - emm...how	It's so funny interesting now Is it can be touchable I am not interested
	bubble broken - On I love it - What's this. On	I don't know what the yellow part mean. How Can you change the picture
	bubble broken - On! Yellow - What's this? last picture - emm	I don't like the minion's character. And I cannot hear the sound.
	bubble broken I love it. depressing. What's this: On	It's funny but I Sends great. How need it to have more modes, like to provide to adults

Appendix

Usability Testing

Task: Experience the prototype until it reminds you crossing the street

Pre-test question: How do you think about current pedestrian crossing design?

Post-test question: What can be improved about this design?

SUCCESS	TIME TO COMPLETE	NUMBER OF ERRORS	NOTES
2	52s	1	"Current design has no specific time counting function." "The time counting function is valuable, but needs to be clarified." This user stopped for a while to make sure the number for time counting.
2	48s	0	"There is no time counting of current product." "You can add more interactions to attract users." Whole experience is fluent but no surprising reaction.
1	1m20s	1	"current design is boring and I have been familiar with it." "The visual time counting is not clear enough." The user is confused about the counting number and stopped to ask about it.
2	54s	0	"Current design is normal, just for safely passing of pedestrians." "This design is kind of interesting but lack of vital attraction." The user has no difficulty during who process, and reaction to audio feedbacks is surprised.
2	40s	0	"I have no comment about current designs, it is just very normal." "The whole thing is easy to use and understand, but not so interesting, there is not many things to explore."

Task: Experience the design prototype while waiting for traffic lights.

SUCCESS	TIME TO COMPLETE	NUMBER OF ERRORS	NOTES
1	1m31s	2	<ul style="list-style-type: none"> User wanted to know if every bubble displays different text after they broke it. <p>Pre- Q: How do you feel the existing crossing design? A: I like the sound, it remind me Post-crossing the street when I was distracted. Q: How do you think about the design can be improved? A: I think it would be interesting if there is more interactive thing going on!</p>
1	58s	1	<p>Q: How do you think the existing pedestrian crossing design? A: I hate it does not tell me how much time remain.</p> <p>Q: How do you think the design can be improved? A: I like the timer, but sometimes I mess it up with game over time, so I think making it more independent.</p>
2	37s	0	<p>Q: Have you experienced similar design? A: I think it's similar to the screen saver interface.</p> <p>Q: How would you like it be improved? A: I would like to see more possible outcome instead of just bubble and bubble.</p>
1	68s	1	<p>Q: How do you think the existing pedestrian crossing design? A: I usually distracted by pedestrian crossing sound effect from other side. I think it make the thing quite annoying sometimes.</p>
1	1m13s	2	<p>Q: Have you experienced similar existing design before? A: The screen saver, right?</p> <p>Q: How do you think the design can be improved? A: Perhaps making it more attractive by improve the graphic.</p>

Appendix

Usability Testing

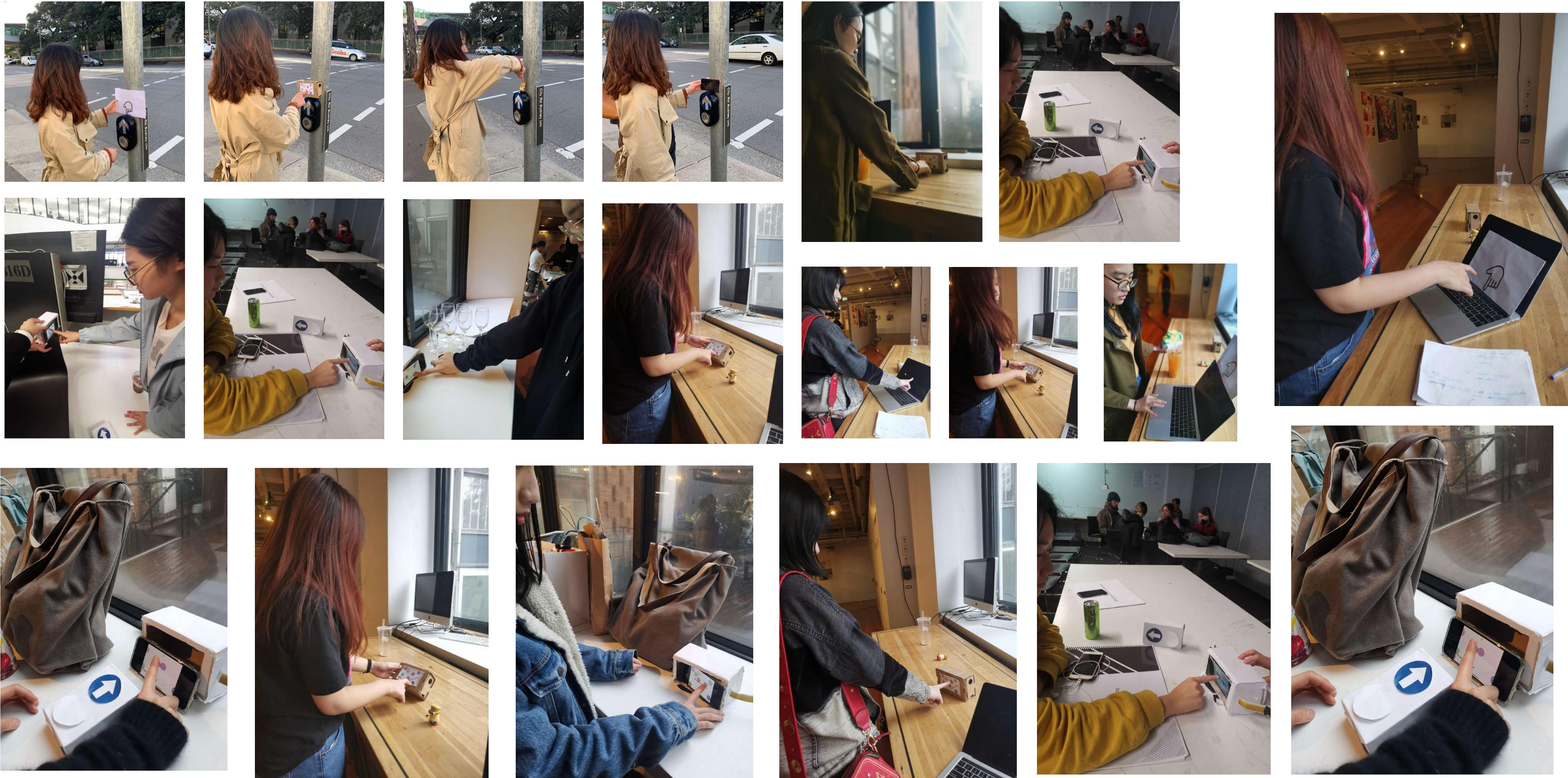
SUCCESS	TIME TO COMPLETE	NUMBER OF ERRORS	NOTES
1	2min	1	Such have more game choices. What the number means. And quite little simple. I want more modes like the drawing on the screen.
2	50s	0	I love to touch bubbles and it can tell me how long will the traffic lights change to green. Are the sound effects when I touch the bubble very cute.
2	50s	0	I like it but where are you Setting it down? On traffic lights? Okay good. But what if children can't get the height of the bubble?
0	2min	2	I have no idea what & somehow do? because I don't know what the numbers means. Is it the game number or a traffic light count down number?
1	2min	1	Amazing! I love the game because touching bubble is really very depressing. I love bubbles & only want to explode them by fingers. I loveem

