

Master thesis

Chachat: towards a design to support Chinese young adults' mental health during quarantine in corona crisis

MSc. Design for Interaction

Master thesis

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Last but not least, thanks to my parents for supporting me during the two years, no matter financially or mentally.

Introduction

23rd of January, the city where I live from my childhood Wuhan was announced to be locked down because an unexpected monster - the coronavirus. Nobody has experienced the situation before, which sounds like a movie plot. My family and friends there are forbidden to leave the city, leave the house. Their world became as small as the room, knowing the outside world via screens even though could not do anything to change the situation. Since then, the news of the epidemic occupied their lives, checking the number of death becoming a necessary and annoying daily routine.

Staying in a place 8800km away from them with worries and feeling helpless made them and me also suffer. Lucky or not, I got the chances to talk with my family and friends over 2 hours frequently, which I never did before. They appeared optimistically but I could feel their difficulties from their endless desire of telling.

My thoughts about a subject for my graduation project were conceived weeks later when my shocks and worries were gradually self-controlled. How could a designer help people with mental health in this situation? According to this question, this project explored the stories of the people who live in this special situation and found design intervention possibilities.

As part of the master Design for Interaction, this final report will explain the main process of the project, including main factors about the context, the used methods to explore the context and to generate ideas, the concepts and final design. The report ends with a conclusions and recommendations for further development.

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Executive summary

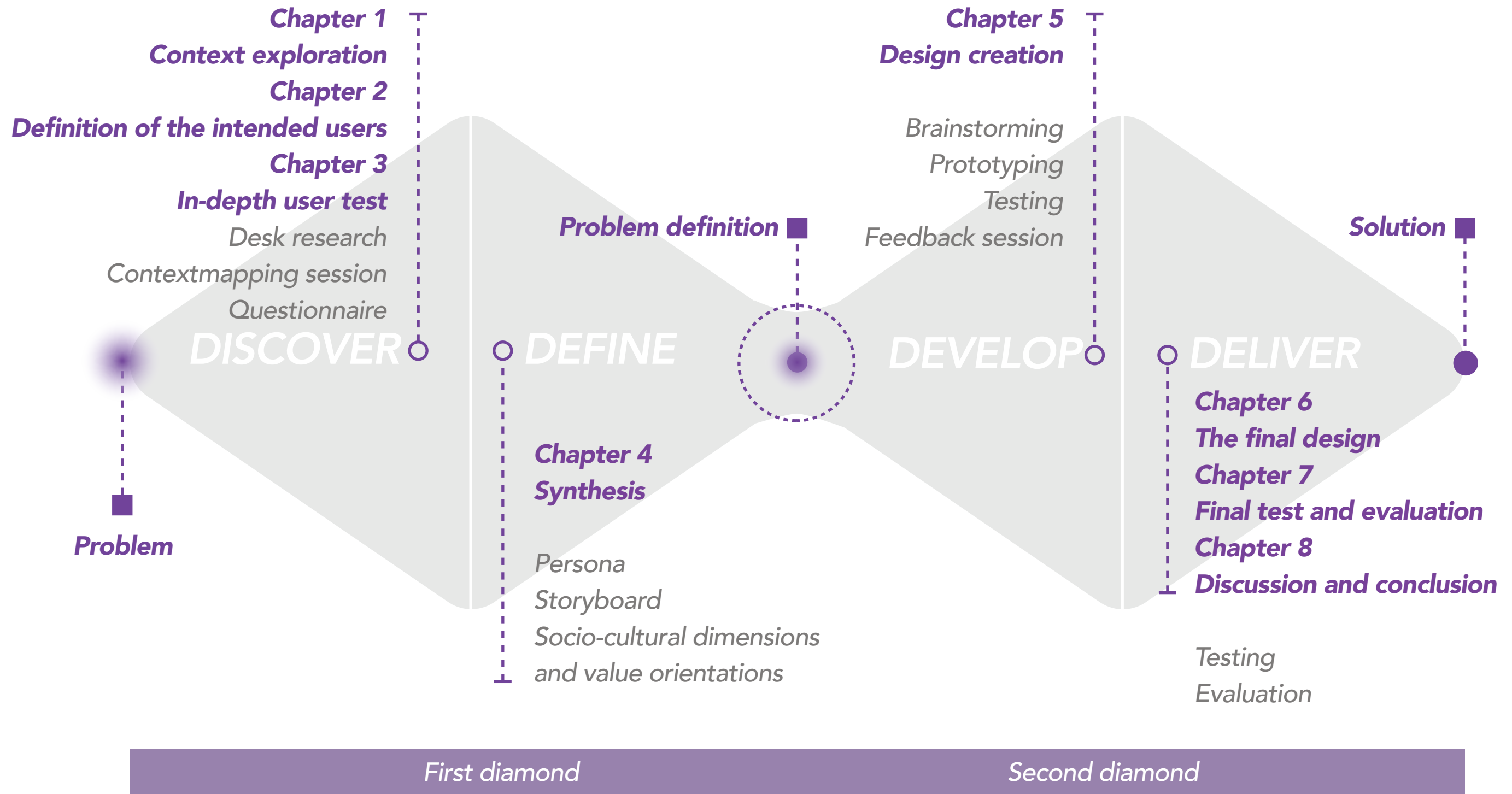


Figure 0-1: overview of the project A graphic based which is made based on Revamped Double Diamond Design Process Framework (design council, 2005), the original model provides a structured way to guide designers through the way of tackling a challenge, it presents a linear process in four phases, discover, define, develop, and deliver.

Introduction

This master graduation project was started from the current issue - COVID 19 crisis, explored a special context - the first quarantined city, Wuhan. The main purpose of this project is to get deeper understanding of the people who were quarantined at home for long time, and try to use interactive design to help them improve their mental states during quarantine life. This thesis project consists of five phases, context exploration, user research, research synthesis, design creation and verification.

Figure 0-1 shows the overview of the project approach and how it is structured in this report. Based on the Revamped Double Diamond Design Process Framework (design council, 2005), this project was followed a linear process in four phases, **discover**, **define**, **develop**, and **deliver**.

Discover

Discover was a diverging process that aims to collect information and open up the eyes. Five explorations with different goals (Exploration A-E) were conducted as research activities in this phase with two parts - context exploration and user research (Figure 0-2), which presented in Chapter 1 and Chapter 2. During the context exploration phase, the aim is to gain basic knowledge and comprehensive information in the context, including the current situations and the contextual constraints. Desk research is the main method to explore existing knowledge on the general background. Therefore, the scope is relatively broad. After that, the research scope was gradually narrowed down based on the findings from the previous research, and the focus on the intended users. User research was conducted to gather opinion from target

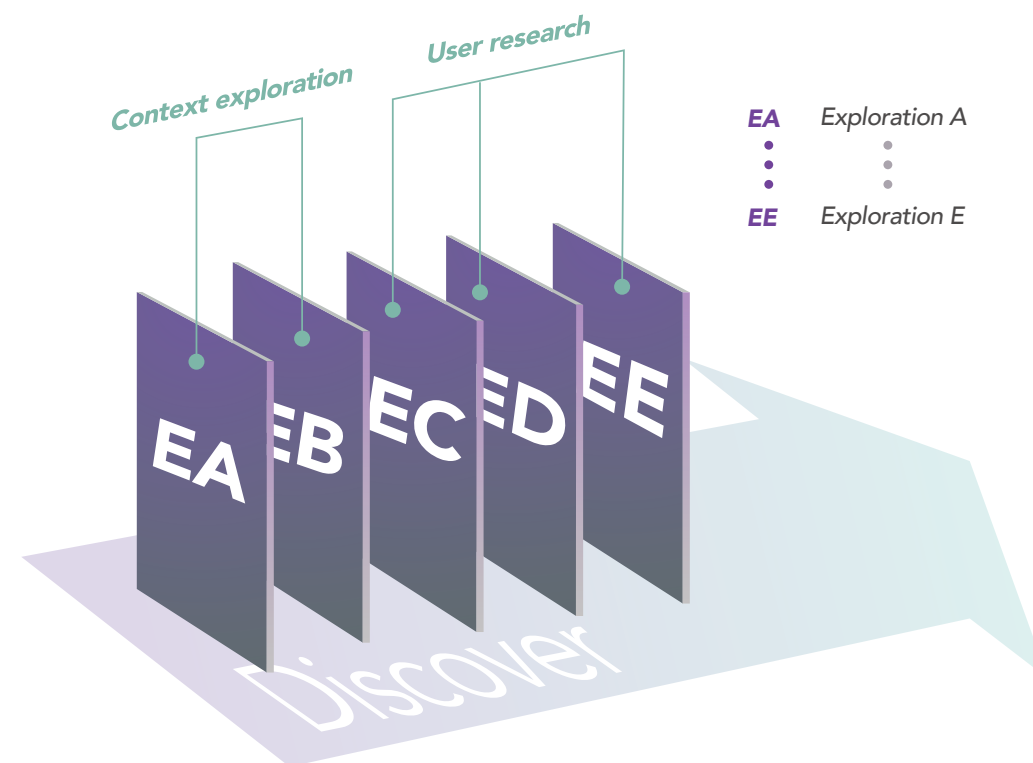


Figure 0-2. Five explorations were conducted in 'discover' phase

group. Several user-centered methods were used, for example contextmapping session, online survey and interviews. The insights from this phase benefit the next phases as solid evidence.

Define

In define phase, all the data collected in the research phase was clustered, analyses to form a synthesized overview and therefore lead to a redefined design goal and design directions. Combining insights gathered from these research activities, a concrete project definition was obtained. Additionally, methods such as persona and storyboard were used in this phase to summary and communicate the significant insights.

All of these contributed the design goal of the project -

"Towards a design to support Chinese young adult's mental health during quarantine in corona crisis".

Moreover, the specific requirements were listed as the evaluation criteria of concepts. The specific explanation was presented in Chapter 3.

Develop


In conceptualization stage, several rounds of ideation were performed to generate initial concepts. According to the requirements and the difficulty of the implement, one concept was chosen for further development. Then a low-fidelity wireframe was used to fast-iterate the concepts by walkthrough.

Deliver

The final concept was then concluded in the final phase of verification. The digitally interactive prototype was built for evaluation of the effectiveness and usability. The evalua-

tion results were analyzed to see whether the final design meets the design goal and how participants experience the design. Due to the restriction of the social distance policy, most offline activities were prohibited, more than half of the evaluation tests were done via internet.

The future recommendation has also been proposed in the last stage.



Chapter 1

Exploration of the context

In this pre-concept stage, there was still a lot of latitude for finding new opportunities. To develop a design goal, it was needed to define the context in which the design intervention would take place.

The preliminary research was conducted in this chapter , various explorations executed to understand the context, to further delineate the context and to determine the focus users and understand their needs and desires. Different research methods were taken in this phase for capturing the insights. First, this section introduced the project by a project scope. Followed with the context exploration via 3 exploration with different research goal. The first exploration provided a general description of when, where and how this context took place. The second exploration addressed the design purpose of the project - mental health care under this context. The knowledge acquired from these studies benefits the in-depth user research and the analysis in the context.

1.1 Scope of the design project

1.1.1 How did the project generate



project was gradually generated in my mind. The topic though conceived from a specific personal experience, it would be started as a board scaled exploration for deeper understanding of the problem.

The project was firstly inspired by my personal experience:
In January, 2020, unexpected COVID - 19's outbreak shocked a lot of people including me, specially when I heard Wuhan, where my family and friends lived in was locked down and all the people were not allowed to get out of their house. In the first two month s' quarantine time, one of my friends usually spent hours a day talking with me and shared her experiences and thoughts with me and I found that she was really anxious. Actually, it was not the only issue for her. People were afraid what may happed since nobody experienced this situation, they were worried about how to get food, how to work, how to get a treatment if infected, etc. Instead of the practical troubles for living, the negative emotions created more bad influence.

How could a designer help these people with their mental problems in quarantine situation?

Regarding to this design question, the

1.1.2 Scoping the project

As a self-driven project without a client, the starting point, project's opportunities were needed to be discovered and the design direction and design purpose were needed to be self-determined.

The most exciting and challenging phase in the project was at the very beginning - to excavate and understand and the related elements around the topic. It involved not only divergent thinking for finding more valuable insights but also convergent thinking to gradually narrow down the range of the topic for establishing the design goal in the next step.

The scoping diagram (Figure 1-2-1) is an overview of this chapter, it shows the several scale levels of this project context, also presents the two explorations that I have conducted against different context scope.

Along the big arrow on the background, there are 3 big ellipses shows the trend of the project scaled in this research phase. Different layers of ellipse in this figure represents the topics that are explored on different scales. From left to right, one more dark purple ellipse inside the big ellipses is overlaid from previous one which stands for the reduction of the project scale according to the research. In addition, the purple rectangle cards with 'EA' and 'EB' represents the explorations that I conducted at different stages.

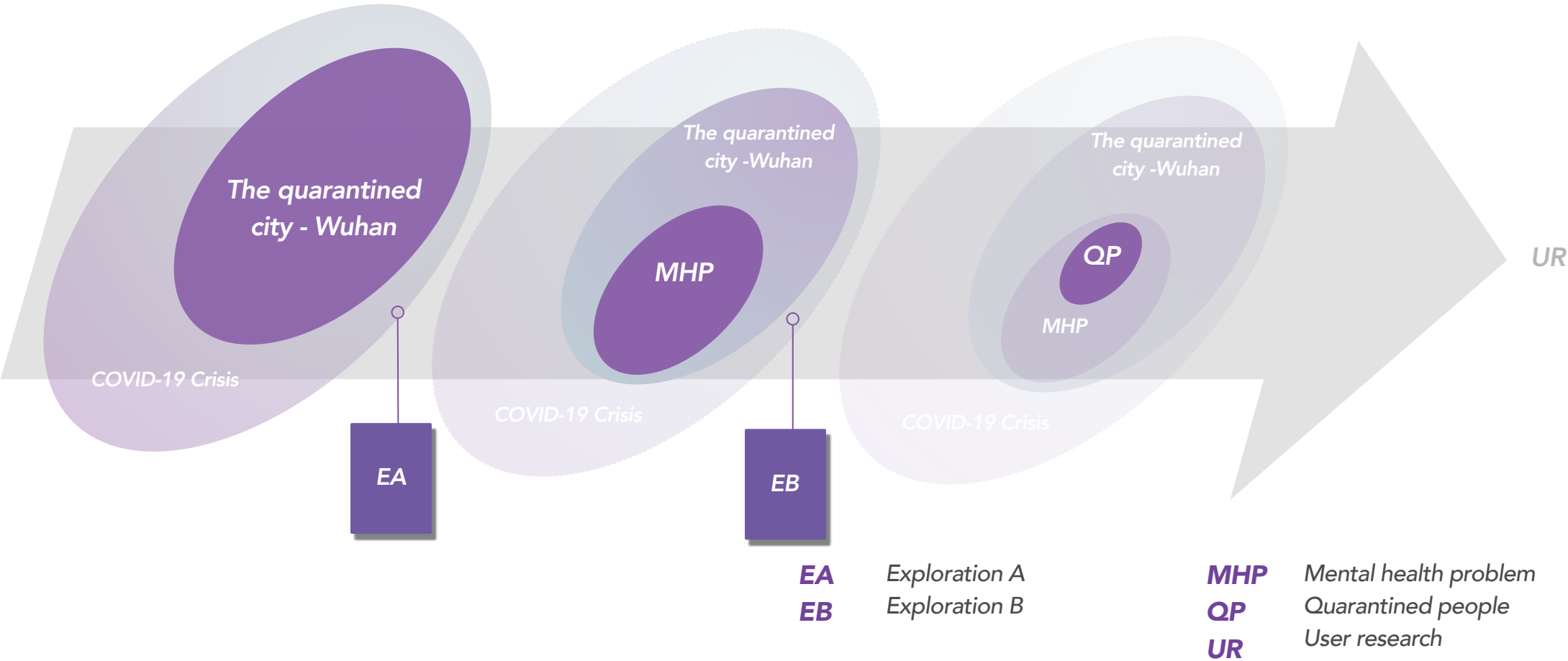


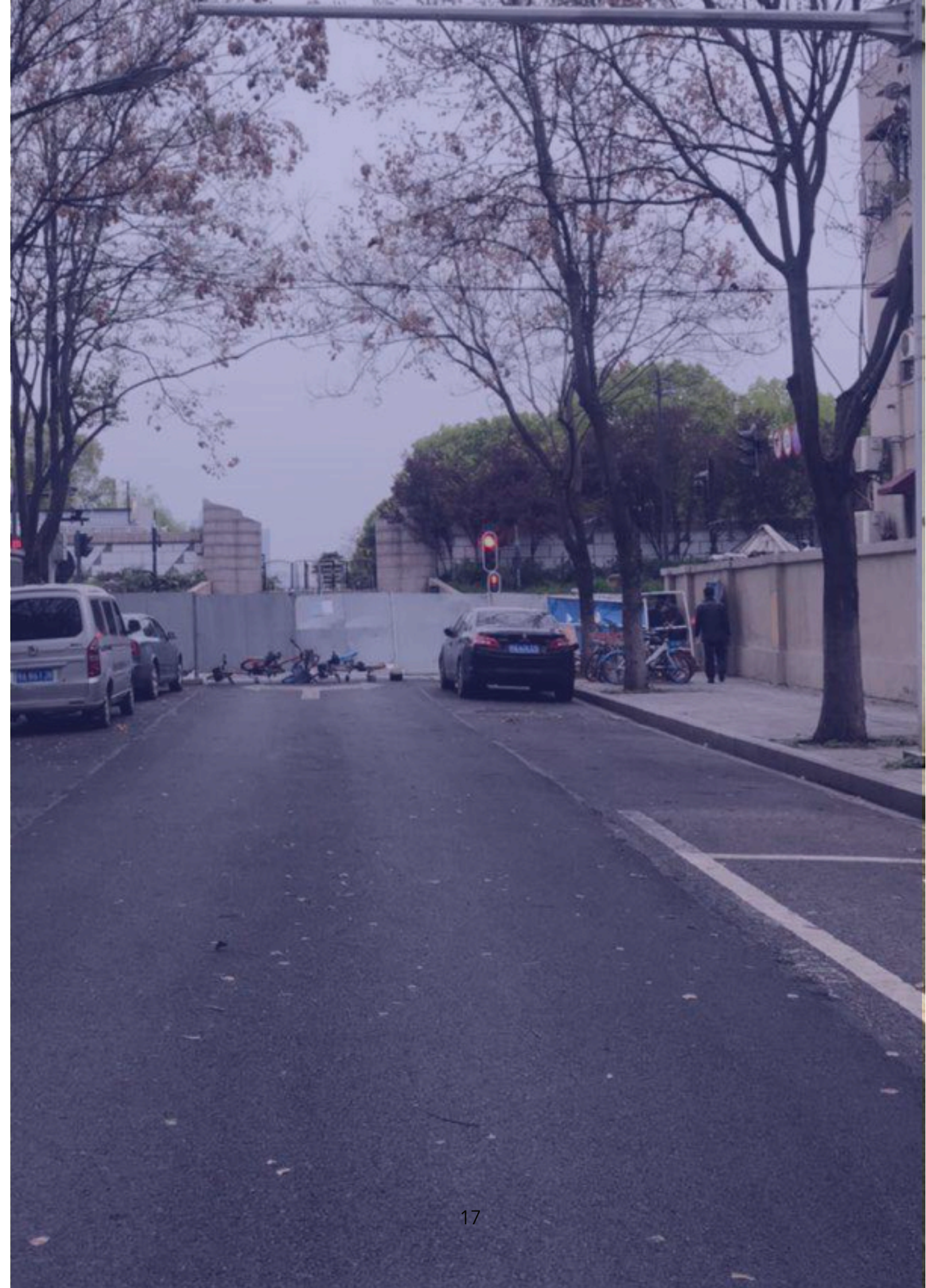
Figure 1-1-2-1. Scope of the design project

Discussing from the first big oval. As the beginning of the research project, a general explanation of the context background - COVID-19 pandemic in 2020 was needed to be firstly introduced, therefore Exploration A was conducted. The epidemic was a severe crisis in China when the topic just proposed but gradually became a worldwide crisis while project processing. Since the project was conceived when the COVID-19 epidemic just outbreak in China, it mainly focused on the Chinese context especially the most severely affected area - Wuhan as the research target. As the first city was locked down during this epidemic, Wuhan became famous globally, 'Wuhan lockdowns' was the common headline of the news websites around the world which triggered hot debates in a period of time. The introduction of this city and its lockdown situation was also in this Exploration A. Furthermore, what happened at the early stage of the epidemic inside this city were also briefly introduced in chronological order.

The second of the big oval represents the main topic I concentrated on in this project - peoples mental conditions in this special situation. Since all the people in Wuhan were quarantined at home more than 1 month when this research was processing. Some literature supports about mental problem in quarantine were found to explore the feasible possibilities of design invention of this psychological topic in Exploration B. Moreover, from the research insights, considering the feasibility in psychological field and accessibility of people, the scope of the intended user group was reduced in this stage. Which brought convenience and efficiency for the next level research.

The third big oval shows the determined project scale at the end of this context explo-

ration - the quarantined people in Wuhan with mild mental health problem which is also the beginning of the following in-depth user research.



1.2 Introduction to the problem and the targeted context

The project was started with obtaining a thorough understanding of the project context. Exploration A was organized as the starter of this research (Figure 1-2-1). This exploration covered a comprehensive introduction. Starting from a broad perspective of the COVID-19 crisis, WWWWH (Who, What, Where, Why, How) checklist was used here for deconstructing the context, through this method, a holistic overview of the context was outlined with time, location, facts, influence, etc.

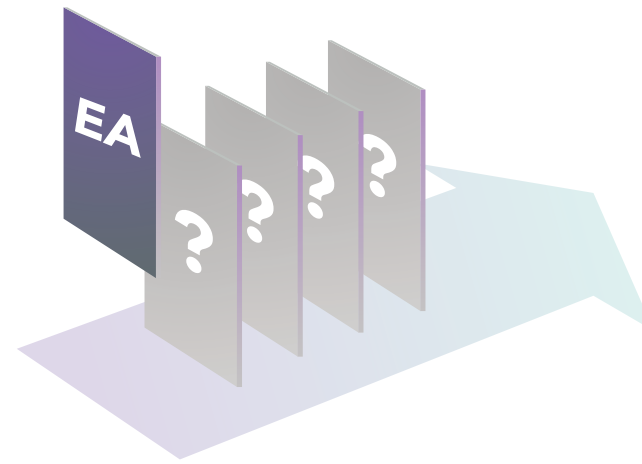


Figure 1-2-1. Exploration A was conducted in this section

EXPLORATION A

Research goal:

1. Obtaining a thorough understanding of the project topic and then extensively analyze of the problem.
2. In addition, finding design possibilities and challenges in the context was also an essential task in this exploration.
3. Laying a knowledge foundation for the further in-depth exploration, which could avoid creating barriers while communicating with users in subsequent user research.

Research question:

1. What is the COVID-19 pandemic and quarantine? What has been influenced because of the pandemic?
2. When and where does the context take place?
3. Who are involved in this context?

4. How does this crisis outbreak? Why do people need to be quarantined?

Approach

Desk research

To gain a broad understanding of the field, desk research is suitable at the beginning phase as a low cost and high efficiency technique. It was basically involved in collecting data from existing resources. In this exploration, information about the COVID-19 was mostly collected from official websites (for example the websites of World Health Organisation (WHO), the websites of Chinese government) and research papers. Some data about local activities and events in Wuhan was collected from some news and reports.

WWWWH

WWWWH (Who, What, Where, Why, How) is a checklist of most important questions to be asked to analyze the design problem. (Delft Design Guide) In this phase, as a starting point of the project research, the topic was still broad and complicated. By listing the questions, setting the priorities, finding the answers of the questions, this method helped me deconstruct and define the preliminary problem systematically.

1.2.1 COVID -19 pandemic

Introduction

Coronavirus disease 2019 (COVID-19) is an ongoing infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and its outbreak occurred in Wuhan, Hubei Province, China, and spread across China and beyond [3].

On 30 January 2020, the World Health Organization (WHO) declared the COVID-19 outbreak a public health emergency of international concern (PHEIC). On 11 March 2020, it was firstly declared as a pandemic and local transmission of the disease has occurred in most countries across all six WHO regions.[4] As an ongoing pandemic, more than 32.6 million confirmed cases have been reported across 188 countries and territories (see Figure 1-2-1-1), resulting in more than 990 thousands deaths. More than 11.9 million people have recovered

(till 26 September, 2020). [5] This pandemic presents people around the world with a common challenge. Although everyone is in a different situation, no one is immune to the pressures of it.

Highly transmissible disease

The virus is primarily spread between people in proximity, most often via small droplets produced by coughing, sneezing, and talking. The droplets usually fall to the ground or onto surfaces rather than traveling through air over long distances. However, the transmission may also occur through smaller droplets that are able to stay suspended in the air for longer periods of time in enclosed spaces, as typical for airborne diseases. Less commonly, people may become infected by touching a contaminated surface and then touching their face. It is most contagious during the first three days after the onset of symptoms, although spread is possible before symptoms appear, and from people who do not show symptoms.[6]



Figure 1-2-1-1. COVID -19 pandemic dashboard

Prevention measurements

Since there are still no vaccines nor special antiviral treatment for COVID-19 [7], recommended measures to prevent infection include frequent hand washing, maintaining physical distance from others, covering coughs, keeping unwashed hands away from the face and social distancing (reduce contact of infected persons with large groups by closing schools and workplaces, restricting travel, and cancelling large public gatherings). [8] Quarantine, as the most direct and efficient measure for cut the infection source was also implemented in several countries. The disease was in remission in many regions after the implementation of social distancing and stay-at-home orders, those regions have been able to sustain an effective transmission rate (" R_t ") [9] of less than one.

1.2.2 Quarantine in Wuhan

On 23 January 2020, the central government of China imposed a lockdown in Wuhan (the capital city in Hubei province) and other cities in Hubei in an effort to quarantine the centre of an outbreak of coronavirus disease 2019 (COVID-19), this action is commonly referred to as the Wuhan lockdown. With this special action, nobody could leave or enter the city without permission during the quarantine period. The research target area of this project is Wuhan.

In Figure 1-2-2-1, a person with a face mask is crossing the empty street. This picture was taken in January while people could go out for shopping but actually in a later stage of the epidemic, people were even not allowed to leave the house. In order to know why this lockdown action was taken, a brief introduction of this city will be given.

Wuhan is the largest and most populous city in Central China with more than 11 millions people.[10] It is also a transportation hub in Central China especially for railway transport. Since 2013, Wuhan's railway passenger vol-



Figure 1-2-2-1 : A man wears a mask in a deserted street (source : <https://metro.co.uk/2020/01/27/eerily-empty-streets-coronavirus-panic-grips-chinese-cities-12131110/?ito=cbshare>)

ume surpassed Beijing's and reaching 120 million passengers, ranking first in the country and becoming the largest transit station for railway transportation in China. [11] This highly dense situation makes Wuhan a dangerous place for spreading the virus. Therefore, to prevent further diffusion of the virus, the Chinese government decided to entirely lock down the city. This meant that from now on hardly any person could enter or leave the city. Moreover, people were obliged to stay at home and only were able to walk out of their home when picking up

supplies and throwing away the garbage. Figure 1-2-2-2 is a picture which was taken on Yanjiang Avenue in Wuhan in February. It can be seen that this road is blocked by a wall made of iron sheets, and a staff guarded door which can only be passed by one person is on the right corner. Actually this door was not existing for people leaving and entering the area, but for people picking up the food and stuffs they ordered online. This is a very common sight in Wuhan at that time. In order to restrict the movement of people in the city, the entire city was divided into small pieces



Figure 1-2-2-2: A blocked road in Wuhan (Photo by a interviewee in this project)

with metal plates. People could not leave the area where their home was located.

1.2.3 The outbreak time

The officially announced time of COVID-19 epidemic is early 2020, several days before the New Year's Eve of the Chinese Spring Festival. The time needed to be emphasized because it not only a trigger for the government's compulsive quarantine measurement but also a crucial influenced factor of some traits of the target group in subsequent research.

Spring Festival (also known as Chinese New Year) is the most important festival of the year in China which lasts 15 days. The festival symbolizes the reunion of the family (Figure 1-2-3-1). Due to the changes in urbanization, many people living in small towns and villages choose to work in big cities for higher wages and living conditions. However, Spring Festival is their most important time and opportunity to going back home. Weeks before the Spring Festival, there is always a large



Figure 1-2-3-1: An impression of Chinese festival activities (Source: http://photos.caixin.com/2012-01-20/100350215_3.html)

number of people leaving from big cities such as Beijing, Shanghai, and Guangzhou to spread across the country which creates a major shift in the flow of people every year. There is even a proper term in China called "Spring Transport period" for such a period of time. While Spring Festival coming, it is very difficult to buy the tickets for long-distance bus, high-speed rail and flight, therefore, people usually book tickets online more than a month in advance.

Wuhan was locked down at 23 January, one day before the New Year Eve, which means most of the people had already came back home and spend time with their families for the annual reunion dinner, although some of people were not able to go home in time. In addition, an important traditional activities in Spring Festival is 'Pay a new year call' which means people will buy some gifts and visits their relatives and friends to bring their wishes to others. After the outbreak of COVID-19, all these kind of activities was forbidden, which prevented a lot of the opportunities of spreading virus.



Figure 1-2-3-2. 'Spring Transport period' (Source : <https://www.boxun.com/news/gb/china/2020/01/202001211354.shtml>)

1.2.4 The impacts in the epicenter

For clearly explaining the influence in Wuhan in the early stage of the epidemic, I made an illustration (see Figure 1-2-4-1) of the main influence from four aspects - the facts happened in Wuhan, people's behaviors, people's thoughts, and the supports for the epidemic.

The information in the graph were collected from some news, reports, websites of local government and charity organizations and some interviews with the people in Wuhan. All the information was presented along the timeline which was on the upper part of the figure. The cure above the time line showed the numbers of people diagnosed and deaths in Hubei Province during the early stage of the epidemic (since the data was published by every province, and Wuhan is the capital city of Hubei province) Four aspects of the impacts was presented below the timeline.

The facts

As mentioned before, to prevent more people infecting the disease, the compulsive quarantine measure are take in Wuhan on 23rd of January. This measure decreased the

risk of infection in other cities but also brought an unexperienced life for the people in Wuhan. Also, at that time the coronavirus was called 'Wuhan virus', hot disputes started appear online with comments involved regional discrimination which also brought negative influence to the people in Wuhan. Within a week, most shops were closed or open for a limited time, all public transportations in city stopped and road blocked people have limited time for getting out for shopping.

Things rapidly went worse since the severe shortage of medical resource, medical equipment and personnel in Wuhan, patients could not be diagnosed and treated immediately. At the same time, China National Health Commission started released real time visual data tracking of the epidemic. Which brought convenience to people to know the latest news and information but also to some extent spread the tense atmosphere about the epidemic.

People's behaviors

The second row below indicated people's behaviors after the every updated policies promulgated and information about the epidemic released. Although some people left Wuhan as fast as possible, most of

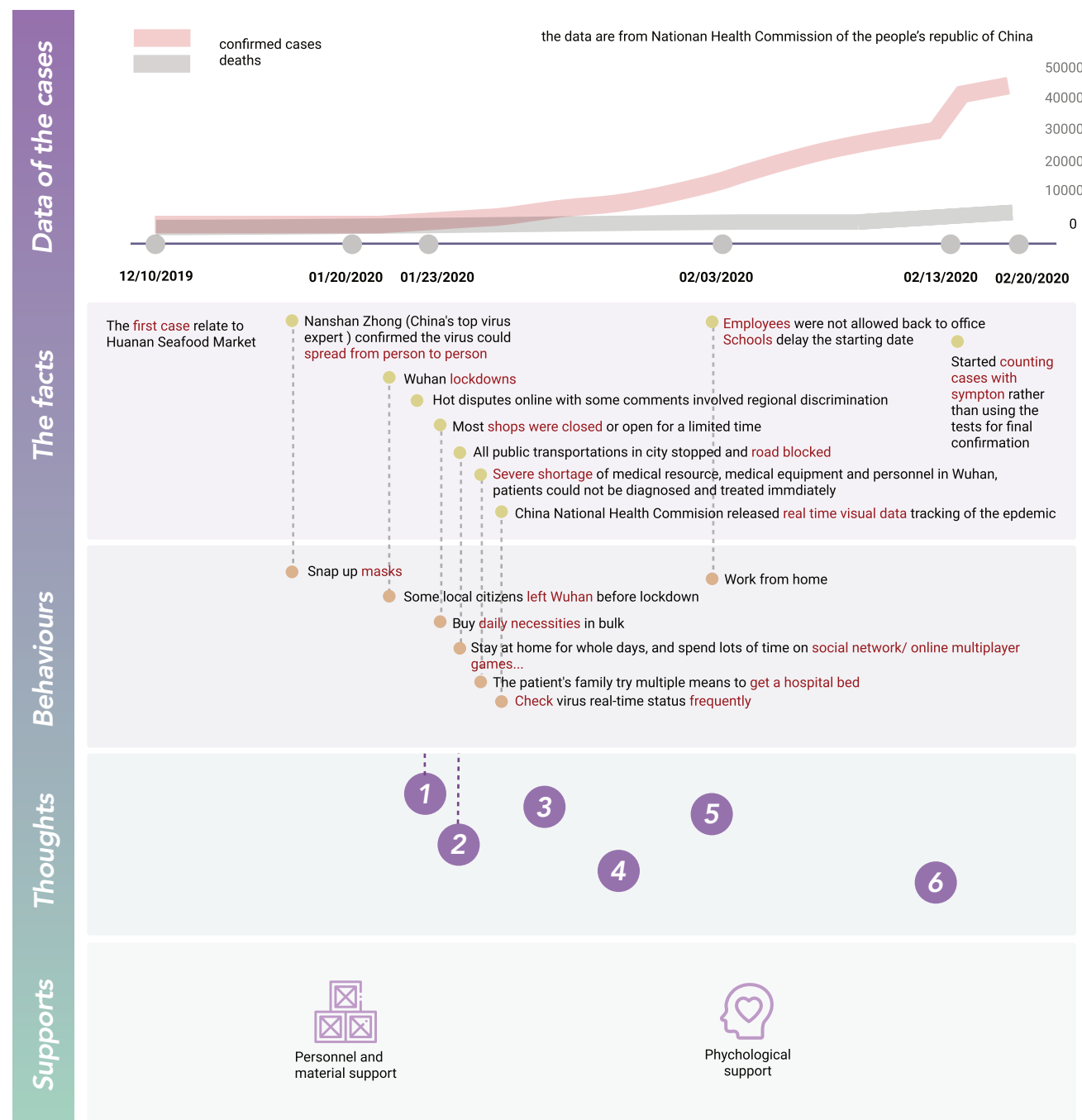


Figure 1-2-4-1. The impact of epidemic development on people live in Wuhan

people stayed and isolated themselves at home. They snapped up mask and bought daily necessities in bulk. Internet gradually played more and more insignificant part of people's life. They needed to spend lots of time online checking the virus real-time status frequently and gaining the updated information about the epidemic, since internet is the easiest way for to know the outside world in this period. People connected other's by so-

cial network, worked online, played games online, even bought daily supplies online.

People's thoughts

I collected some quotes from some interviewees when I generally talked about the epidemic with them. It could be seen that the quotes were represented the worries they had the feelings they had when something happed (Figure 1-2-4-2). Moreover, what



Figure 1-2-4-2. Quotes of the people's thoughts

they told was also impressed some negative emotions which showed some mental states of these people.

Supports in Wuhan

Two types of supports were given from the local government, some organizations and warm hearted people.

Here are some examples of these two types of supports:

Personnel and material supports:

- Money donations initiated by official organizations and famous people (for example some movie stars) Life necessities donated to various companies and citizens.
- Medical staff volunteers from other cities/ countries gathered in Wuhan.
- Several emergency specialty field hospitals also constructed as fast as possible.

Mental supports:

TV series' and movies' copyrights are do-

nated

- Spontaneous encouraging video/essay/ spread on social network
- Some academic resources are open to the public
- Some movies stars and influencers release charity singles
- Spontaneous encouraging video/essay/ spread on social network
- State broadcaster China Media Group has hosted the streams from the construction of the emergency specialty hospital to isolate people.
- 24-hour mental health support telephone hotlines
- Some teachers in school were trained to give psychological consultancy to students

Key takeaways

It can be seen in the previous introduction that the accidental outbreak of COVID-19 epidemic brought significant influence to the people who lived in the epicenter.

With the continuously promulgated policies and measurements from local government, people in this city experienced unpredictable things every day. The space for people's activities was restricted, the living environment and the people they came into contact with every day were also changed. All of the changing factors created people's different behaviors, emotions, even the value of their lives.

After gaining this information and piecing together the information, more curiosities and interests came to my mind, which generated a series of question:

How people specifically live in a quarantined city during this epidemic?

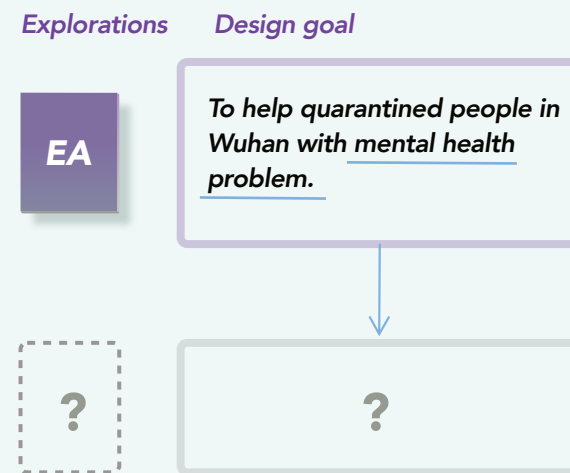
Do they have a particular lifestyle?

What were the mental states of these people?

Were there any changes in people's relationship?

These questions provided some potential design opportunities and directions. Based on these questions, subsequent research was planned to find the answer.

Design goal iterations



1.3 Mental health issues in the COVID - 19 crisis

This section was based on the question from the previous exploration - 'what is the mental states of the people in quarantine'. After obtaining a general overview of the context and some, this stage was going to focus on mental health issue in quarantine situation. Exploration B was conducted to collecting more information and knowledge about mental health topic, also to discover the design opportunities.

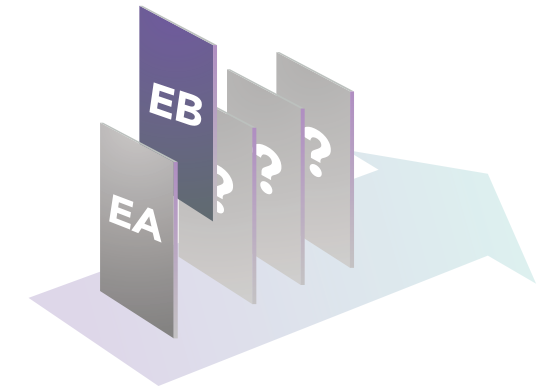


Figure 1-3-1. Exploration B was conducted in this section

EXPLORATION B

Research goals:

To gain more knowledge and literature support about people's mental health in quarantine during the epidemic.

To explore the feasible possibilities of design invention as a non-professional of psychological topic.

Research question

Why mental health issue counts in this context?

What is the current situation of the mental health support in this context?

What factors influence people's mental health in quarantine situation (in the context of this project)?

How to find a more specific design target in mental health scope?

Approach

Desk research

1.3.1 Psychological impact of quarantine

As the healthcare system strains to battle the coronavirus epidemic, another health crisis appears on its hands: deteriorating mental health. A recent Chinese Psychology Society survey found that 42.6% of 18,000 Chinese citizens tested positive for having anxiety related to the coronavirus epidemic.

Mental health problem in quarantine situation is not only existed in COVID -19 pandemic. Quarantine is often an unpleasant experience for those who undergo it. Separation from loved ones, the loss of freedom, uncertainty over disease status, and boredom can, on occasion, contribute to some severe effects. From the quarantine study of previous outbreaks, some cases happened for example suicide[12], substantial anger, even lawsuits brought [13] following the imposition of quarantine.

1.3.2 Current mental support

In Wuhan, the local governments made great efforts to provide medical supplies and daily necessities for the people in need but not enough mental health support. For better understanding of the measures which had been taken currently, I collected government policies, news, and some actives reports which had positive impact for people's mental states online and classified them into following two categories:

1. Encouragement and distraction

For comforting people in quarantine, short movies about latest information told by Nanshan Zhong (famous authoritative virus expert in China) were frequently posted by mainstream social media, also some spontaneous encouraging video/essay/ spread on social network.

There was one special activity, the State broadcaster China Media Group hosted livestreams from the construction of the



Figure 1-3-2-1. A screenshot of the live streaming of Huoshenshan emergency special hospital construction (source: https://www.youtube.com/watch?v=UvI69beMgQ8&ab_channel=%E6%9F%AC%E4%B8%AD%E6%97%B6%E6%8A%A5)

emergency specialty hospital to isolate people in Wuhan, it involved over 90 millions people watch the livestream (see Figure 1-3-2-1). In addition, some TV series' and movies' copyrights were donated by the movie companies to the local television stations and some academic resources are opened to the public to distract people from the epidemic. Another interesting activity named 'Good night massage Hubei project' by Xinshixiang Company and China Daily was held to exchange goodnight messages between strangers inside the epicenter and outside the epicenter every day, which aimed to built connections among people and encourage them to support each other.