SUCCESS	TIME TO COMPLETE	NUMBER OF ERRORS	NOTES
1	1.5 min	0	(mixed modes. I want more modes to develop the concept. I love the sound effects. The sounds very lovely. Amazing. I like it.
1	33s	0	But how many people can write at the same time. If I stand in front of the screen. I cannot touch the bubble either to play it.
2	24s	0	Amazing. I love the sound eff fects because it is so cute. It is easy to understand. The writing number became I always cannot get the feels of
1	1.03 min	1	Can the bubble be more realistic? It seems like provide for children. or what if the sounds off? When is too low.
0	2.5 min	2	Cannot know what it mean. It is just like a game of touchy bubbles. I want a DRY comes to draw or write some thing. For me.

Appendix

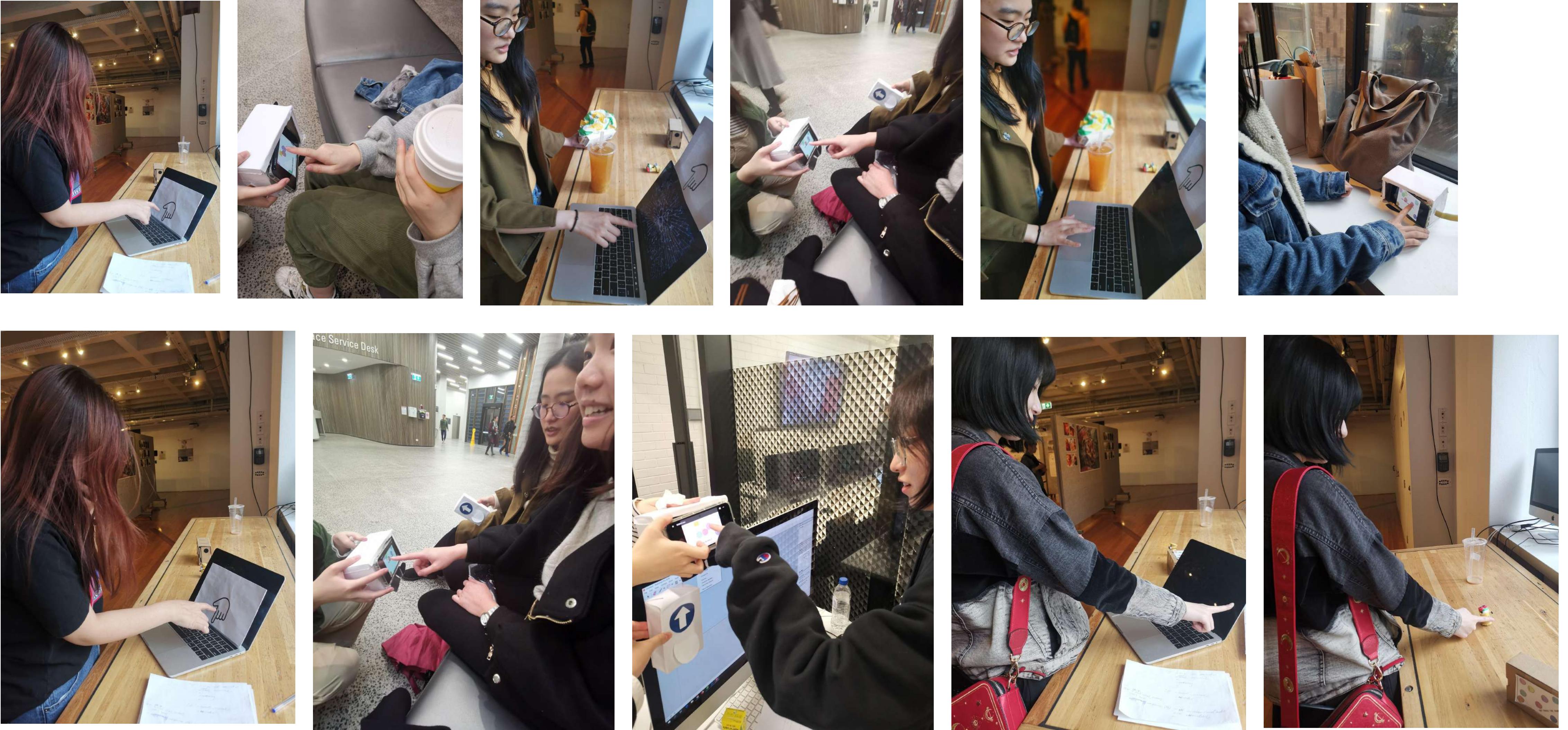
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User Evaluation Pics