2. Psychological counseling service

Counseling service was the most direct measure for helping people with mental problem. During the epidemic, 24-hour mental health support telephone hotlines had launched across the country, with support from university psychology departments, counseling services and NGOs. Also, a public account on WeChat called KnowYourself opened a green channel for frontline healthcare workers, patients and family members with members of its psychological team chatting with individuals to help reduce panic attacks. In addition, some teachers in school were trained to give psychological consultancy to students.

Limitation

As mentioned, counseling services are the main direct operations for the current issue. But these supports are far from sufficient because of two main reasons.

1. **Mental health still remains a relatively taboo subject to a large number of people in China,**

only a small percentage of people have awareness and are willing to actively seek mental help [13] (Yin, H. 2019). Most of people are not willing to talk about their mental

problem and seek help to others.

2. Since the limited number of psychological experts, there are **a lot of hotlines out there staffed by a lot of volunteers without well-trained, which may do harm more than good.**

1.3.3 Mental health phases

Due to differences in people's age, gender, living environment, etc, people's mental problems are also different. In order to further narrow down the scope of the target group, the Mental Health Continuum Model (MHC model) [14] was used to divide people through their mental health phases.

Figure 1-3-3-1 shows the MHC model that illustrated the different mental health phases people may experience throughout life. It also describes the physical and mental effects associated with each phase and suggests actions that may help. The model includes the following phases:

1. Healthy: Healthy and adaptive coping
2. Reacting: Mild and reversible distress
3. Injured: More severe and persistent functioning impairment
4. Ill: Clinical illnesses and disorders requiring concentrated medical care

People with serious mental illnesses need professional clinic treatment, designer's intervention without expert support and detailed data support is very dangerous for those people.

According to the informally interviewed with 3 people in Wuhan, I find out that all of them mentioned the symptoms of 'nervousness', 'trouble sleep', 'tired/ low energy' which were the symptoms from the second level- 'Reacting' phase of the mental health problem. Also 'anxiety' which belong to 'Injured' phase of the mental problem was mentioned by interviewees. The specific mental states of target users would be discussed in



Figure 1-3-3-1: Mental Health Continuum Model (MHC model) [14], it illustrates the different mental health phases people may experience throughout life. It also describes the physical and mental effects associated with each phase and suggests actions that may help.

the further user research stage.

As mentioned before in a recent study nearly half of the people had anxiety related the epidemic in China, which proved that even more people had mild mental problems. However, due to the prejudice against mental problems, a large number of people were concealed or even do not aware that they had a mental problem. Actually, the mild mental problem could be self-controlled or adjusted after non-professionals' intervention [15]. This showed a great opportunity for design intervention.

Therefore, considering the feasibility of intervention as a designer and accessibility of the intended user, in this project, I planned to focus on the people who's mental health were at 'reacting' level and mild 'injured' level.

1.3.4 Multi-layered mental health support

Regarding to the IASC (Inter-Agency Standing Committee) Guidelines on MHPSS (Mental Health and Psychosocial Support) in Emergency Settings, multi-layered support is one of the core principles [17]. The multi-layered support system is aimed to support people

according to their mental states and mental needs.

The structure of the multi-layered support was presented in the intervention pyramid (Figure 1-3-4-1). The four layers were briefly explained below:

Basic services and security

The bottom of the pyramid showed the well-being of all people should be protected through the (re)establishment of security, adequate governance and services that address basic physical needs. In this COVID -19 case, the basic services and security could be the personnel and material supports such as money support and medical resource from the governments.

Community and family supports

The second layer represented the emergency response for a smaller number of people, these people were able to maintain their mental health and psychosocial well-being if they received help in accessing key community and family supports. Family tracing and reunification, assisted mourning and communal healing ceremonies, mass communication on constructive coping methods, supportive parenting programs, formal and non-formal educational activities, livelihood activities

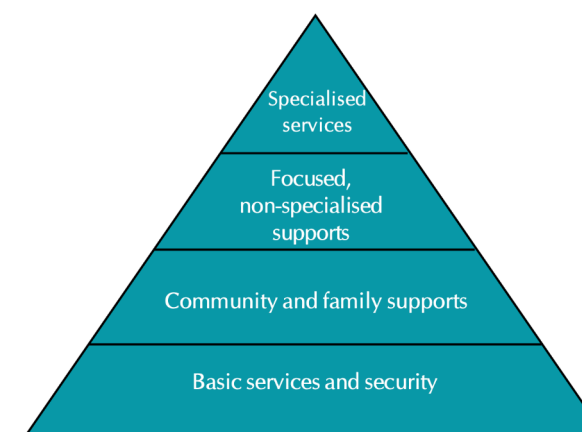


Figure 1-3-4-1: Intervention pyramid for mental health and psychosocial support (MHPSS) [17].

and the activation of social networks [17] were the useful responses in this layer.

Focused, non-specialized supports

The third layer represented the supports necessary for the still smaller number of people who had more severe mental problem additionally require more focused individual, family or group interventions by trained and supervised workers (but who may not have had years of training in specialized care).

Specialized services

The top layer of the pyramid represented the additional support required for the small percentage of the population who had very severe mental problem suffering even with significant difficulties in basic daily functioning. This assistance should include professional psychological or psychiatric supports.

Key takeaways

About target group

Based on the understanding of people's mental problem in this city, and taking into account the practicability, I narrowed down the scope of the target group to the **quarantined people with mild mental problems**.

In this phase, the target group was still very diverse, which needed to further redefine in the following research.

About design intervention

The intervention pyramid provided a limitation for the non-specialized supports, it helped me scope the people I wanted to design for and provide help. Also a feasible and suitable area of design intervention was generated - **Community and family supports**.

Design goal iterations

Explorations

Design goal

EA

To help quarantined people in Wuhan with mental health problem.

EB

To help quarantined people in Wuhan with mild mental health problem through community and family support.

?

?



Chapter 2

Definition of the target users

The previous chapter has explained the complexity of the context from a macroscopic level. This chapter's explorations were started within a broad scope and a lot of latitude for finding new opportunities then narrow down to the specific target users and design direction.

Both quantitative research and qualitative research methods were used to gather information from these experts in the field. Structured interviews were conducted to reveal what people did and thought in this certain context. Questionnaires were handed out in a larger scale of people for confirming the common perspective and practice of them. At the end of this chapter the final target user group was defined.

2.1 Quarantine life in Wuhan

Through the understanding of the context and the discovery of problems in the previous context exploration, a direction of the continued development of the project and the scope of the target group for research were already established at the end of chapter 1. However, to delve deeper into the topic - people's mental states during quarantine, more information about what people's experiences, perspectives, opinions and motivations needed to be revealed. Since every user is the 'expert on his or her experience'[16] In this Exploration C, qualitative research was conducted to gather this significant information through face-to-face contact with the current target group.

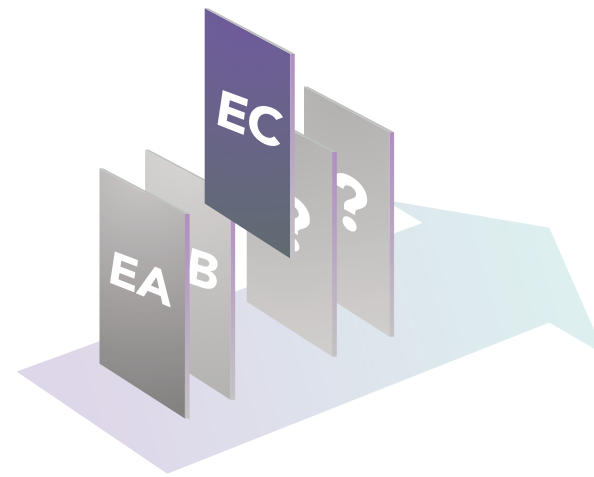


Figure 2-1-1. Exploration C was conducted in this section

EXPLORATION C

Research goals:

To collect the experiences from the target group and discover target group's practical matters, pain points and latent needs from their experience.

To find more in-depth insight for ultimately reducing the scope of the topic and target user group.

Research question

How did people in the epicenter spend their one ordinary day?

How were their mental states in a day?
Why?

Approach:

Contextmapping (online)

Why use this approach?

Contextmapping [16] was a qualitative

approach and highly explorative approach. This approach was used in this phase to yield a diverse range of outcomes especially about the personas and design opportunities. In order to let the participants express their experience in a playful way and at the same time become more aware of their experience, a template was used as the generative tool in this exploration.

2.1.1 Contextmapping session

Generative tools

In order to get a more first-hand information for in-depth understanding of those people's current experience, this Exploration C was conducted in the form of structured session. In this exploration, participants were asked to reflect and express their experience which I could gain their needs and values from their expression. But needs and values are abstract qualities belong to tacit and latent level of the knowledge (Figure 2-1-1-1) that participants are unable to talk about directly during the session. Therefore, I made a template as a stimuli tool for the session. This template helped me gain the tacit and latent knowledge from people by 'layering' which stepped up from their personal stories about specific day.

This template consisted of four steps. The first one was to draw or write on the paper for describing their one ordinary day during the epidemic, this form the 'layer of facts'. The timeline provided them a structure of creation. Considering that there would be participants who don't know how to draw or write to express, an example in the upper right of

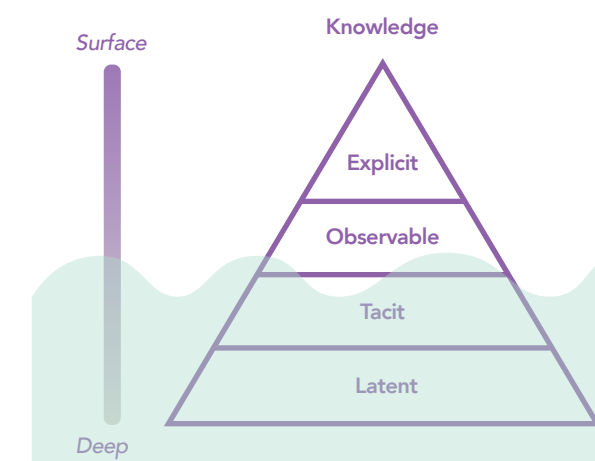


Figure 2-1-1-1. Levels of knowledge in this context [16]

this template is given for some guides and inspirations. When that was completed, the second step was to use the facial expression icons to choose the activities they enjoyed and which they hated, forming a 'layer of valance'. In the third step, participants were asked to indicate the reason for choosing the 'happy face' and 'sad face' for certain activities in a day and these reasons could release the values and needs.

In addition, I wanted to get more understanding of the phenomena, influential variables, and other elementary interrelations. For the last step, since I could not go to the context during epidemic, I asked participant to take pictures in their house to where they spent happy time and unhappy time to show the environment in specific situation instead of observation.

Also, participants needed to fill in the basic information before the which contains age, gender, occupation and date. Those information are essential for analyzing the group in the next phase.

Participants

There are 6 people participated the session in this research phase. All of them lived in Wuhan with their family during the epidemic since 23 January the city locked down till 8 April the city unlocked. Four out of six participants were young adults ranged 22-25 years old and the other two were middle ages ranged 52-59 years old. 5 of them had no permission for going out of their house and only one person went out for 5 times for being volunteer.

Setting

The contextmapping sessions were performed face-to-face online via social network individually. Ten minutes before the session, I sent them the picture of the template and asked each of them to follow the steps and write the answers on paper, after finishing the

Name _____ Gender _____ Job _____ Location _____ Date _____

Step 1
Please describe your one day by writing/drawing on the timeline.
(an example is on the right side)

Step 2
Using the emotion icon to mark your happy moment and unhappy moment.

Step 3
Using the star icon to mark the time you spend with your family.

Example

Name _____ Gender _____ Job _____ Location _____ Date _____

Step 4
Please take 1-3 pictures to express your 'happiness' in a day.

Please take 1-3 pictures to express your 'unhappiness' in a day.

Figure 2-1-1-2. Stimuli tool: 'What is your one ordinary day during quarantine' template

template they took a picture then sent it to me. The session was started with the explaining the one day according to the timeline they drew and some questions were asked randomly if there were some special findings in their story.

In addition, some questions were prepared according to the template:

1. Why _____ is your happy moment?
2. Why _____ is your unhappy moment?
3. How do you deal with your emotion when you unhappy?
4. Do you influence other family members emotionally or do they influence you? How?
5. Can you describe the pictures you take?
6. Why can they represent your happiness and unhappiness?
7. What is you main worrying during the epidemic?
8. Could you give some recommendations for the quarantined people in Europe now?

Data collection:

All the handed-in templates were collected and clustered. The pictures which participants took from there home were collected with permission. All the sessions were audio recorded and transcribed, also the notes I did during the session for the some significant points were also digitalized. In general, all the data collected in this contextmapping session was qualitative data.

Data analysis

Filtration

Transcription, filled templates, and notes I took were read several times. Since all the participants spoke Chinese during the session. The irrelevant data was excluded while the significant quotations and writings were picked out and translated into English.

Classification and generalization

Selected quotations were first coded using deductive reasoning into two groups: common behaviors and high and low points in a

| No. | Age | Gender | Job | Location | Living with | Relationsh -ip | Permissio -n for going out |
|-----|-----|--------|---------|----------|-------------|-------------------|----------------------------------|
| P1 | 52 | F | Teacher | Wuhan | Family | / | No |
| P2 | 22 | F | Student | Wuhan | Family | / | No |
| P3 | 25 | F | Phd | Wuhan | Family | P4's daughter | Volunteer (less than 5 times) |
| P4 | 59 | M | Retired | Wuhan | Family | P3's father | No |
| P5 | 24 | M | Student | Wuhan | Family | / | No |
| P6 | 24 | F | Intern | Wuhan | Family | / | No |

Figure 2-1-1-3. Participant list

day. Then, inside each group, quotations were recoded with inductive methods, based on which themes they were related to. After that, new themes come into being.

2.1.2 The result

Common behaviors

Reading the latest information about the epidemic

In quarantine, reading the information about the epidemic became a common daily routine for all the participants. Especially, after waking up and before sleep are the most usual occasions they spend online for gaining the updated data about the epidemic and new policies or events. 6 out of 6 people express that smartphone is the most used appliance for gaining those information. In addition, 5 out of 6 participants chose the moment when they were reading the information about the epidemic as the most unhappiest moment in a day.

Increased screen time

Since one of the participants mentioned about her significantly increased screen time of her smart phone which arose my curiosity. I asked every participants to send the screenshot of their screen time page from their phones and I got 4 of them with permission. In these four people, the minimum 'last week's average' screen time per day was 6 hours 55 minutes while the maximum ones reached 11 hours 25 minutes (Figure 2-1-2-1). The other two people also indicates orally that they used watch screens more frequently. In addition the most used applications are social network applications. This data was collected only for the smart phone usage, not including the use of laptop, TV and other appliance with screen, which meant people spent even more time in front of screens. The data was collected in early

March, at that time people was quarantined about a month, people's behaviour would be different in different period of time.

Sleeping time and life schedule

From the templates participants handed in, the timeline showed that all the 4 young adults had irregular sleeping time to some extent. From their expression, they usually had no perception of time and found hard to fall sleep at night since they spent most of time indoor with light.

In fact, an irregular sleeping time bothered them a lot. It contributed the difficulties for scheduling the life, made them felt chaotic.

On the other hand 2 middle-aged participants' templates showed entire opposite results. Both two people had the same schedule as before quarantine. They seemed to even paid more attention on healthy lifestyle, for example, regular time for afternoon tea and sunshine, calculating nutrition and vitamin for food.

High and low points in their story

Since the step 4 of on the template was to ask participants to take photos of some things or some places at home to express their happy time and unhappy time. These pictures were collected and sorted it into two categories which I named them - 'negatives' and 'positives'.

Figure 2-1-2-2 showed two categories of the collect pictures. The first row of the pictures represented the happy moments of the participants in a day. Based on the content in the pictures and interviews, they were further classified into 5 groups which constitute '5 factors of happiness' in quarantine life:

Natural elements

Talking about 'what makes you feel happy in quarantine', 6 participants mentioned natural elements such as sunshine, the growth of plants and blue sky. They thought these natu-

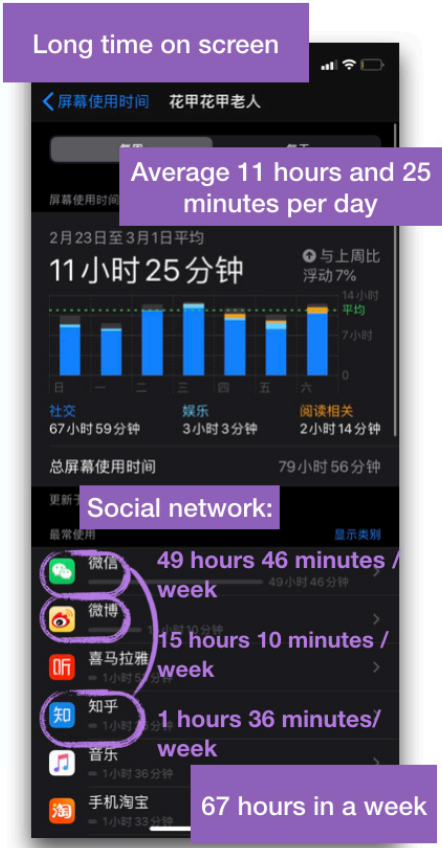


Figure 2-1-2-1. A screenshot of one participant's screen time page in smart phone

ral elements could make them feel temporary relaxed.

Pets

One of the participants had 3 dogs in her house, and she usually feel happy when spent time with dogs. She also mentioned that one of her friends specially asked her to sent pictures and short video of the dogs to her every day, these could make her happy.

"they don't know what happens, they were just innocent, some times energetic, sometimes quiet, which made me feel I need to be gentle and take care of them."

Food and snacks

2 middle-aged participants and 1 young adult were keen on making dishes during the

epidemic. They tried different receipts and sometimes share the pictures of the dishes on social media, since they could feel satisfied after making good looking and tasty foods. 2 young adults shared pictures of their 'snack box', since the epidemic, they had stored a plenty of snacks. One person said the full snack box made her fill 'rich'.

'Good looking and tasty food me feel satisfied'

Entertainment and art creation

It can be seen, in this categories contains the pictures of LEGO blocks, paintings and pigments and TV. While doing these actives, they could be temporally distracted from the thoughts about the epidemic.

Company from friends and family

All the people mentioned about telephoning or video chatting with friends online was the happy moment during the epidemic. But the frequency was not that high, friends usually connected each other by texting. Spending time with family members are also a happy occasion when quarantining at home.

The second row in Figure 2-1-2-2 contained the pictures which represented negative emotions. They were also clustered into four sub-categories.

Hard to concentrate

This is a common pain point of four young participants. Since people were gradually finish their holiday and came back to work and study online when I did this research. 4 young people all have different tasks need to do in this period of time, but they found that they felt reluctance to do and hard to finish the tasks.

Being alone and think too much

'Being alone' was usually a moment creating and accumulating negative thoughts. 3 young adults mention that they usually felt

Positives



Figure 2-1-2-2. Categories of the participants' picture

Negatives

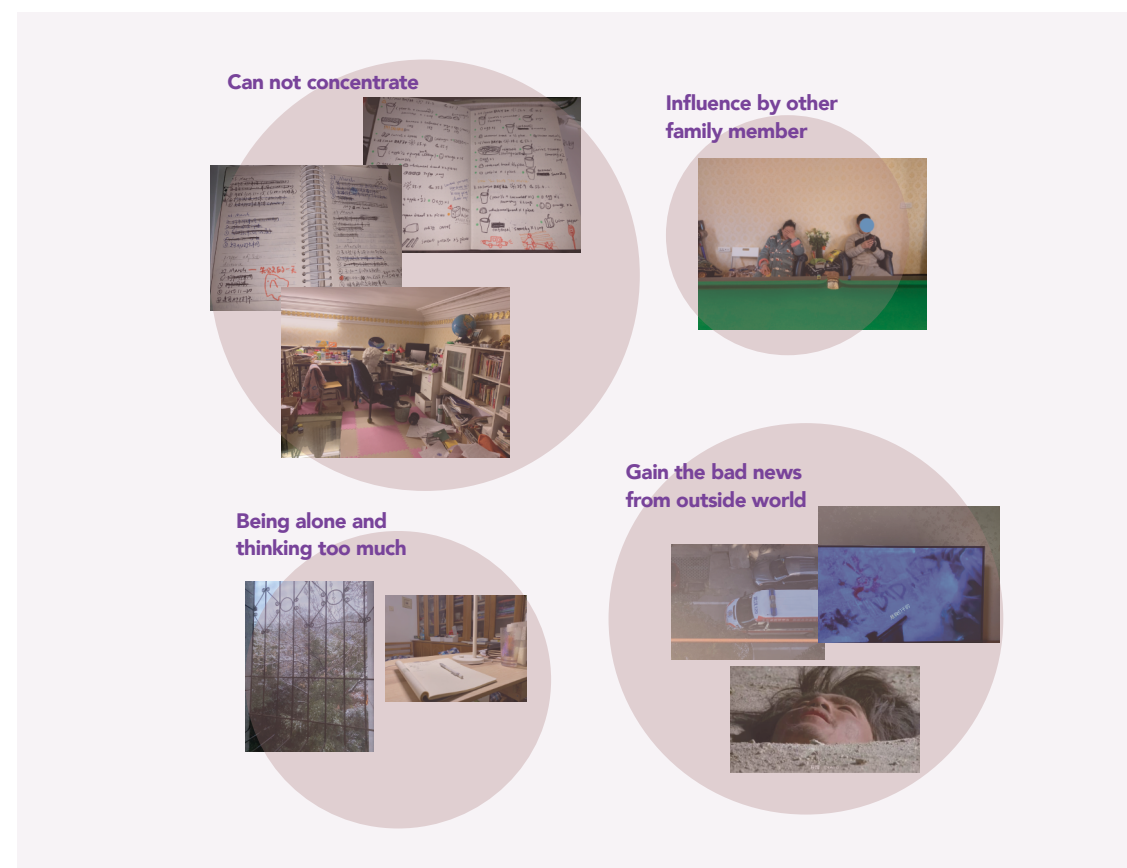


Figure 2-1-2-2. Categories of the participants' picture



Figure 2-1-2-3. Real-time data of the epidemic in Alipay

very bad when seeing some bad news or comments on internet and wanted to complained or discussed with others but could not find a understanding person at that time. Some thoughts usually faded momentary but came out again while being alone quietly.

Information about the epidemic

This trigger of negative emotion was mention in previous paragraph. People spent a large sum of time online.

Since the beginning of February, the government launched a service that allowed real-time viewing of epidemic-related data online. After that, more and more commonly used applications such as WeChat (the most popular social app) , Alipay (the most commonly used payment app) launched functions for querying epidemic information.

In Figure 2-1-2-3, it shows the interface which provides real-time data of the epidemic in Alipay. Although people could more easily know the latest information, it also brought some psychological pressure to people. Especially in this period on time, people could

not go out, the Internet became the only way to know the changes in the outside world. To some extent, they are passively exposed to the information about the severity of the epidemic everywhere, as if someone continuously reminds you that you are living in danger.

Figure 2-1-2-4 shows a typical example. It is an epidemic-related function provided by Gaode Maps (one of the most popular mapping application in China). I received this picture from one of the participants . From this picture, the blue location icon indicates where she lives and the red virus pattern around represents the confirmed cases around where she lives. Such a picture can intuitively show the the data also provide a warning effect to people, but also accumulate anxiety.

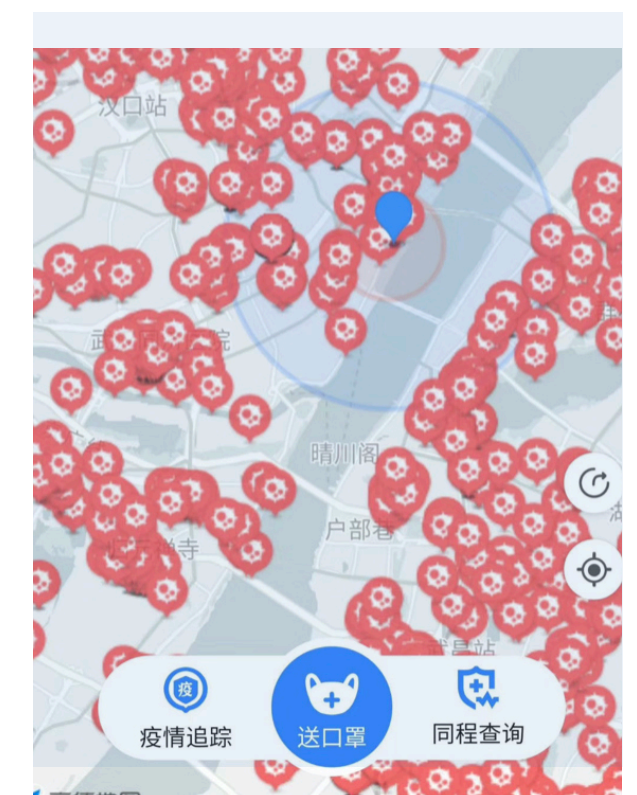


Figure 2-1-2-4. Overwhelmed data for confirmed cases in mapping application.



Figure 2-1-2-5. Overwhelmed data for confirmed cases in mapping application.

Influenced by others

One of the participant sent a picture (Figure 2-1-2-5), her parents were sitting in the chairs with depressed facial expression. She told me that her father was in an unstable mental states recently, he usually felt angry after seeing some bad new on internet and she could also felt whiny while spending time with her father.

Key takeaways

People spent long time online

Because of the physical living environment changes, the internet became the most important connection method between people and people, people outside the world. From the long screen time during the epidemic, we could know that the internet played a significant role during the epidemic. It contributed to different aspects of life, such as gaining information, online working, and online shopping. It brought a lot of conveniences for people, but also brought a lot of information with stress in-front of people's eyes.

Young people's life were highly influenced by the epidemic

The result showed apparent differences between the two age groups. Talking about their lifestyle, elderly people were more able to adjust and adapt to the environment, while young adults were highly influenced by the changes. Moreover, the lifestyle might be an essential trigger for the different mental states.

2.2 Characteristics of the intended users of the new design

From the result I got in previous Exploration C, there were some common behaviors and perspectives appeared among the 6 participants. But it could not confirm that these insights were applied for all the intended users. In this section, another exploration - Exploration D was conducted, and quantitative research method was used for investigating a larger number of target users to verify and refine the insights.

In addition, in order to find out common values and needs of the target group, more direct questions about their needs and values were asked with a choice according to the collected data I got before in this exploration. The outcomes in this exploration were significant for making the persona and scenario in the future.

cant for making the persona and scenario in the future.

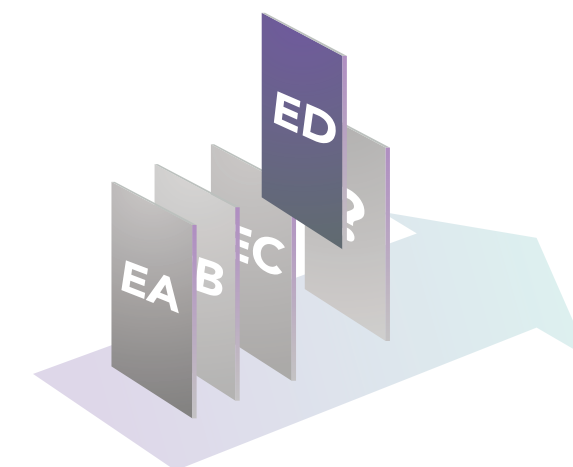


Figure 2-2-1. Exploration D was conducted in this section

EXPLORATION D

Research goal

To determine whether large group share certain values and needs I gained in previous exploration.

To gather the characteristics of the current intended users for making persona and scenario.

Research question

What is the common values and needs of the target group?

Approach

Questionnaire

This quantitative research method was used in this exploration. Although qualitative methods were better suited for

deep insights, some insights which obtain from qualitative research was suit for small scale of people but whether could be share with majority of the group. In this case, questionnaire was the an efficient way for reach a large number of people.

2.2.1 Questionnaire

Question formulation

For setting the questions of the questionnaire. I made three part of the questions (in Appendices).

The first part was the basic information (consisted of question 1 to question 7). Considering some basic information could be the variable quality in this exploration, for easier sorting and filtering the collected data and to classifying the groups of people during analysis for the next step, I set up questions about the basic information at the beginning of this questionnaire, including age, gender, location, living conditions (living alone or with family), and work conditions (stay at home or work out with permission) during the epidemic.

The second part was for people's online behaviors, which consisted of question 8 to question 11. In this part, I intended to collected the data for example how long they spent time online and what kinds of activities they did online from a large group to find out what the majority of people do online.

The last part was question 12 and question 13. These two multiple response questions were set for explore the reason why people felt negative after seeing some information and how did these people solved these negative emotions currently. The choices were formulated based on the collection from the precious research.

The questions were tested several time and refined several times before formally handing out.

Distribution and collection

The survey was only distributed and collected online by online survey tool. The releasing date was 22 March, and ending date was 26 March. It was mainly spread on the social network.

Respondents

There were 440 respondents in total of the questionnaire. But most of the respondents were not located in my target area. By using the sorting tools, I filtered the answers with the location. There were 127 respondents lived in Wuhan. These people were aged from 19-62, 65.4% of them were female and 34.6% were male.

Data analysis

Data analysis was executed via the online survey tool. The data was firstly filtered by cross-tabulating subgroups since the responds from people not live in Wuhan was useless. After that, 127 valid responds was interrogated and generated sector diagrams.

2.2.2 The result

After analysis and filtering the gaining, 7 main insights were presented:

1. Most of people live with their family

Figure X showed that 90.6% (from 127 people who live in Wuhan) of the participants live with their family. Since in the epidemic was outbreak during the spring festival holiday, most young people already came back home and stay with their families.

2. Not the majority of people had closed experience to the COVID-19

25.2% (from 127 people who live in Wuhan) of participants had acquaintance infected coronavirus and only 16.5% people had friends or family infected coronavirus. In a lockdown city, people have more first-hand information about the epidemic, the closed experience could be a very influential variable in this research. Luckily, only minority of people had closed information about the disease.

3. Long time online

Over 50% (from 127 people who live in Wuhan) of people spend time more than 6 hours/day online. This result confirmed the consumption in the previous exploration C.

4. Long time checking the information about epidemic

Half of the people spend more than 1 hour on knowing the information about the epidemic.

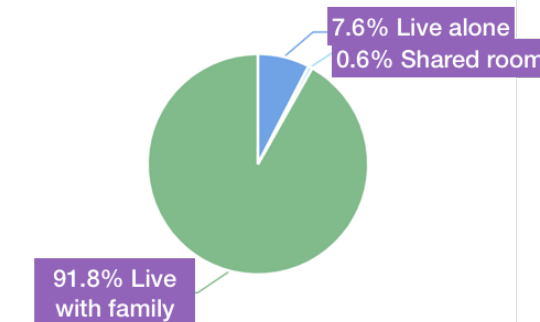


Figure 2-2-2-1. Living condition

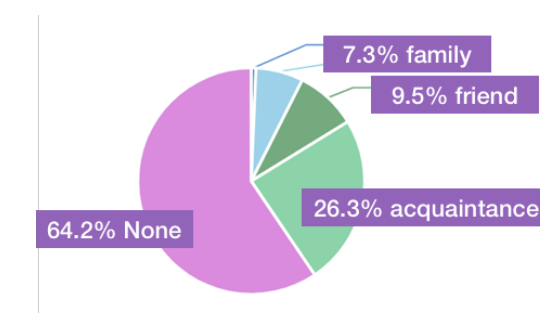


Figure 2-2-2-2. Living with

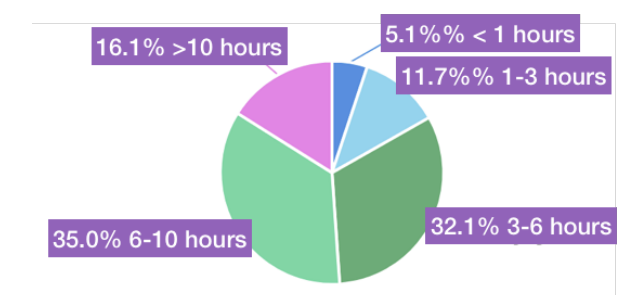


Figure 2-2-2-3. Time spent online

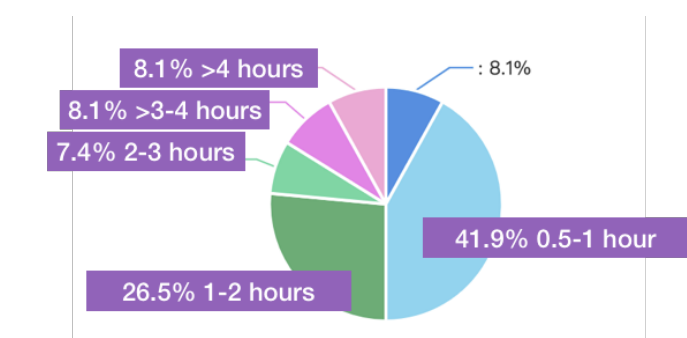


Figure 2-2-2-4. Time spent on checking the information about epidemic

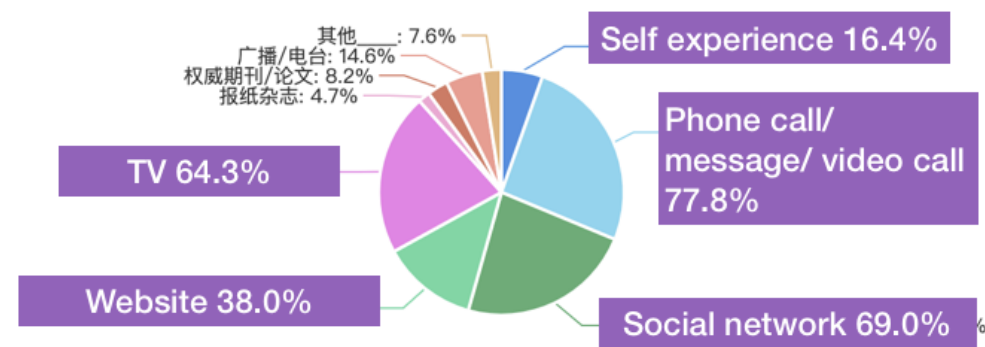


Figure 2-2-2-5. Main activities

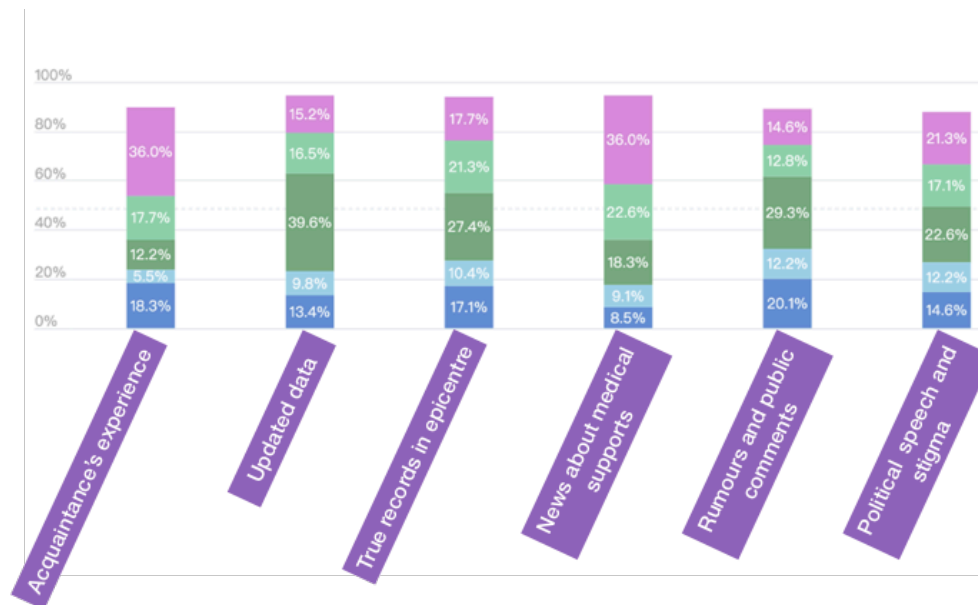


Figure 2-2-2-6. Categories of information that contributed

5. Main activities online

Using social tools (phone call/ message/ video call and social network) was the main activity for people online.

6. Main categories of information that contributed negative emotions

High percentage of people thought the acquaintance's experience about the disease (ex. someone you know confirmed with coronavirus, difficulty in getting medical treatment, etc.) and the news about medical supports can lead to negative emotions.

7. Main methods for solving the negative emotions

Sharing with friends, sharing with family were the first and second choice of methods for people to deal with negative emotion.

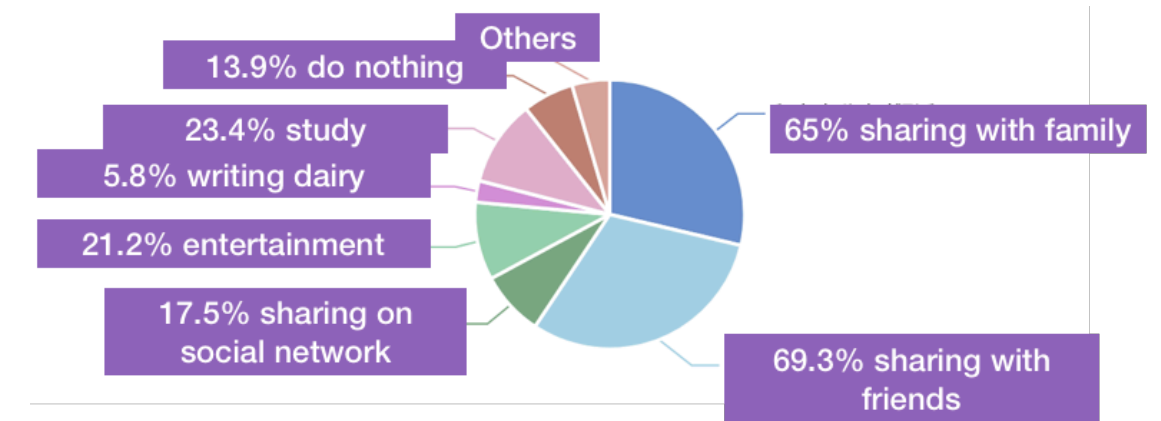


Figure 2-2-2-7. Main methods for solving negative emotions

Key takeaways

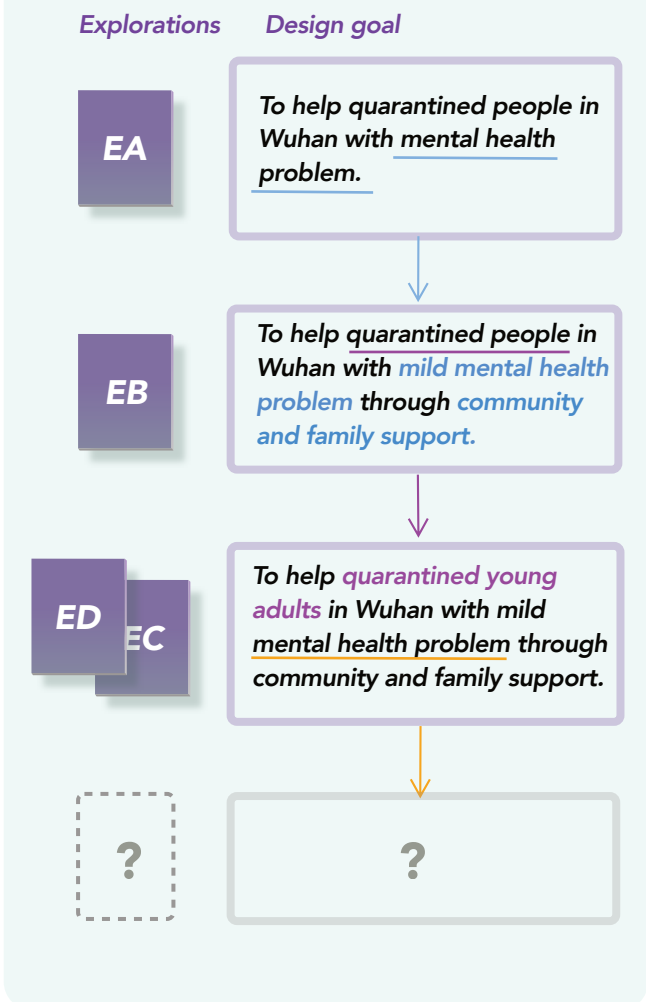
The results of the questionnaire showed a collection of characteristics among this group of people. And the profile of the target users was presented gradually:

- *Most of the people live with their family*
- *They spent a long time online and checking the information about the epidemic.*
- *Social activities occupied a long time online.*
- *They preferred to deal with negative emotions via talking to friends and family.*

These insights would be used to make reliable personas in the subsequent project process.