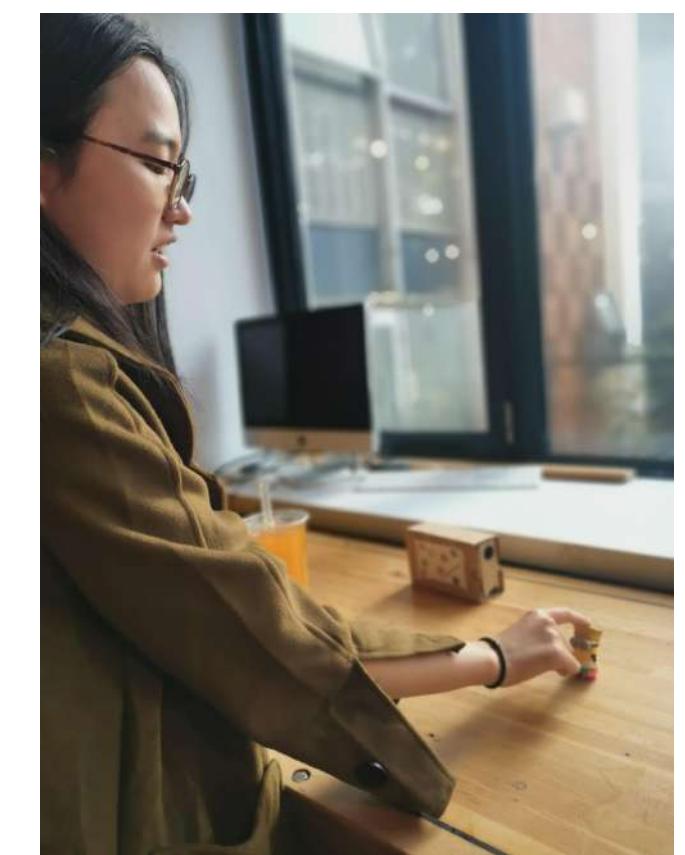
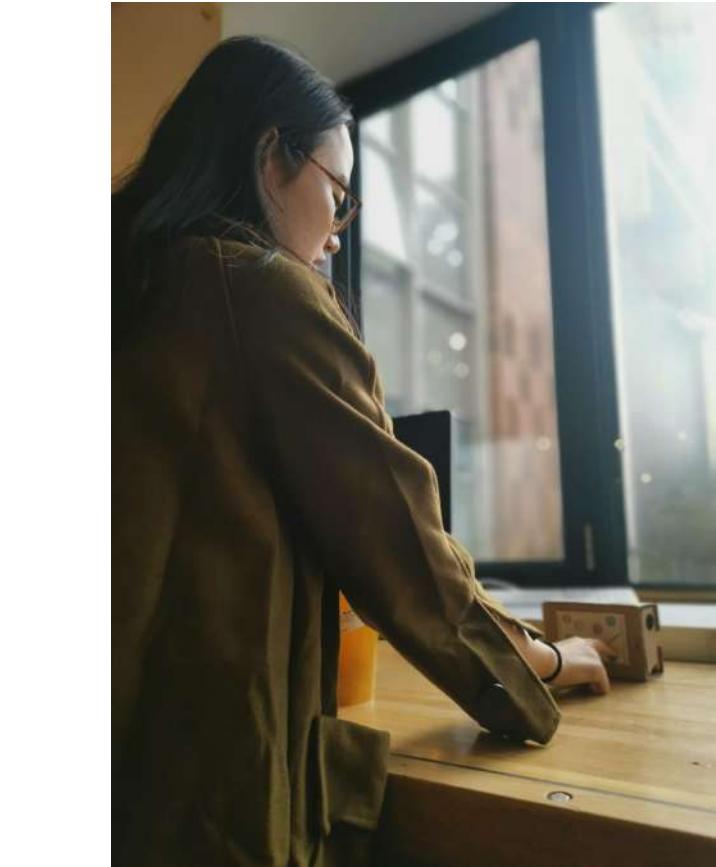
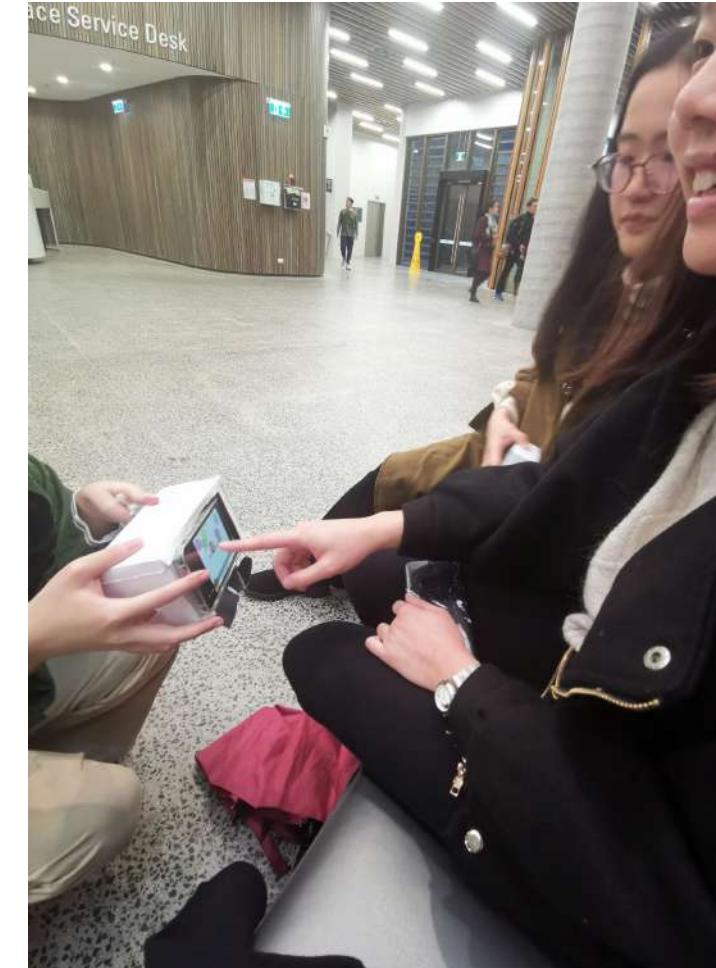
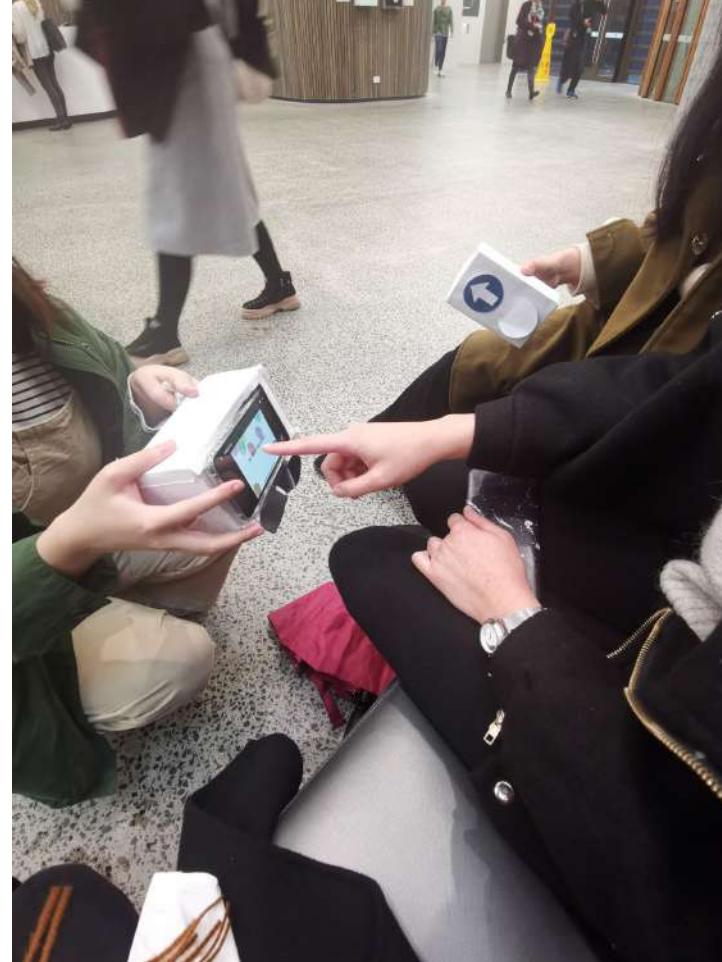
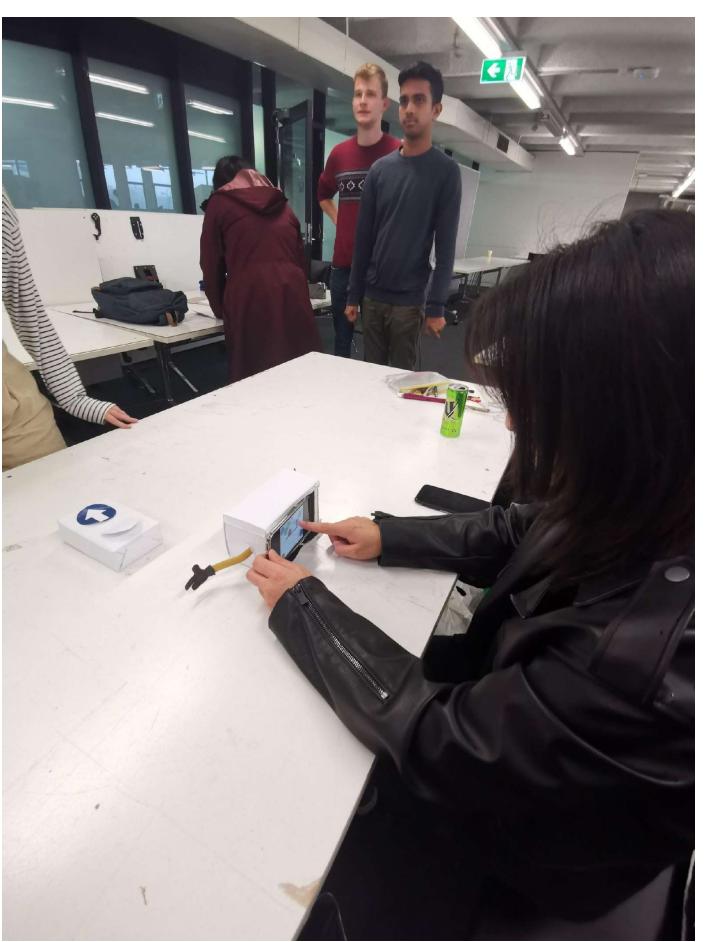