From 'They preferred to deal with negative emotions via talking to friends and family' we could know that, 'communication with people' might be a key point of design creation. Further exploration was conducted in the next section.

Design goal iterations





Chapter 3

In-depth user research

After defining the specific target users in the last chapter, this chapter would focus on this group of people. In-depth user research was conducted via qualitative research methods. The collective data were analyzed and refined into the results for defining the specific problem and discussing how ideas and design decisions come into being.

3.1 Negative emotions in a quarantine situation

As mentioned before, the mental health issue was the direction of this project. In contrast, the understanding of the mental states of the intended users was still on the surface level; therefore, a focused investigation needed to be arranged.

This epidemic changed the lives of people in Wuhan. The quarantine life lasted for two months (this stage of research was conducted in March). In this duration, they experienced happiness and sadness. In-depth research - Exploration E was conducted to emphasizing the negative emotions during the epidemic.

Since from the previous Exploration A and B, it was found that the epidemic had a more significant impact on the lives of young people compared to the older adults, in this stage, young people were the research target. Besides, from the results of the previous questionnaire and interviews, communication

was the most popular way for people's to deal with bad emotions during the epidemic. In this section, exploration was also focused on the social part during the epidemic as a breakthrough. I compared two types of social modes: physical, a social situation without an epidemic and online social situation during this epidemic, the differences between them could help me to find the desired situation of intended users and possibilities for the design solution.



Figure 3-1-1. Exploration E was conducted in this section

EXPLORATION E

Research Goal

To explore the negative emotions people have in quarantine.
To understand the reason behind of these negative emotion and their needs.
To know the needs of users, collect ideas and inspirations from users.

Research question

What types of negative emotion did people have in quarantine?
What is the reason behind these nega-

tive emotion?

How could they solve these negative emotion currently through community and family support?
What is the common values and needs of the target group?

Approach

Design for emotion
Interview
Role play

3.1.1 Interview and role play session

Participants

There were five people participate in this session. All of them were young adults living with their family in Wuhan. Considering the individual personalities might be a variable quality for people's mental states in a similar situation, it might be a factor that could affect a person's mental state during the epidemic, the personalities in social of the participants were also recorded (Figure 3-1-1-3 on next Page).

Generative tools

1. A collage of negative emotions (Desmet, 2009)

This collage contains almost all kinds of negative emotions. With the pictures and short

explanation, the participant could use it as a reference to describe the negative emotions they encountered at different moments. A timeline was also given to them to help them to recall the abstract feeling in a structured way.

2. Role play toolkits

A role play toolkits (Figure 3-1-1-1) with cards of 5 different roles designed for participants to have random choices in advance. To make the role play story be closer to the real situation, I incorporated the people's characteristics collected from previous research into the roles, such as 'living with family', 'the only one child'. Besides, the roles included not only young people but also the stakeholders - their families.

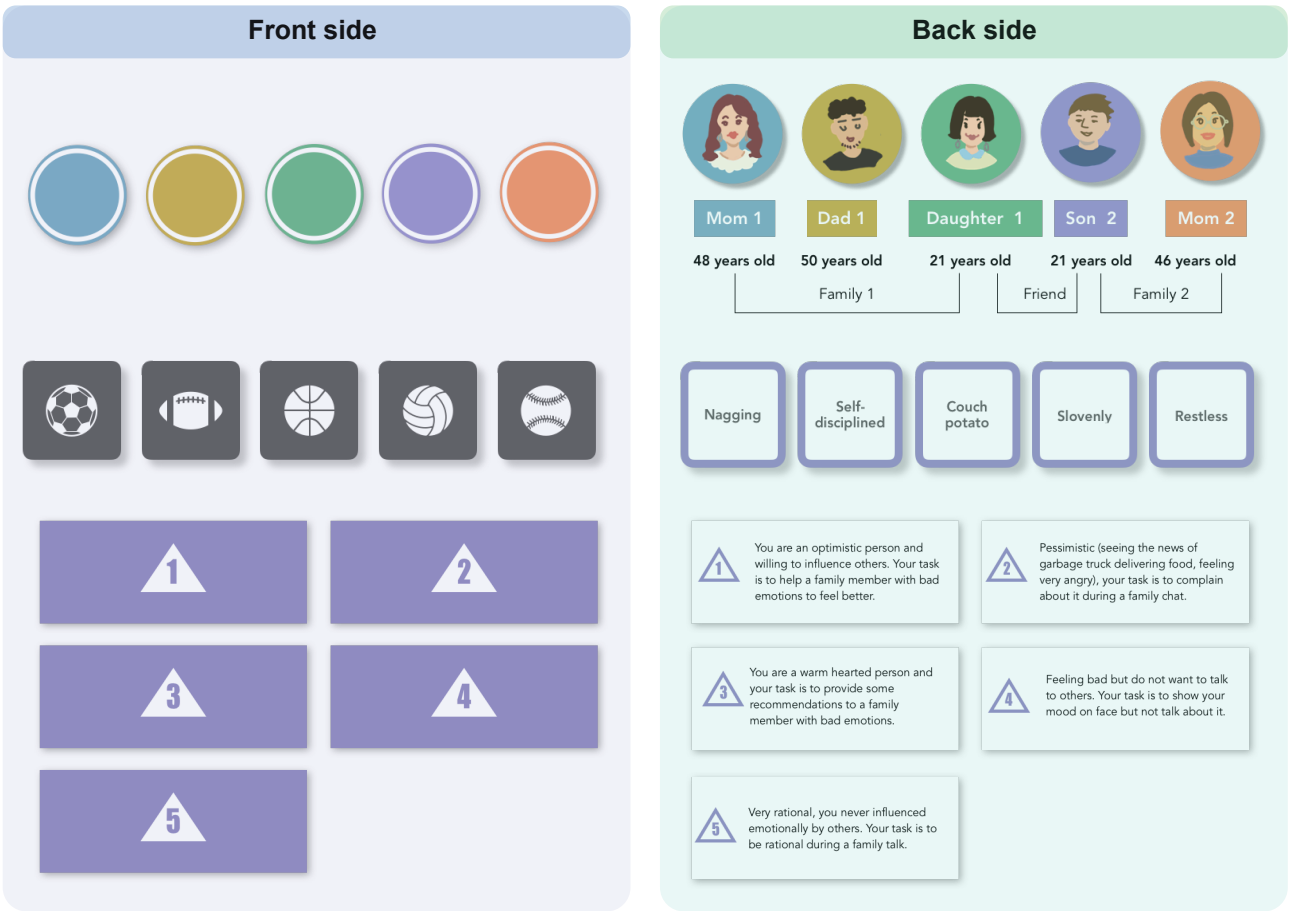


Figure 3-1-1-1. Role play toolkits

Settings

This session was performed online by the on-line shared whiteboard. The session lasted about 3 hours. Figure 3-1-1 showed the primary process of the session.

Step 1

Since the 5 participants met each other for the first time, the first step of the session was organized to let the participants become familiar with each other. They were asked to introduce themselves, including name, age, occupation, where she/he lived and personality.

Step 2

Secondly, to guide participants to get into the topic, they were asked to talk about their unpleasant experience during the epidemic. Some questions were prepared to trigger them to talk more about themselves:
How many days have you been at home?
When did you feel the worst?
What was the most inconvenient during the epidemic?
What was the most worrying thing? The saddest moment and the happiest moment?
Do you concern more about what is happening outside during the epidemic than before



Figure 3-1-1-2. The process of the session



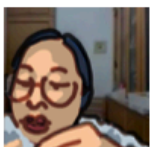
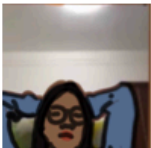

| | Portrait | Age | Location | The only one child / | Live with family / not | Occupation | Personality |
|----|--|-----|----------|----------------------|------------------------|---|---|
| P1 |  | 22 | Wuhan | Y | Y | Animation design senior student | She is keen on socialising and an atmosphere maker. She is an emotional person and usually shows emotions on face. |
| P2 |  | 24 | Wuhan | N | Y | Lawyer | She is an easy-going, tolerant and compassionate person, who likes to listen to others. |
| P3 |  | 25 | Wuhan | Y | Y | PhD student | She is a chatty and infectious person. She loves concerning about current affairs is fond of discussing with others about it. |
| P4 |  | 23 | Wuhan | Y | Y | First-year master student in Architecture | She is relatively introverted, she talks a lot with friends but very shy with strangers. She likes staying at home. |
| P5 |  | 25 | Wuhan | Y | Y | between jobs | She is a shy person and not good at socialising. |

Figure 3-1-1-3The participants of this session

the outbreak?
Do you feel that you have less time to complete what you should have done when self-quarantined at home than before?

Step 3

In this step, a collage of negative emotions and timeline of the epidemic was shown to participants; they were asked to choose the types of negative emotions they encountered and dragged it on the specific place on the timeline by using the online whiteboard. Also, they needed to talk about the reasons behind their choices.

Step 4

In the role play phase, participants were given a random role with a specified personality, an emotional state, and a task. They needed to make up a story of the role’s one day during the epidemic. The story needed to match the personality and mental state of the role. After everyone shared their story, they could find out the relationship between each role (ex. mother and son). At last, everyone would share their task of the role (ex. comfort your mother) and act like the character to try to finish the task.

Step 5

In the brainstorming phase, participants were asked to share their imaginations of the methods of releasing negative emotions during epidemic and methods to support a person with negative emotions.

Data collection and analysis

All the written data were presents on the shared whiteboard online. The highlighted gainings were noted during the session; the session was also recorded. All the prepared results materials were first examined and reviewed thoroughly and then used affinity diagramming [20] clustered relevant information.

3.1.2 The result and takeaways

Negative emotions at 3 stages of the epidemics

People's mental states were changing while the time past and the trend of the crisis changed. The specific negative emotions were also different at different stages of the epidemic.

Outbreak stage

Due to the sudden outbreak of the epidemic, people's lives have undergone tremendous changes in an instant in January and February.

Shock

The shock was the first negative emotion they mentioned. The emotion was caused by the unexpectedness of the epidemic, lockdown policy and a series of unexperienced experiences.

Anger and disgust

There were two main reasons that contributed to anger and disgust; the first one was the stigmatization. They usually felt angry while seeing insults about Wuhan and Wuhan people on the social network. The second one was the reported low efficiency and dereliction of the government.

Anxiety

Anxiety was the most common negative emotion in this period. Since less knowledge of the disease, they were worried about the health of themselves and their family. Besides, they never experience this situation before; they did not know what may happen in the future. They worried about how to storage foods, masks and daily supplies.

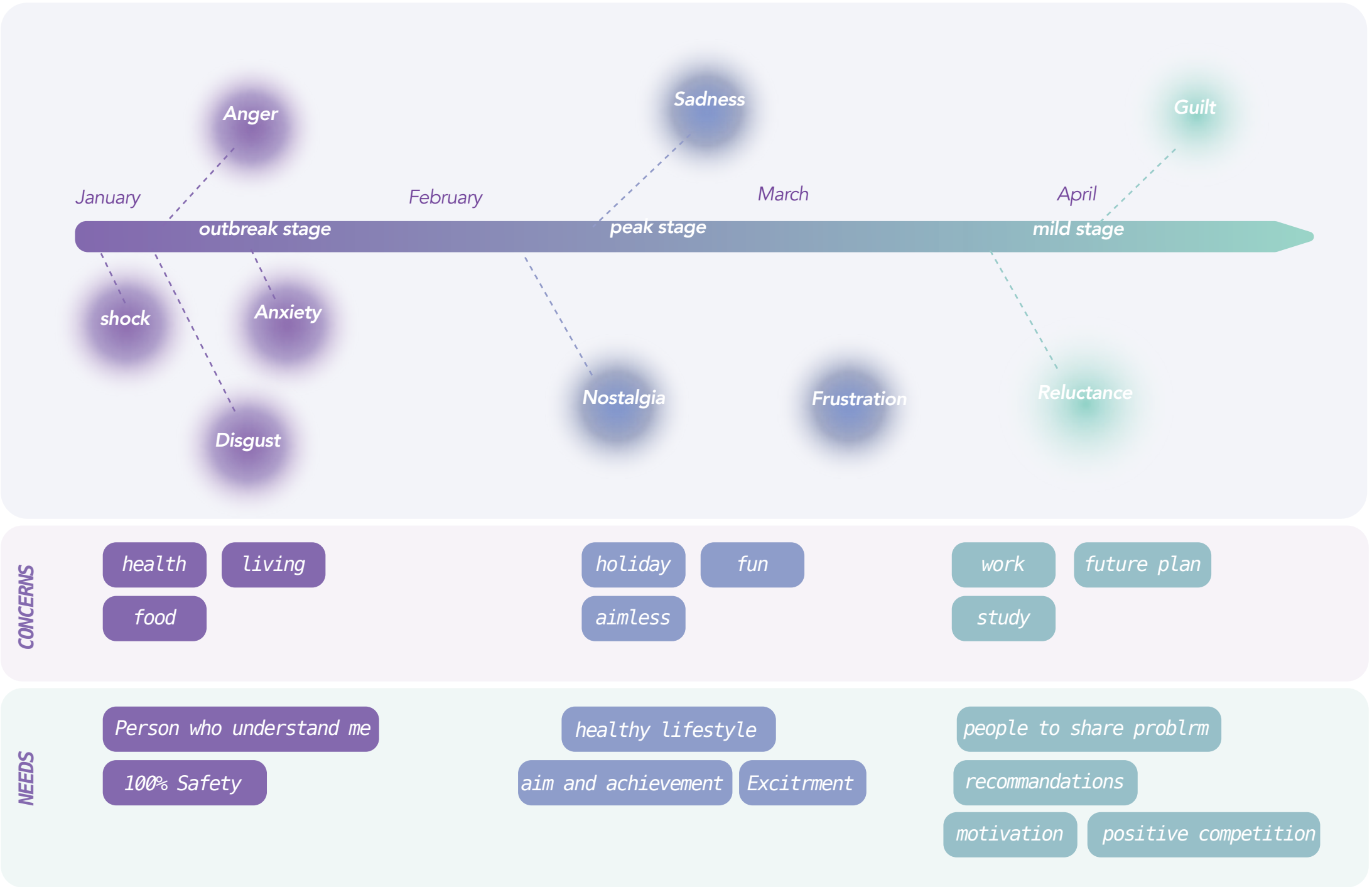


Figure 3-1-2-1. Negative emotions at different stage of the epidemic

Peak stage

After living in isolation for more than a month, although the epidemic is getting worse, people are used to the quarantine life and no longer fear the epidemic and its impact. However, people were getting tired of living in the same area and met the same people every day; other types of negative emotions emerged.

Nostalgia

One participant mentioned that she would often pull up her previous photos to see where she had travelled and the delicious food she had eaten. Compared with the current situation, she sometimes felt unhappy.

Sadness and frustration

Since nothing new happened every day, they

found hard to felt excited by something. The life was aimless and the time usually passed without doing anything meaningful. There was no sense of achievement in daily life.

Mild stage

The information about the city's unblocking has been announced, the time of quarantine was no longer endless. They started to con-

siderate the near future about their work and study.

Reluctance

After few months aimless life with rough sleeping time, they found it hard to go back to the daily schedule like before. All the participants encountered this negative emotion; they mentioned about distraction, tiredness while working/ study. Even one of the participant had the good ability of self-discipline before the epidemic, and she also talked about this problem.

Guilt

This negative emotion appears at the end of the quarantine period. One of the participants said 'it's like few months just gone, but I did nothing.'

All the participant said they were guilty about wasting too much time while being quarantined at home, the more plans needed to be done after quarantine.

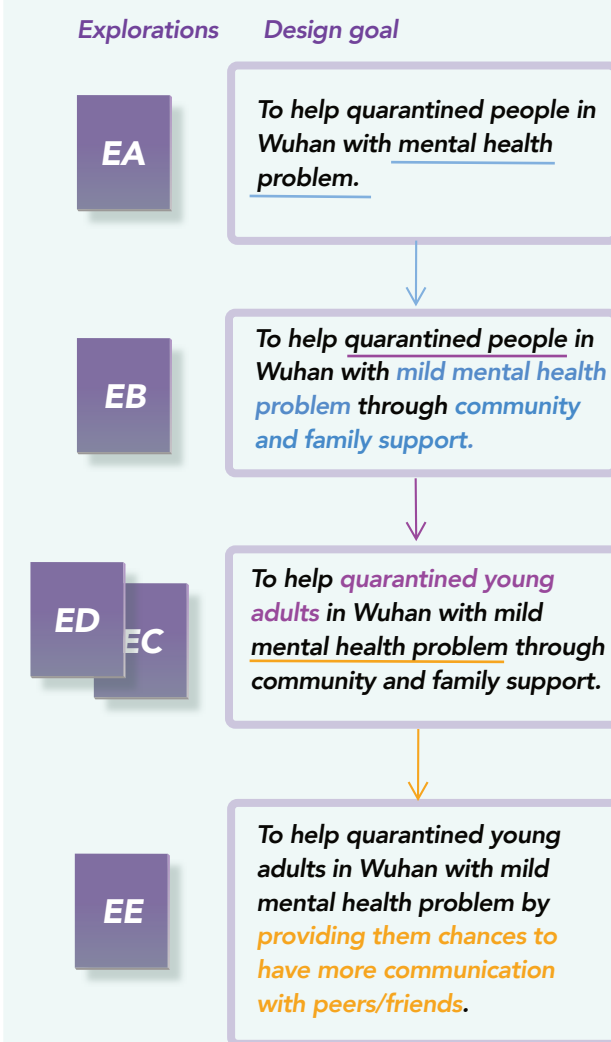
Community and family mental support

The result of the role-play session was different from my expectation. Participants agreed that they felt unwilling to asked parents for emotional support since they spent already a long time with their parents. Besides, in this situation, the unhappiness they accumulated were mostly related to the things they did not want to talk with parents. They thought peers and friends were the better people to talk to.

Key takeaways

- Young people had different needs and concerns at the different stage of the epidemic, and these needs and concerns to some extent influence their mental states.
- After gaining the needs and concerns of the intended user, the user profile gradually appeared, all these information were integrated into personas in the next chapter.
- Communication with peers and friends as young adults' preference for opening their mind

Design goal iterations





Chapter 4 Synthesis

As a transitional chapter from research to design, this chapter synthesized the findings and insights from the theoretical and exploratory research done in the previous chapters, aiming at consolidating a strategic solution to tackle the challenges of this project.

To summarize and communicate the findings through the user research and set an archetypal representation of the intended user and current situation for the future design process, personas and storyboard were made in this stage. After that, the problem definition was concluded. Based on the problem definition and design goal, design visions and requirements were set for the further design process.

4.1 Target users and context framing

4.1.1 Target user

Introduction

In this section, lots of insights were already gained from previous research activities but the mass of information still showed a blurred outline of the intended user. Since personas are archetypal representations of intended users, I chose persona as the summarizing approach for better commenting information in order to have a better presentation of this insights.

Process of making personas

As shown in Figure 4-1-1-1, there were four steps in the process of making these personas which were collecting insights, clustering, refine the useful information, and visualize persona. Firstly, all the insights relevant to the intended users from previous Explorations A-F was collected (first column in Figure 4-1-1-1). Then I classified them into the main informa-

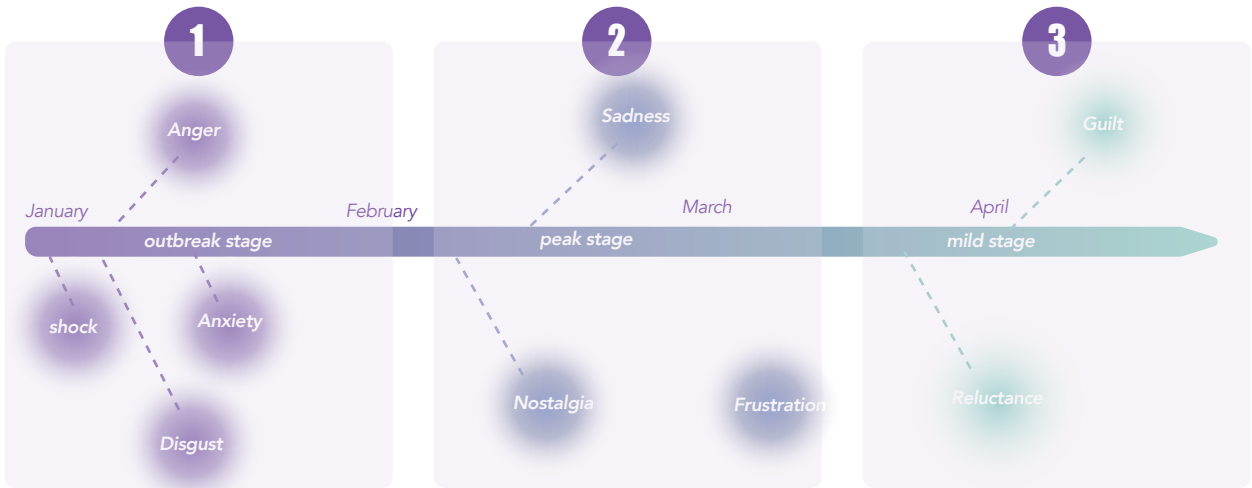
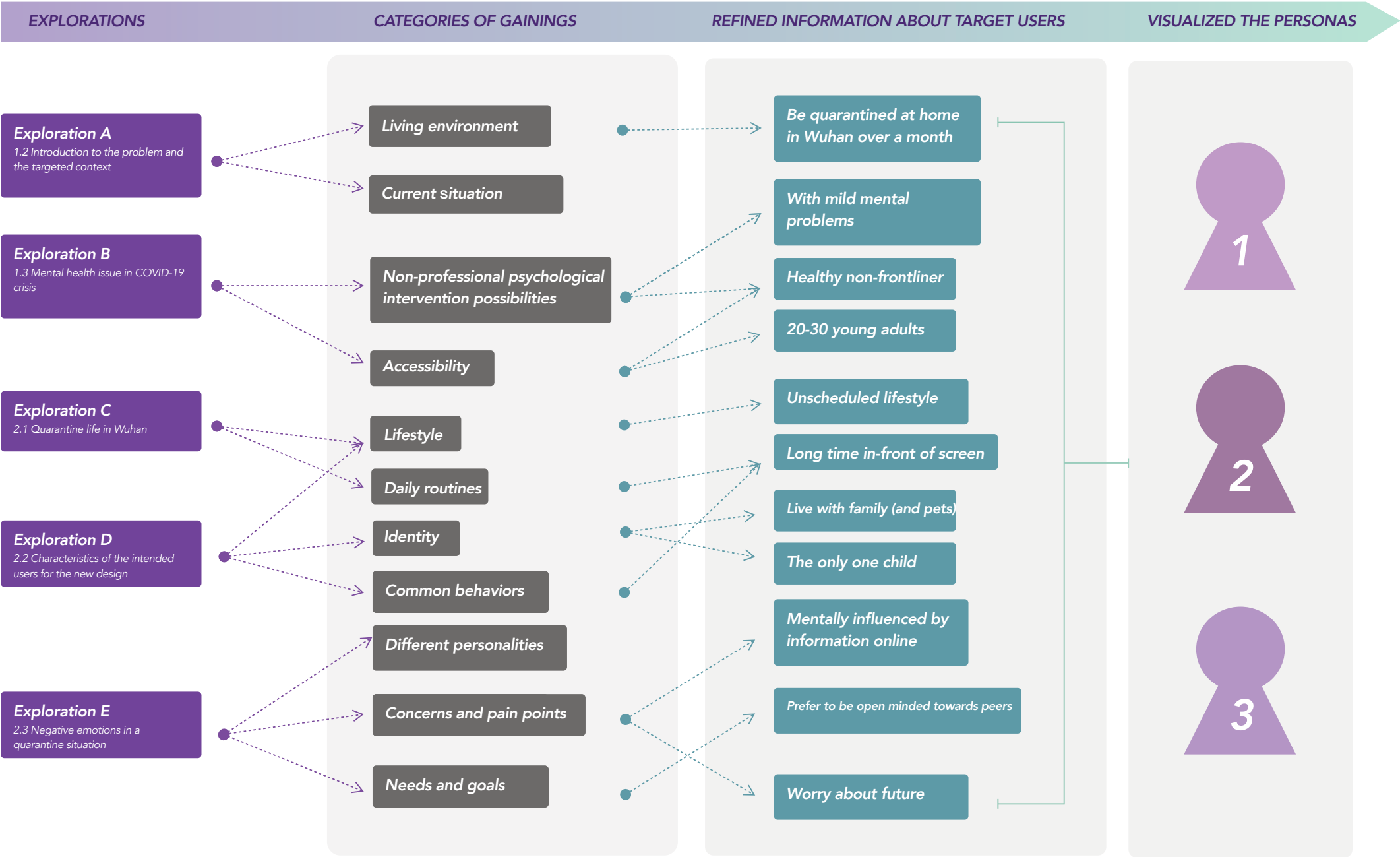


Figure 4-1-1-1. the process of making personas

tion categories about a person, which was illustrated in the second column. After that, the essential information which could be useful for making a persona was refined and presented in the third column. The last step was to visualize the persona with data and brought them alive.

Personas

In Exploration E, the result of in-depth user research suggested that people had varies negative emotions and varies emotional

needs at different stages of the epidemic. Based on the 3 stages of an epidemic - outbreak stage, peak stage, mild stage, three typical personas was made respectively.

The content of the personas had also referred to the participants' basic informations and real life experiences in exploration E. Figure 4-1-1-3 showed the three personas - Xin, Shiyu and Yanbin.

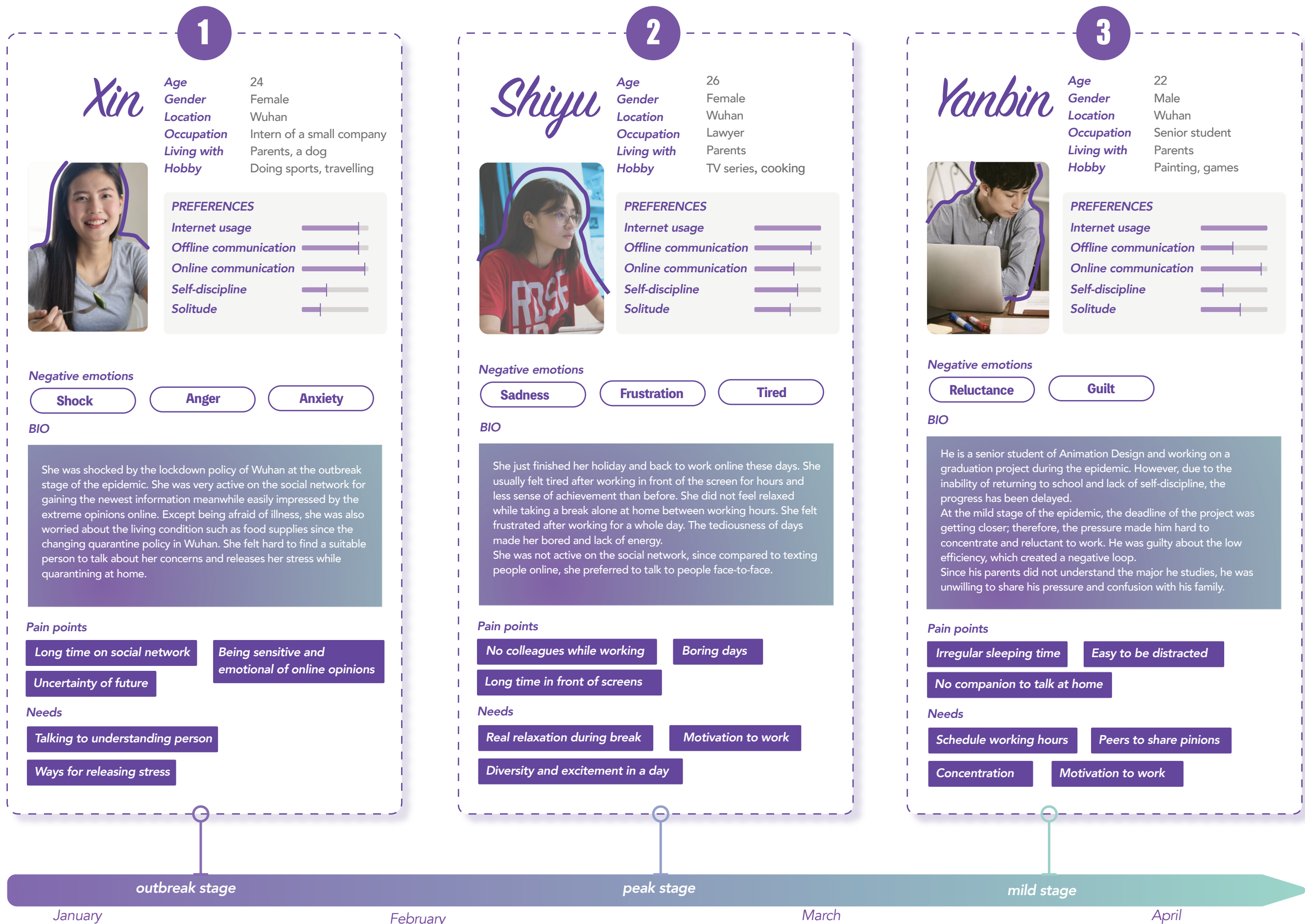


Figure 4-1-1-3. Personas

4.1.2 Context framing

In Figure 4-2-1, a typical one day of target users was drawn into storyboard as an example of the daily experience. Additionally, an emotional curve was also illustrated along with this story which clearly showed the high and low point of the everyday experience.

Key takeaways

It could be seen that three personas share the same pain point - **lack of communication with a suitable person at a specific situation.**

Persona 1 felt hard to find a person could listen and understand her, Persona 2 and 3 usually hesitated to connect with their peers.

According to the experience map, it showed the negative emotions were usually accumulated while people were staying alone at their rooms.

These generated a valuable design opportunity - to provide them chances to talk to the people they want when they were staying alone.

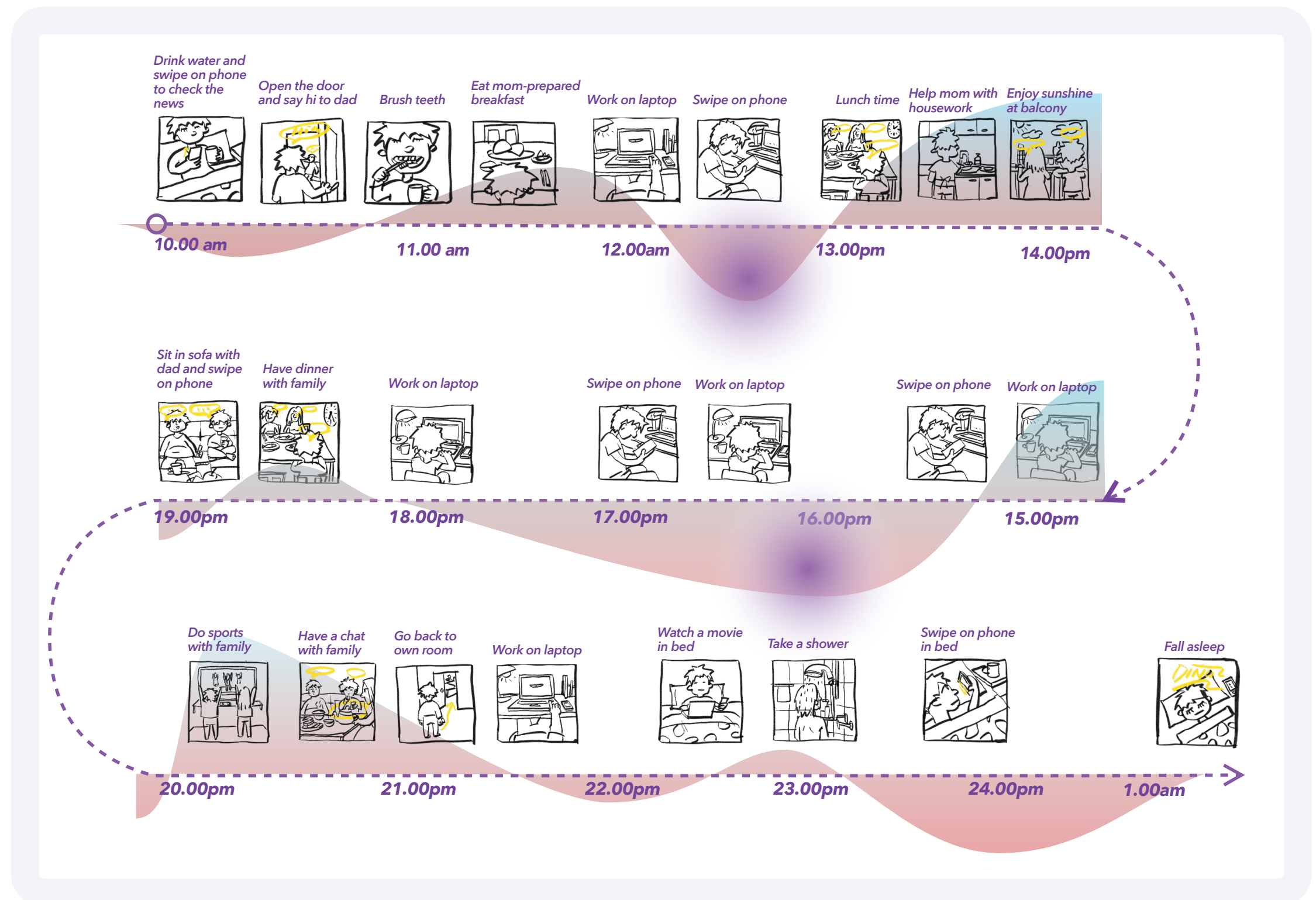


Figure 4-1-2-1. Experience map of one ordinary day in quarantine

4.2 Problem definition

Some young adults (20-30 year olds) live in urban place in China had some mild mental health problems since they were isolated at home with their families more than a month during COVID-19 crisis.

Who
Young adults (20-30 year olds) live in urban place in China

This target group most are the only one child, they do not have peers' company at home during quarantine and attaches importance to the relationship of friends. They were to some extent sensitive, and felt hard to adjust the life changes during the epidemic which contribute the mild mental health problem.

Where
Homes in quarantined cities.

The starting point for this project is Wuhan, a city with 11.08 million people, but during the project other places with similar situations will be taken into account. Because of the government policy, home became the place where the target user spent 24 hours per day for over a month.

When
During the quarantine period of COVID-19 epidemic

The design should be used in the whole duration of quarantine, in this case, from February, 2020 to May, 2020.

Why
Mild mental health problems

Isolation made the internet becomes the main methods for people to know the out-

side world and connect with others. Since the limited face-to-face social connection, young people spend more time alone which to some extent leads to accumulating negative emotion. In this special period, most of the social behaviors are arranged in advance on-line considerate with time and excuses. People are losing the happiness of casualness and unexpectedness such as greeting and chatting on the streets.

How
To bring back some values that they lost because of quarantine during the epidemic.

Creating a more half-public online platform which provides young people informal and relaxing online communicating experience among acquaintances and brings them senses of togetherness and feeling of freshness.

To reduce sequestered young people's negative emotions by brings them senses of togetherness with the acquaintances they can not meet during the epidemic.

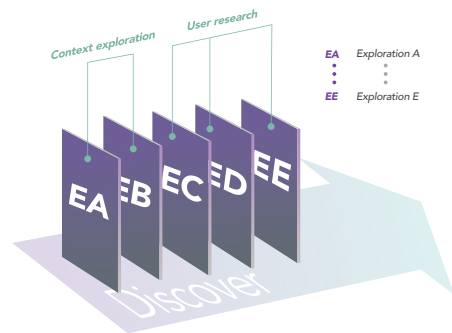
Value orientation
During the COVID-19 quarantine period, young people in Wuhan temporarily share the same living rules, values, even similar behaviors. According to this sameness and uniqueness, they shared a subculture during

this quarantine life. Socio-cultural dimensions[19] was used here as an assistive tool to find the preferred value of target users. The dimension of identification, space, attitude and experience were taken into considerations. A comparison of value orientation be-

tween the current situation and the desired interaction was presented in the following table chart.

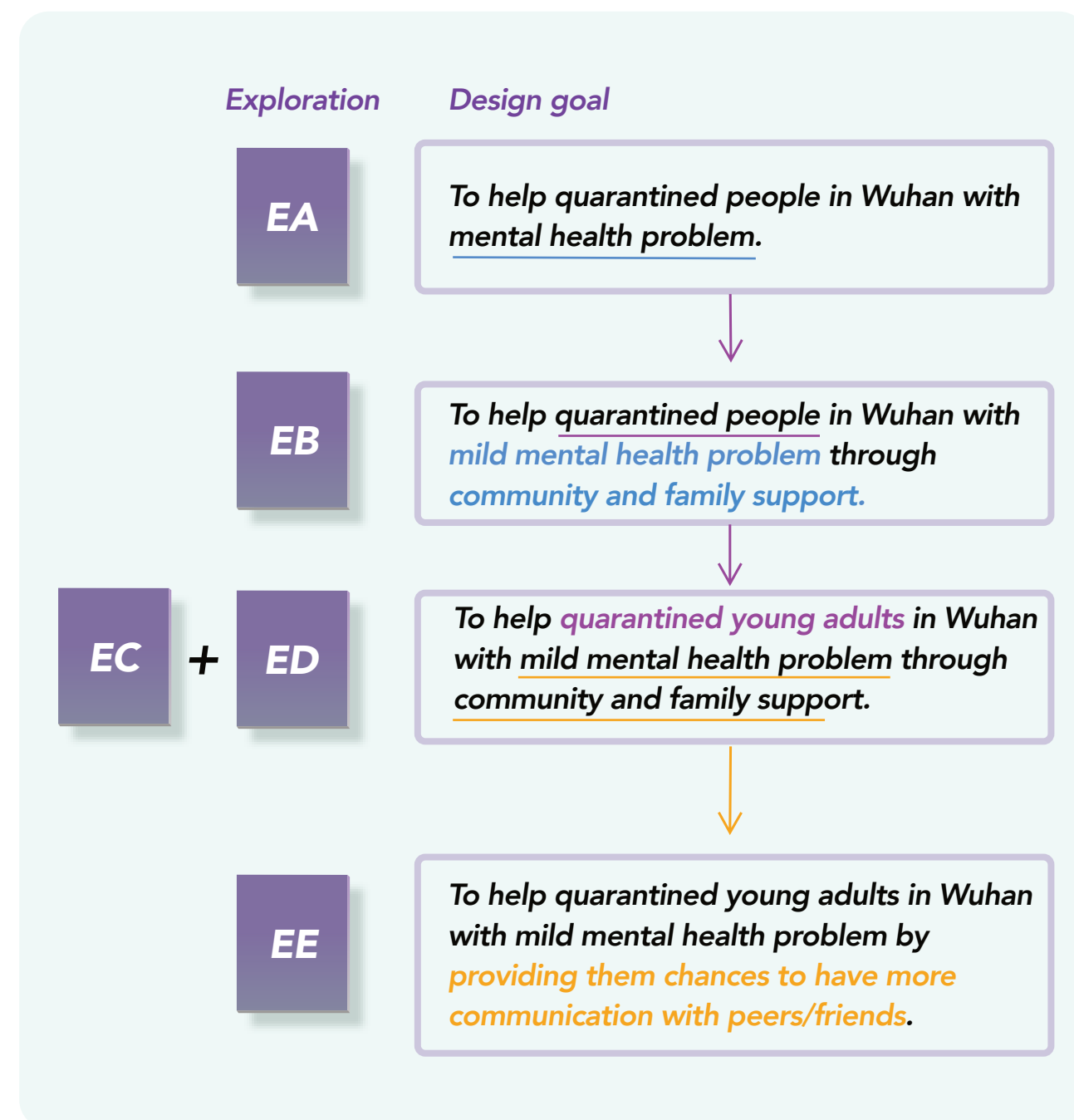
| | Current situation | Desired interaction |
|---|---|---|
| <div>Value orientation</div> <div>Dimension</div> | | |
| Identification | Individual Since the quarantine policy, people can not meet each other, they spent more time individually and hesitate to contact others. | Together People can talk to friends casually without hesitation. People can feel the sense of togetherness while realising that their friends are accessible and welcomed to reach. |
| Space | Private They stays in a private area - home, the only people they can meet are their family. | Public The online platform provides a more public space for people to reach each other randomly, they can talk to people not only through one-on-one chat but also group chat. |
| Attitude | Fun Since the early stage of the epidemic was in holiday, while the time past, they they found hard to back to work and study in the same environment - their home. | Duty The platform also brings them reminder about the duty of their work and tasks during the epidemic. The communications among people can bring motivations and stimulus to work. |
| Experiences | Expected They live in the small space and doing similar things every day, even talk to expected person, since they make appointments in advance before contacting each other. | Unexpected People can talk to unexpected person just like walking in a street and run into different people. |

4.3 Design goal



After the explorations of the topic, the design goal was finally defined:

To help quarantined young adults in Wuhan with mild mental health problem by providing them chances to have more communication with peers/ friends.



4.4 Design visions and requirements



V1. The design should bring young adults a sense of togetherness with peers while being quarantined at home.

R1: providing them with an online platform for them to reach each other casually.

R2: creating a greeting ritual for users to show their kindness to others, meanwhile receiving the warmth from others.