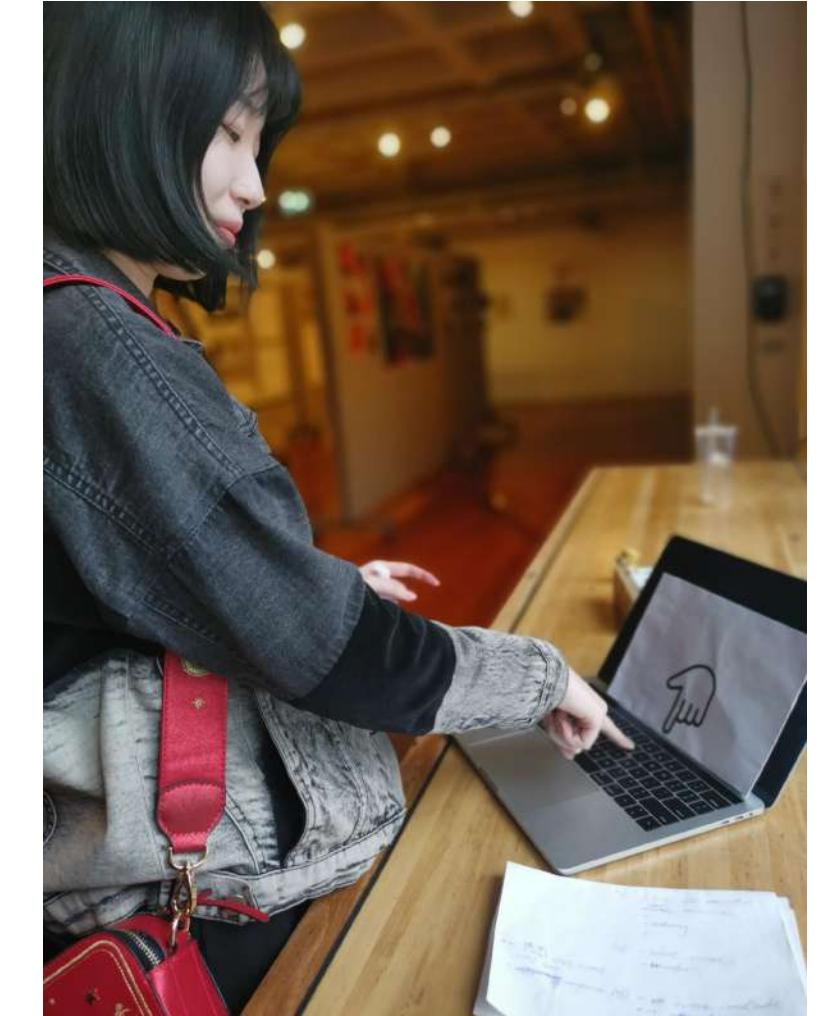
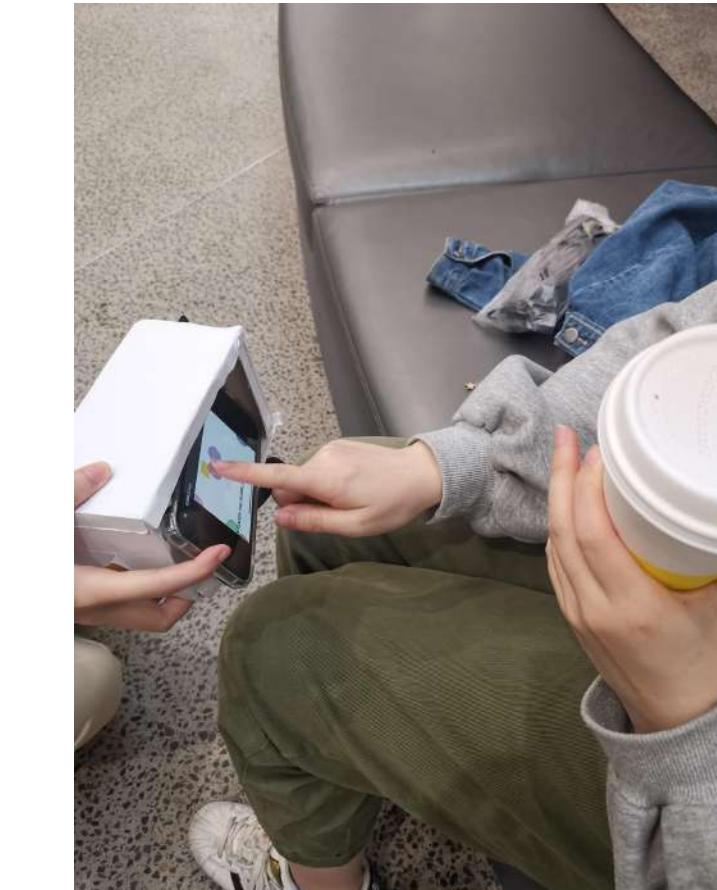
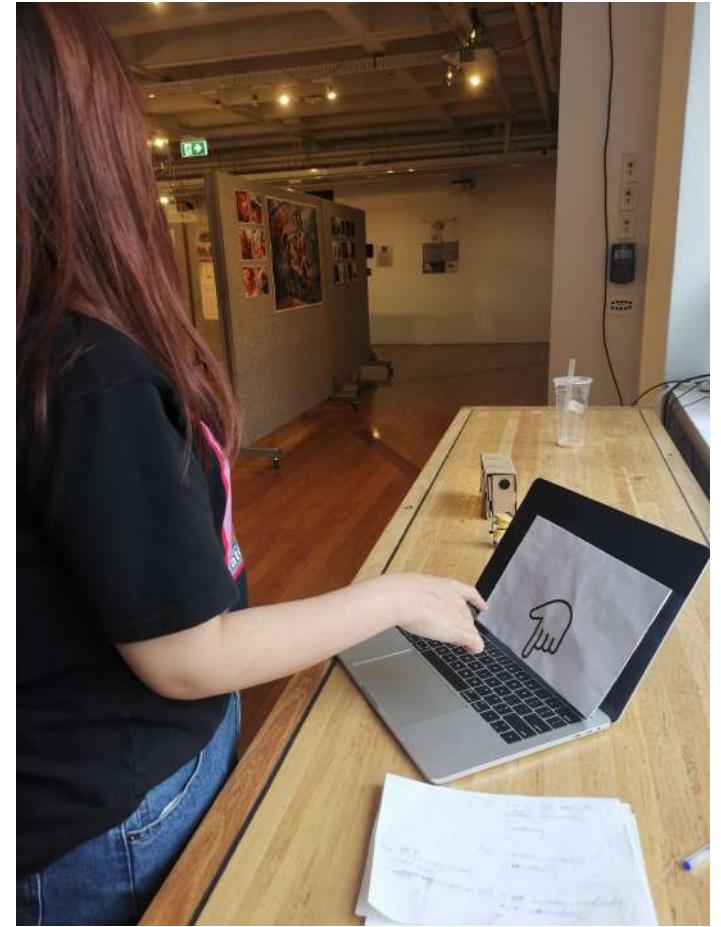