V2. The design should provide the user with a platform and let them feel being in a relatively public space.

R3: the theme of the platform remind users being in a public area in the physical world.

R4: provide users to meet people randomly in the platform just like walking in the street and run into someone.



V3. The design should bring young adults unexpected social experience while being quarantined at home.

R5: Providing them with a social network platform which could match people to talk randomly.

V4. The design should remind people of the duty for their work and tasks and encouraging them to support each other mentally.



R6: Giving them a time limit for talking while using it in working days.

R7: Encouraging them to support each other mentally and accumulate energy to work.



Chapter 5 Design creation

The previous chapters explained the analysis phase that concluded with the design brief, which is the basis for following steps taken in the design process. This chapter discussed how the design concept generated.

With the design visions and requirements, three initial ideas were explored. After a feedback session with peers, an idea was chosen as the base of the design direction. With feedback from peers, a concept - 'Chachat' was refined for further development. After that, prototyping and tests were conducted for revising the concept. After the iterations, the final concept was created.

5.1 Preliminary design concepts

After gaining the design vision and requirements, this section discussed about how the initial concept gradually generated.

The process of the concept generation

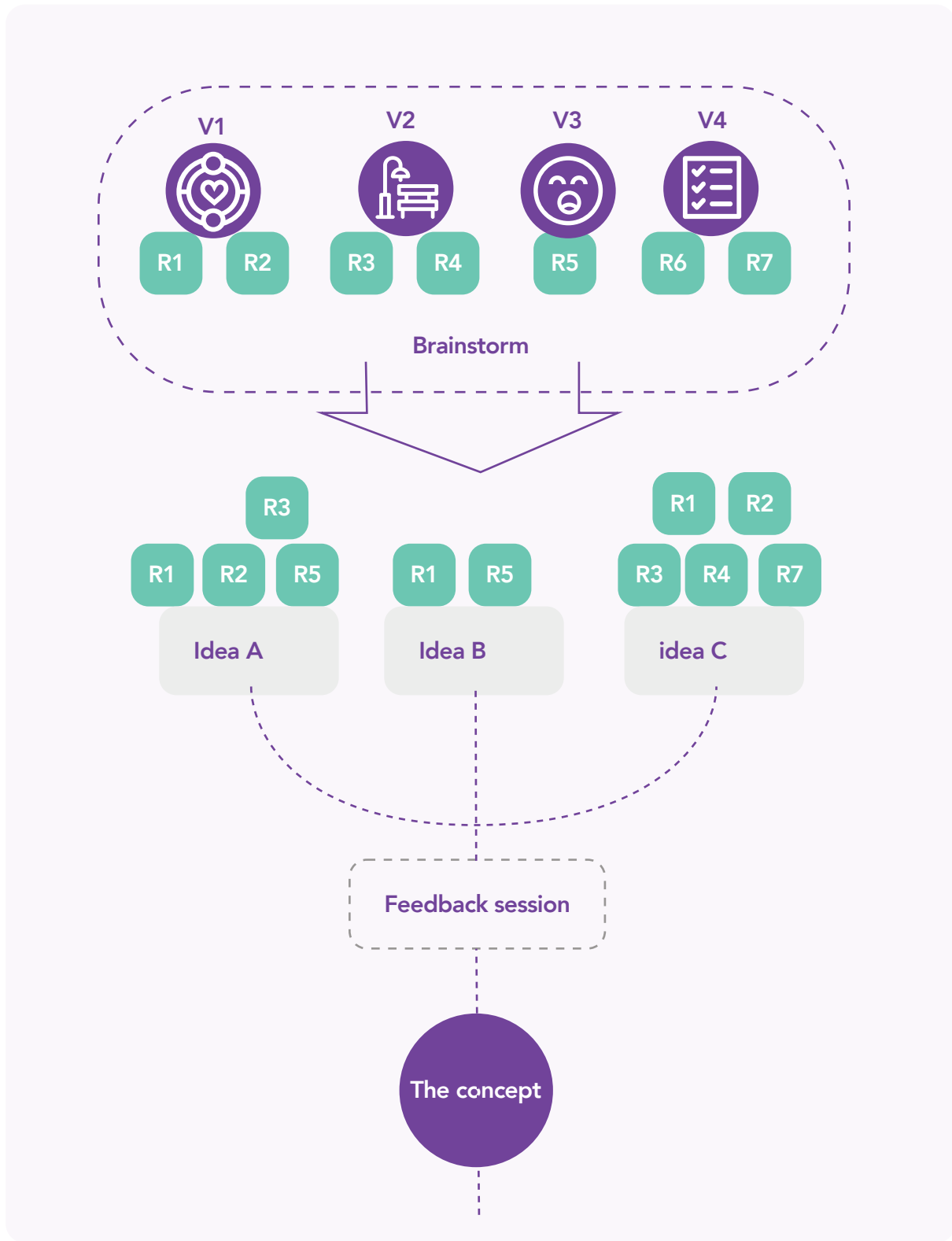


Figure 5-1-1. The process of the concept generation

Regarding the design goal - to help quarantined young adults in Wuhan with a mild mental health problem by providing them chances to have more communication with peers.

I did a brainstorming by using the four keywords of design vision - together, public, unexpected, duty. (See Figure 5-1-1) For reaching different design requirements, three con-

cepts firstly came up with. After gaining three ideas, I did a feedback session with four peers and obtained some useful feedback and recommendations. After that, an initial concept which integrated the benefits from the previous three ideas was generated.

Three ideas

| | Sketch | Form | How | Introduction |
|--------------------------------|--------|-----------------------------|--|--|
| Idea A - 'jump then talk' | | Application | To create random interaction among acquaintance through daily movement | It is a social network application for acquaintance, every time the user open the application and bring his phone for walk, the application will randomly match the user with another user who is doing the same interaction. Users can choose to talk to the other side by jumping once or refuse to talk by jumping twice. |
| Idea B - 'stop to have a chat' | | Product-service combination | To create an unexpected conversation by monitoring users movements. | The user needs to wear a smart watch while using this service, the watch will monitor people's movements. If the user sits for too long time, the watch will vibrate and remind the user to stand up and at same time automatically pair a person to talk to the user. |
| Idea C - 'teatime break' | | Product-service combination | To create a teatime atmosphere online and pair people randomly for an unexpected conversation. | The user can connect his/ her friends while using the smart cup to have a 'teatime break'. The cup is also a terminal equipment for the service. The user can use it randomly connect to friends and have a talk. |

Feedbacks

After coming up with these three initial ideas, I brought them with a small feedback session online with four peers and discussed them. I made a template for peers to vote the ones among these three ideas with the standards of my four design visions. Also, they were asked to vote one regarding their preference. Besides, they also talked about some advantages and disadvantages of ideas.

The result of the feedback session was shown on Figure 5-1-2. It is clear that the third idea got the highest score among three and also became the most popular one because they thought it 'reminds them of the 'teatime break' when they were a company and university'. In conclusion, Idea C was chosen as the concept direction for further development.

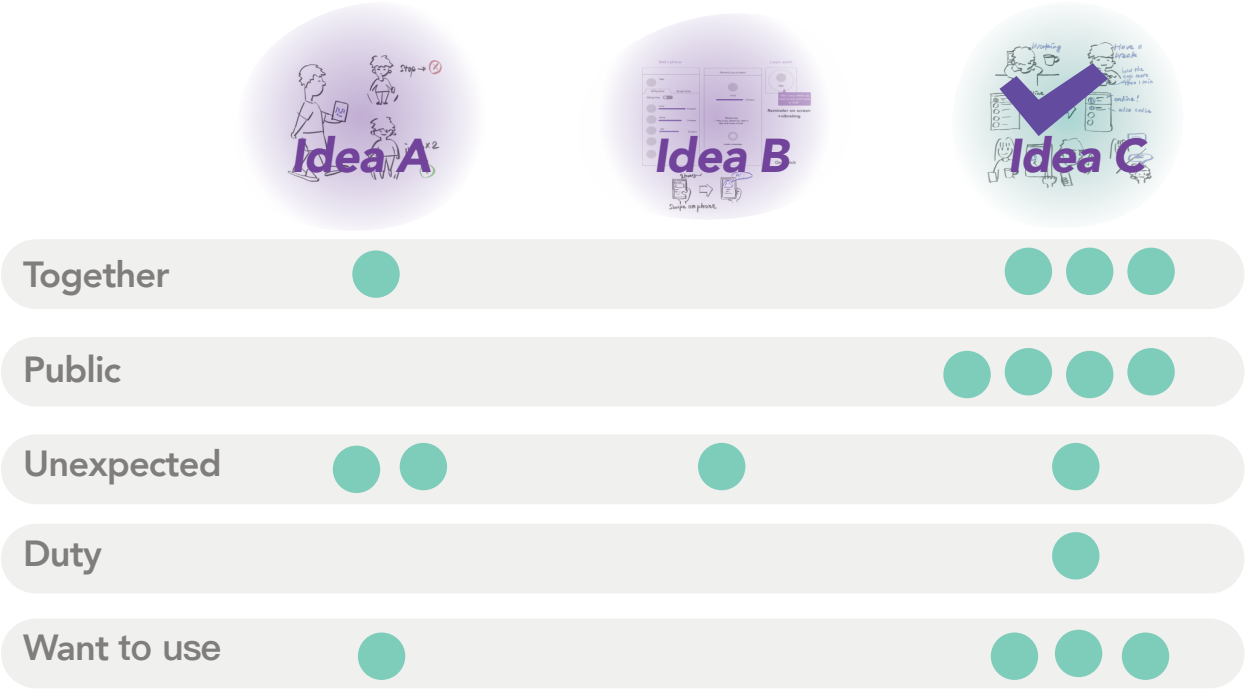


Figure 5-1-2. Result of feedback session

Challenges

1. How to reach the vision - Dutiful

For all the ideas, only one person chose idea C, and the other three people chose no idea since they thought none of ideas could help them remind the duty of work/study. How to provide a relaxing platform, meanwhile attach with the importance of work duty was a question for further design.

2. Ending a conversation online

People mentioned that they usually feel embarrassed to end a conversation online comparing in the physical world. Since the aim of the design was to create a casual social platform, 'how to end a talk without awkwardness' was also a challenge in design.

3. Users' privacy

According to the feedbacks from three ideas, people mentioned the privacy many times since they do not want online platform access too much data about themselves, for example, the daily movements which was mentioned in idea B. How to balance the privacy and functions needed to be a consideration.

5.2 Concept development

In this section, I explained how the initial ideas developed. Since the chosen idea in previous section was still abstract, prototyping was executed in this stage as the main design method for implementing ideas into more tangible form. Several low-fi prototypes were made and tested for gaining feedbacks and having iterations.

5.2.1. Iteration 1

1) Concept 1.0

Concept 1.0 was a in-detail version of Idea C in the last section. The inspiration of this concept was the physical 'teatime' experience. Young adults usually had a break while having a cup of tea/coffee. The behavior 'take the cup and walk to the kettle' could be a sign of 'I am free to have a talk'.

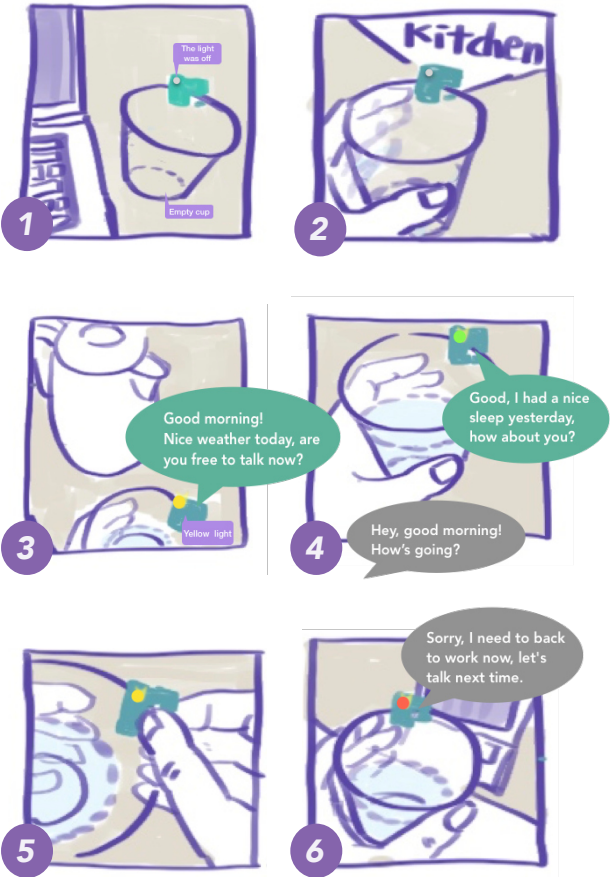
Talk to an unexpected person at an unexpected time

This concept was a product-based solution. It was a smart cup that connected to a social network application. The sensor on the cup could sense users' actions. When a user took the cup and walked, the sensor would judge the user as 'free to talk' then it would start match the user to a random person for a chat.

A greeting ritual

After two users successfully paired, a recorded greeting message from the user on the other side would play as a special ringing. Users could choose to talk to that person or not by touching the button on the cup. The greeting messages was an important part of the concept, according to users' personalities, they could record their greeting message differently, for example adding a sweet flirty sentence, tell a short joke, etc.

Concept 1.0



- 1 Stop working and decide to have a break
- 2 Walk to kitchen to fill the water
- 3 The yellow light flashes and a voice message received
- 4 Reply the message and start a conversation
- 5 Touch the button to stop the conversation
- 6 The red light shine and a 'bye' message is sent

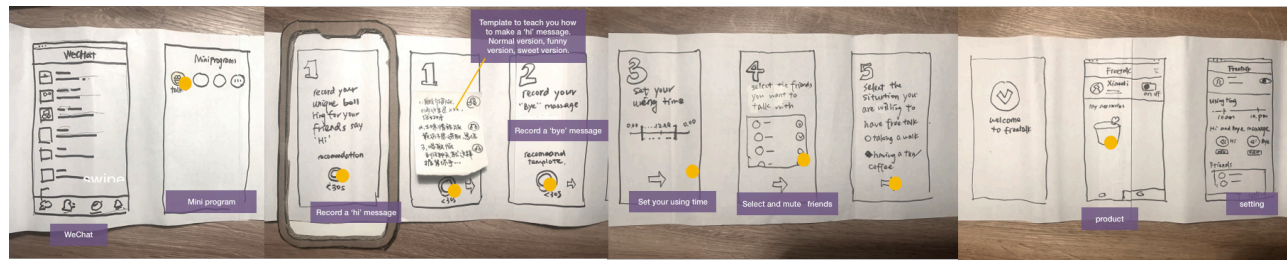


Figure 5-2-1-1 Low-fi prototype of concept 1.0

2) Prototype and test

A low-fi prototype was made. For the application part (Figure 5-2-1-1), screens were made by paper a full-sized smart phone model was made by cardboard. Since the cup in the concept had telephoning function, a mini speaker-louder was used to simulate the smart cup. The prototype was tested with two peers of mine individually, who were both Chinese students in Industrial Design Engineering faculty in Delft University of Technology. Before the test, I generally introduced the concept and design goal. Participants were asked to follow the instructions on 'screen' to record their greeting message firstly. Then they could hold the 'cup' and pretend to walk to the kitchen for filling the cup (Figure 5-2-2). After that, I would play a recorded greeting message in my voice since I acted the user who they paired to have a talk during the test. Then they could chose to chat with me or not. After the test, they was asked to give some feedbacks and recommendations for the product part and the experience part.

3) Result and findings

About the experience

Two participants both gave me positive feedbacks for the experience when hearing someone's voice came out from the 'cup', both of them laughed when heard the recorded 'hi' message (sweet flirty version). One of the participant answered 'go away' but in a very happy tone (Figure 5-2-1-2), she said it was an interesting experience and the greeting message could also be a topic for warming up a conversation. Another participant said it was good even just hear the greeting message from a friend without a chat, it made her feel the person was close to her.

Quote

'... this part is valuable since I can feel surprise to hear a message from an unexpected person even if I can not talk with he/her, especially a person I haven't talk with for a long time.'

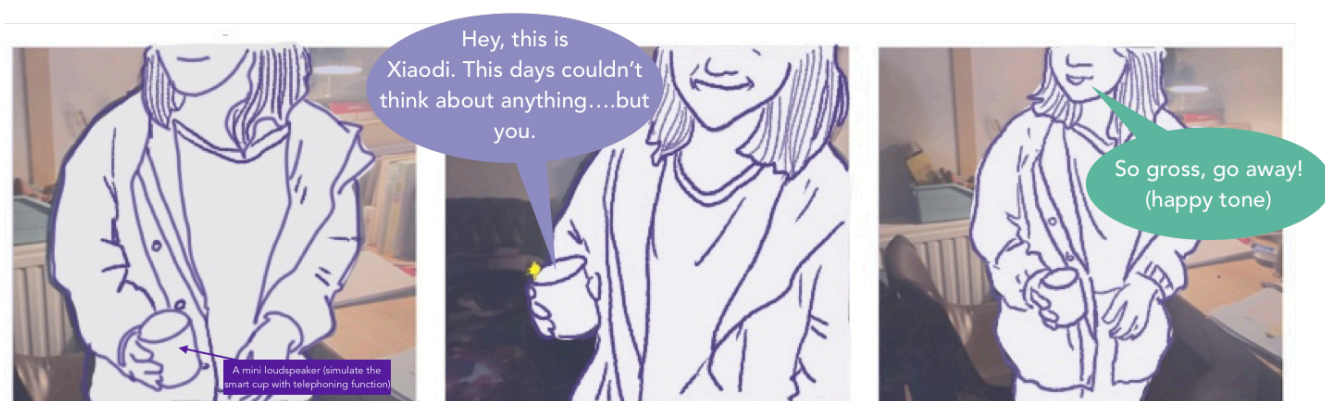


Figure 5-2-1-2 Prototyping test for concept 1.0

About the smart cup

The smart cup was a controversial part in this concept. One participant thought the cup was useless for her since she never used a same cup to drink water meanwhile another participant thought it was interesting to have that smart cup in this experience. Both of them mentioned that - if the service was only provided for the people who bought the cup, they would not buy it as the first group of people since they could not pair friends.

Key takeaways

1. Since the 'greeting message' experience receive good feedbacks, it would be kept in the further concept.
2. Regarding the feedbacks of the smart cup, different people have different cup using habits, this product was not suitable for every one in the context but it could be an extra service for enriching the experience for the people who liked it.

5.2.2. Iteration 2



Figure 5-2-2-1 Concept 2.0

1) concept 2.0

This concept based on a digital version of 'teatime' break. It integrated the solutions of the 3 challenges which mentioned in section 5.1.

How to reaching the vision - dutiful

The concept gave a time limit for users for chatting with friends/peers while working. Both side of the user would have a cup of full tea while starting a chat, the tea became less in the cup with time passed. One cup of tea represented 15 minutes. After 15 minutes, the cup was empty and a reminder showed on the screen - 'you finish your tea, are you going back to work?' The user could choose

to leave the chat or prolong the chat by 'add more tea'.

Ending a conversation

This concept was actually inspired by a welcomed excuse of leaving a talk from the participants in previous research - 'I have finished my drink, I need to go back to work.' I brought this excuse into the concept by showing the amount of the tea in cups on both side of users. Therefore, users could use the excuse without embarrassment.

User's privacy

This concept was a sub-application of an existing social network platform. Therefore, the social circle of this sub-application was based

on users’ existing contacts, users would not worried about exposing personal information to strangers.

2) Feedback session and insights

This concept was discussed in a feedback session with other 3 peers (Figure 5-2-2-2). The time limit for chat and ‘back to work’ reminder got positive feedbacks, all the peers thought it would be useful to schedule the break time while working at home. But another question came out, since the concept only supported two people’s chat, it still seemed to be a private experience comparing to the group chat experience in a real public ‘tearoom’. In addition, two peers reflected that they usually wanted talk to different people in different duration when they were on duty and off duty, for example they preferred wanted to talk to peers in working



Figure 5-2-2-2 Feedback session for concept 2.0

hours but preferred to talk to friends without time limit after finishing works. For the next step, a group chat function could be added into the updated concept to fit the design vision ‘public’, and two different modes should provided for users to distinguish two different usage scenario ‘on duty’ and ‘off duty’.

5.3 The concept - ‘Chachat’

Introduction

The concept - ‘Chachat’ was created based on the combination of the positive parts from concept 1.0 and concept 2.0. It was a product - service combined social network mini program which attached to Wechat (the most popular social network application in China).

The name consisted of Chinese ‘茶(cha)’ and ‘chat’ which indicated that the platform was related to Chinese ‘teatime break’ culture. Chachat was design for the young adults who had to stay at home for a long time, and tired of working and study online in quarantine.