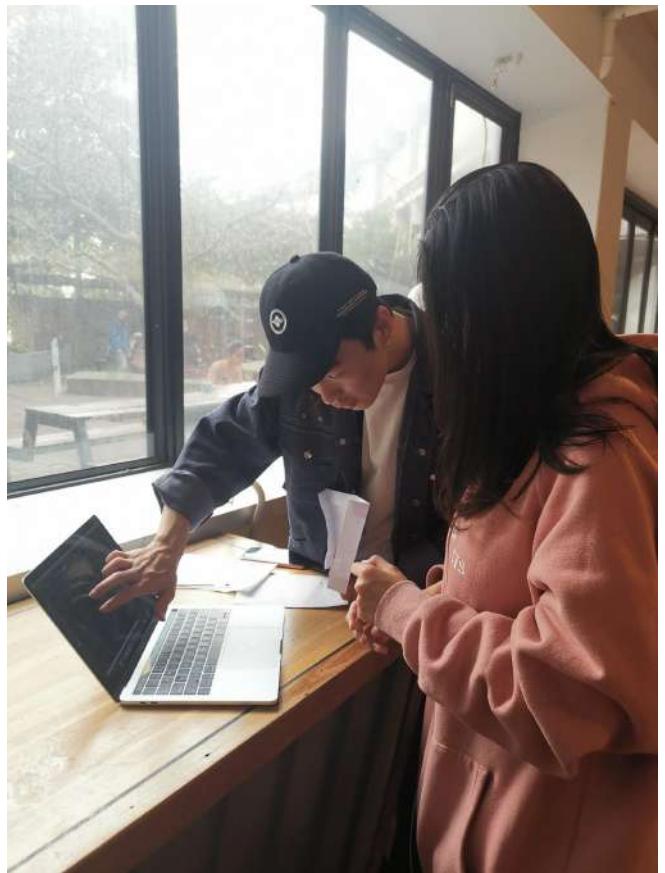
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User Evaluation Pics



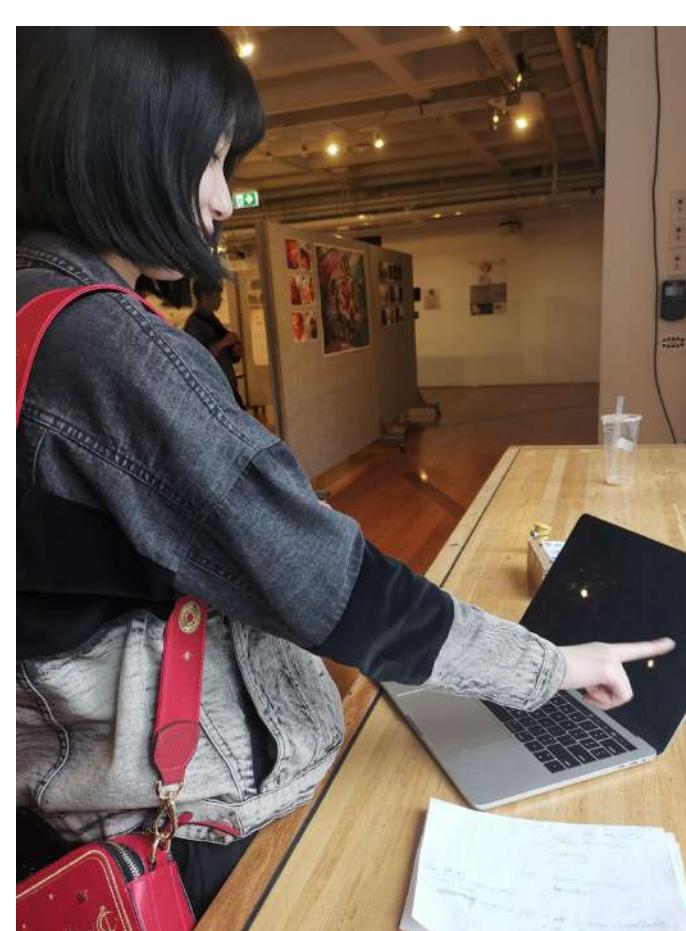
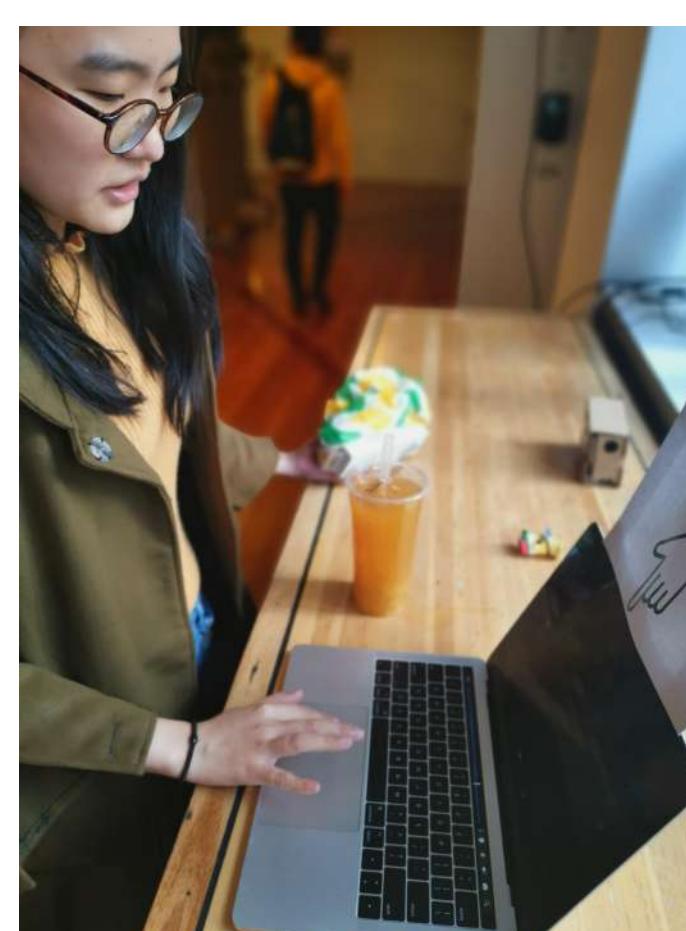
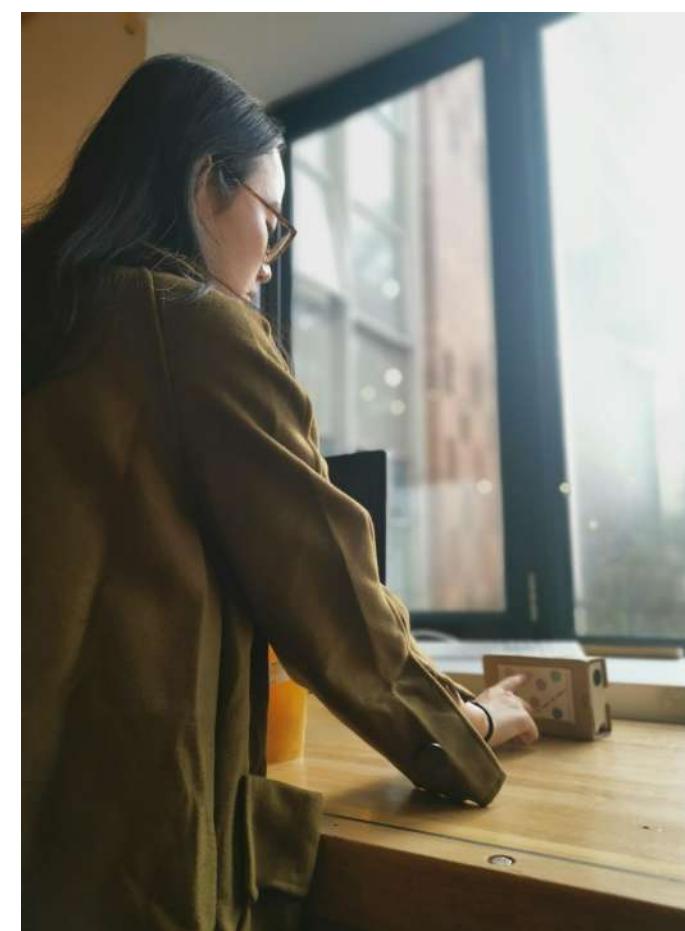
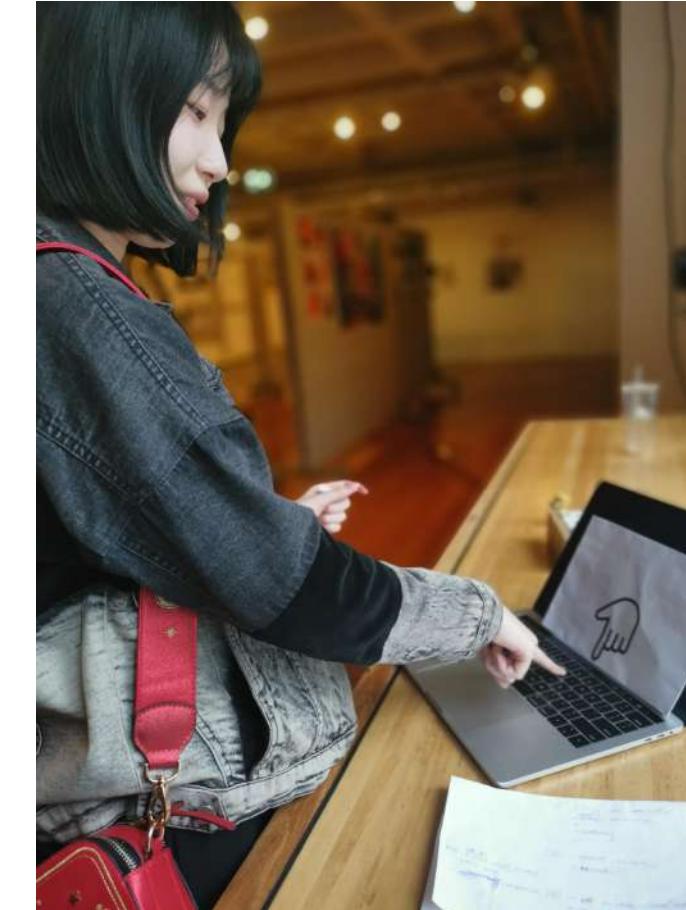
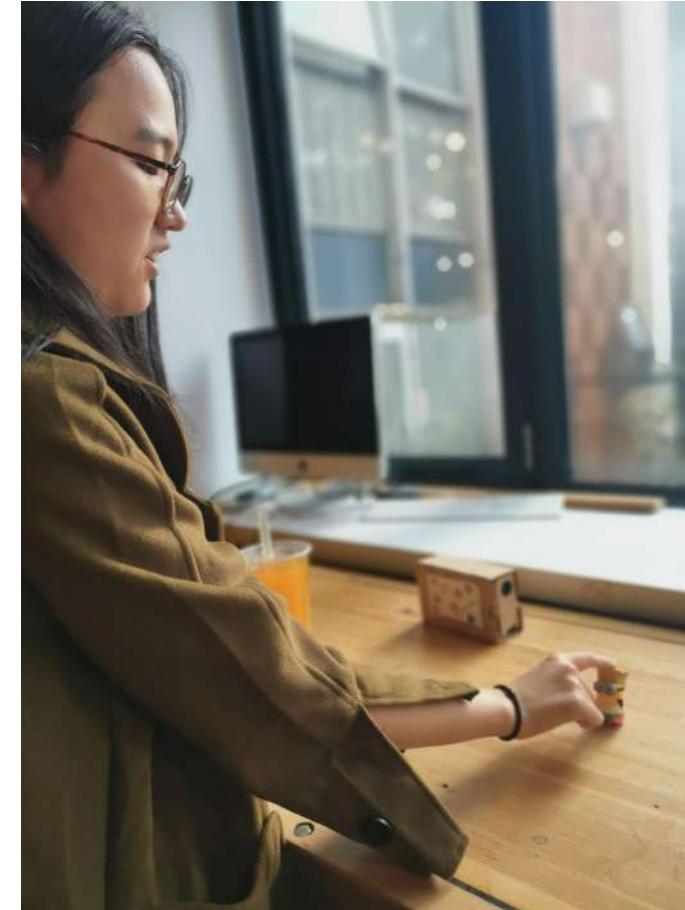
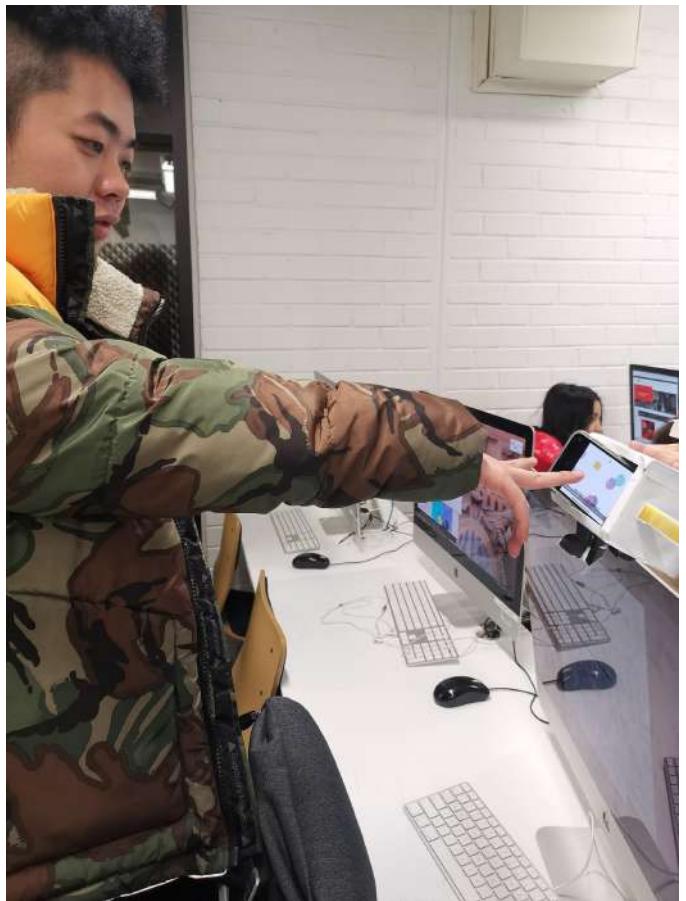
Appendix

User Evaluation Pics



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