Concept breakdown

Regarding the design requirements in the previous chapter, the concept consisted of several modules, and each of them was



aimed to implement different requirements. Figure 5-2-1 showed the main structure of the concept, and each module was explained individually in the following paragraphs.

Theme - ‘Tea room’ culture

In China, most of the company have a ‘tea room’ (茶水间) for employees have a short

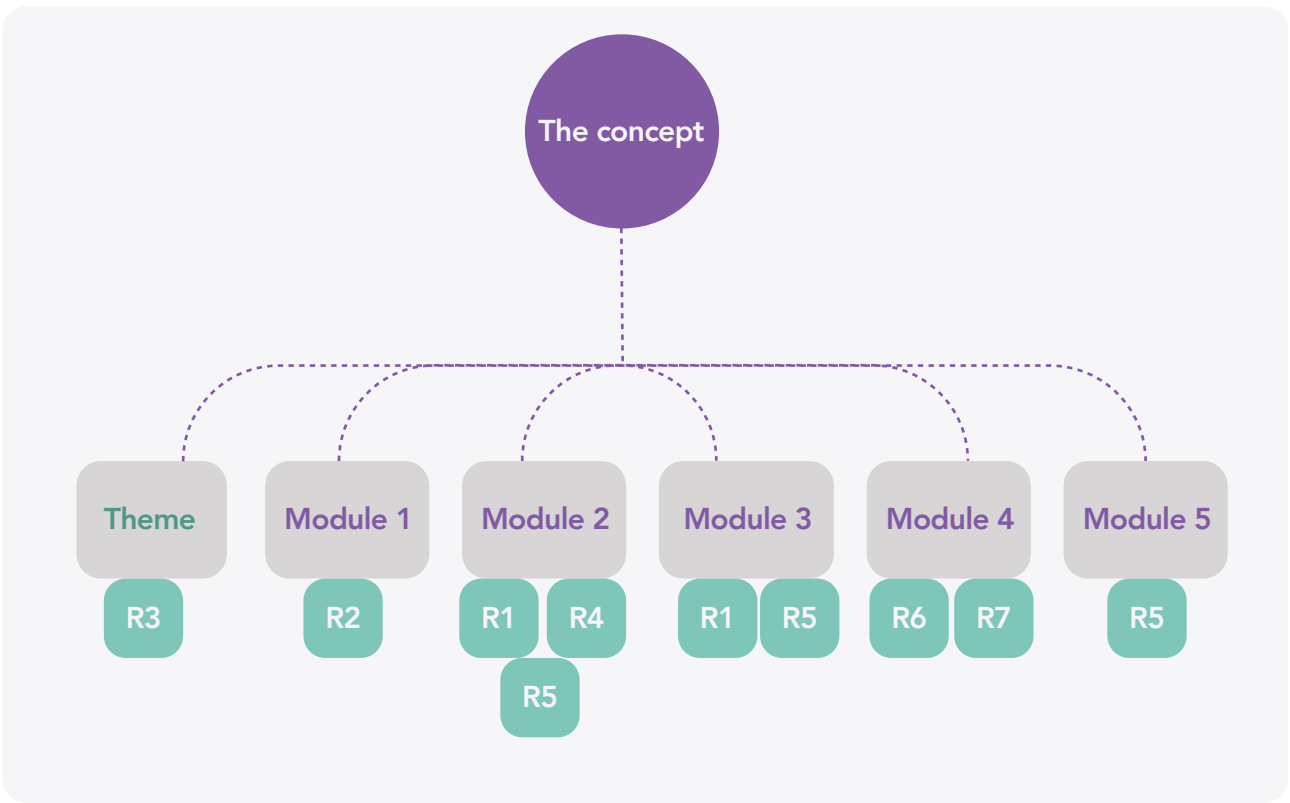


Figure 5-3-1. Concept breakdown

break during working hours. This ‘tea room’ was a public space always provides hot water, tea bag, coffee, snacks, seats for rest and even some entertainment equipment. For young employees, ‘tea room’ was a symbol of relaxation, where they can sit down together and have a short time free chat. After a short break, they can recharge more energy to work.

However, people had no ‘teatime break’ experience during epidemic since quarantine; they lost the happiness when they spent time in this shared area.

This concept ‘Chachat’ aimed to bring back the values from the physical teatime experience through an online platform; it also wanted users to feel the teatime atmosphere even stayed alone at home.

Main modules:

There were several modules in this online platform (Figure5-3-1):

Module 1. Greeting ritual

Every user needed to record sentences as greeting messages. The greeting message would be played automatically while pairing two people successfully, no matter they could have a talk or not. The prepared greeting message was not only a personal ringtone



but also a daily greeting which spread warmth.

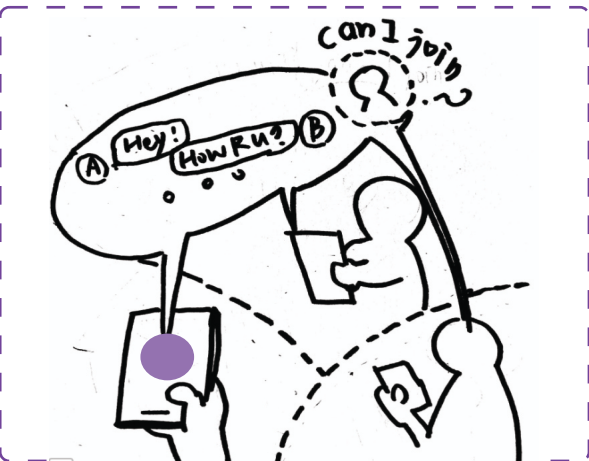
Module 2. Unexpected chat with an acquaintance

The mini program would access the Wechat's contacts of users while using. It also allowed users to choose the people to talk and mute people they do not want to talk while using Chachat. The main function of Chachat was to match the accessible person in the contact list randomly and to create a random chat.



Module 3. Welcome to interrupt and join the conversation

Chachat allowed multiple people (3 people) chat in a small group. When there were two people in a conversation, they could set a sign - 'welcome to interrupt and join' to the other people, which created a more realistic public occasion.



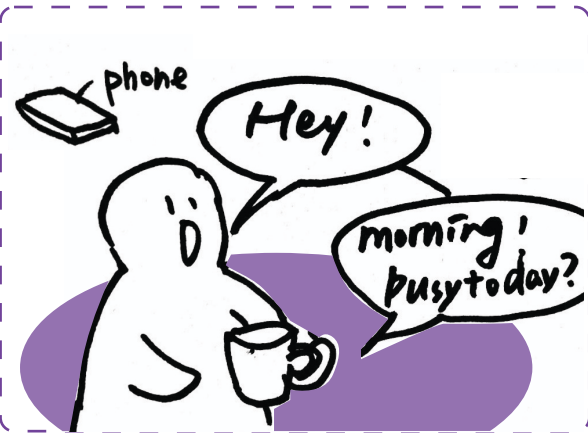
Module 4. Time limits for 'teatime break' during working hours.

Since Chachat wanted to provide the user a relaxing 'teatime break' meanwhile remind users about their duty of work and study during working hours. Two modes- Work modes and Holiday modes were provided in the platform. When the user set on Work mode, there would be a reminder popped up after 15 minutes' conversation to alert the user to back to work/study, but the user still had the choice to prolong the conversation or back to work/study.



Module 5. Physical product - the smart cup for upgraded users

Since during quarantine, people spent too much time in front of screens. The physical product was design for users to get rid of the smartphone and having a real break after working for long hours. The cup allowed the user to handle every



process of the mini program, for example, pairing and accepting a conversation. In addition, the cup could sense the water and stop a conversation while finishing the water.

5.4 Prototype development

After the entire concept was defined in the last section, 'how to implement the concept' became the primary question in this stage. This section would explain the prototype I made and the process of the development of its usability.

Wireframe and usability test

A wireframe of the mini program (Figure 5-4-2 on the next page) was built to have a draft prototype of the entire concept. It incorporated all the module and functions of the concept; it also conveyed the overall direction and description of the user interface. The explanation of the user interface was given in Figure 5-4-1.

| Tasks | Completion |
|---|------------|
| Setting modes | |
| Open the function and choose the working mode | P1 P2 |
| Set the time limit for working mode | P1 P2 |
| Pairing another user and chat | |
| Find the button for random pairing | P1 P2 |
| Enter the conversation | P1 P2 |
| Be reminded for 15 mins | P1 P2 |
| Leave the conversation | P1 P2 |
| Joining a group conversation | |
| Find the button to join a friend's conversation | P1 P2 |
| Prolong and leave the conversation | P1 P2 |

Completed smoothly

Completed but hesitated

Asked for assistance

Figure 5-4-1. Task completion list

Two peers participated the usability test online. The test was conducted online, two participants were asked to share their screen with me online while using the prototype, and the testing process was recorded. After reviewing the recorded video, a task completion list was filled. The process of the prototype test was divided into three phases - setting modes, paring to another user and entering a chat, join a group conversation (Figure 5-4-2), each phase had several tasks. It could be seen that participants could finish most of the tasks smoothly, but had difficulties find the button to join a group chat (interface 11-12 in Figure 5-4-2) since the lacking of indication.

Additionally, some quotes of the participants were concluded and cluster into positive feedbacks and negative feedbacks.

Positive

- The prototype was simple to use; most of the buttons and icons are easy to understand.

Negative

- The setting mode part made participants confused (interface 5-6 in Figure 5-4-2), because of two reasons: 1. The lacking of explanation of different modes for the first time user. 2. It is not suitable for a 'setting' occupying one main interface; it made users mistakenly thought it was a pri-

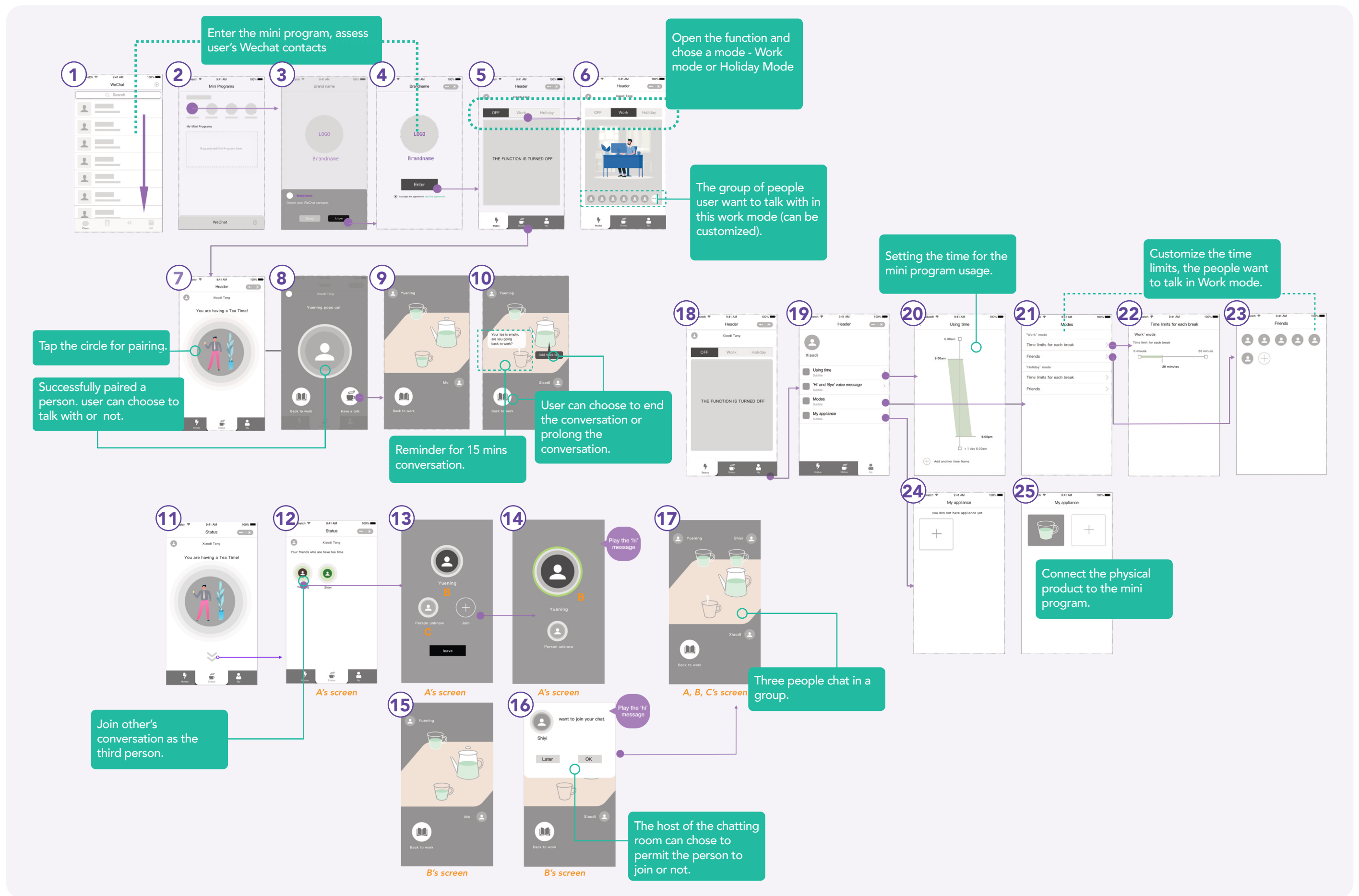


Figure 5-4-2. The wireframe and explanations

mary function.

- The button of 'joining a group chat' was challenging to find; it should be more eye-catching.
- A guidance was needed for the first time users since there were some special rules and function in the prototype (ex. Two modes, one cup of tea represented 15 minutes, etc.)

Structure updates

An updated structure of the prototype was made according to the recommendation in the previous usability test. For combing the flow of the user interface, I layered the information in the prototype. (Figure 5-4-3) the most significant update was that the 'choosing mode' part was integrated into the same interface of the home page as second-layered information.

This structure provided the base of making the final design in the next chapter.

Summary

This chapter introduced the whole design creation process, started from how the initial ideas generated, how these ideas came into a concept, and how the concept developed.

After several iterations of concepts and prototypes, a final concept - Chachat came out. Moreover, a revised structure of the final prototype was prepared for making into the final design..

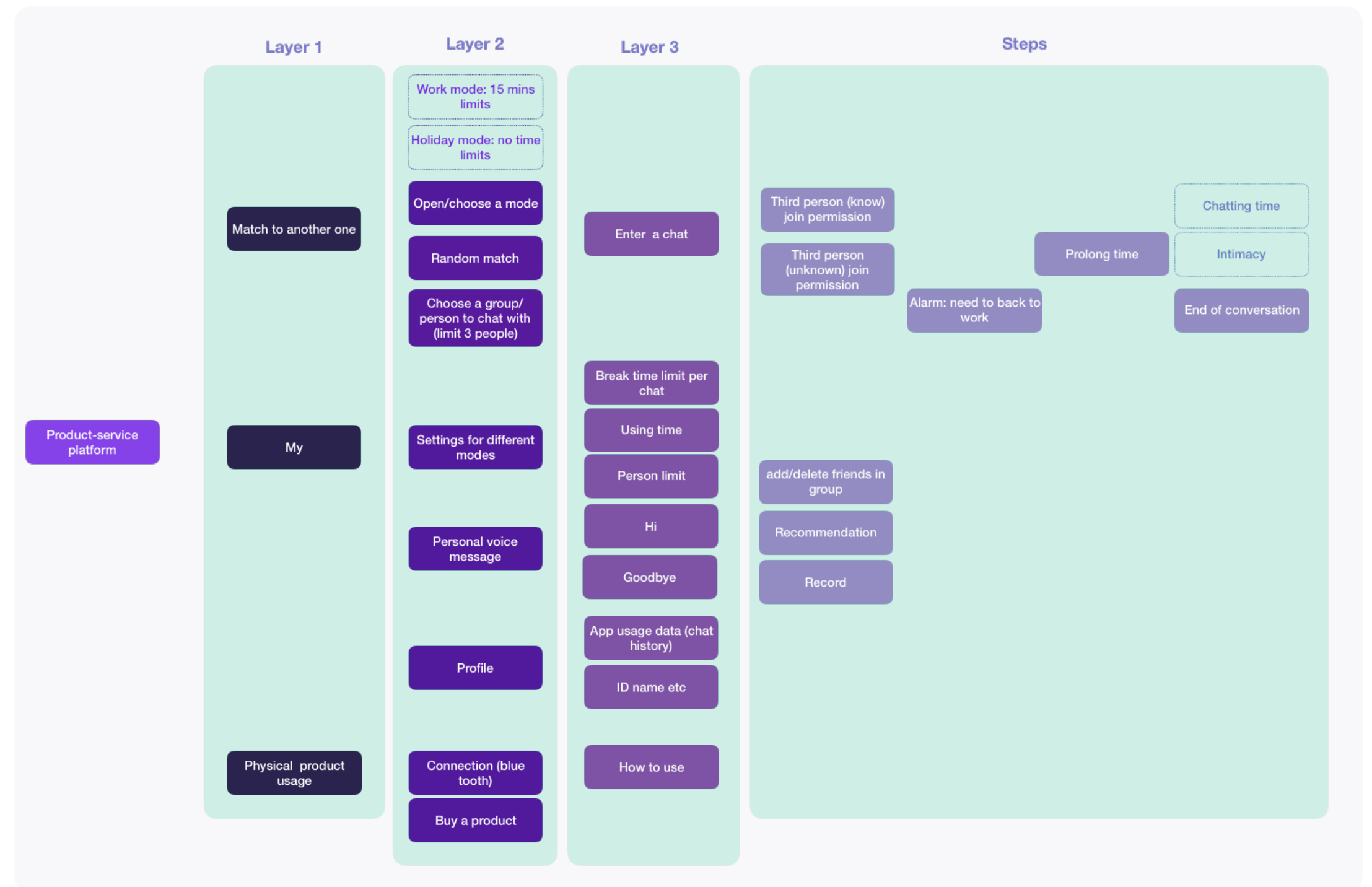


Figure 5-4-3. Structure of the prototype



Chapter 6

The final design

This chapter elaborated on the final design - 'Chachat' a mini program that enabled young adults to have an unplanned chatting experience while working/study from home. The chapter started with a brief introduction of the concept, then an in-detailed description of how the final design

6.1 Introduction

Concept overview

Chachat (茶寮) was a sub-application in Wechat mini program platform. It was designed for the young people who were quarantined at home for a long time in 2020 COVID-19 pandemic. It aimed to help these people to reduce some negative emotions and brought more energy while working/studying from home.

To achieve this goal, I created a social platform that - during tea breaks - provides informal chats between friends and peers. The intention of the design is that such an informal meeting will give the quarantined people a kind of 'tea room' experience where people meet in an unplanned way. Central to this concept is the idea that the users do not know in advance who will join their tea break. They will be all from their own selected group, but - similar to a physical tea moment - who will be there at the same time is a surprise.



Figure 6-1-1-1. Theme colors of Chachat

Visual communication

The visual style of the final design was inspired by a traditional Chinese painting by Ren Xiong (1687-1763) (Figure 6-1-1-2). This

painting illustrated people peacefully having rest in the mountains.

For creating a relaxing atmosphere in this design, I picked out the colors from the painting and used them as the theme colors (Figure 6-1-1-1) of the mini program.



Figure 6-1-1-2. A Chinese traditional painting - Qiu Ling Gong Hua Tu by Ren Xiong (1687-1763)

6.2 Description of the mini program

The overall design was introduced in the previous section; this section would describe the final design detailedly. The final design would be destructed into five parts according to its different phase of the experience:

- 1) A login page;
- 2) Presetting;
- 3) Guidance for first-time users;
- 4) The main screen;
- 5) Pairing with another user and starting a chat.

1). Login page

Since the concept was a sub-application in Wechat platform, users could directly login with their Wechat account, and they needed to allow the mini program to access their existing contacts.



Figure 6-1-2-1. The Login interface



Figure 6-1-2-2. The Presetting interface

2). Presetting

For the first time users, they need to do some settings before enter the mini program including record their 'greeting message', set the time limit and social circle while using different modes. Meanwhile, it was also an explanation of when and how to use the functions of 'hi' and 'bye' messages, 'on duty' and 'off duty' modes.

3). Guidance for first-time users

Since the final Prototype needed to be tested without any oral introduction and assistance, a short tutorial was provided for users. The tutorial included the main functions - opening and choosing modes, pairing with another user, customizing modes, joining a group chat. of the mini program and meaning of some particular phases in this mini program for example 'on duty' mode and time limit for a tea break. The specific content of the tutorial could be seen in Figure 6-1-2-3.



Figure 6-1-2-3. Guidance for first-time users

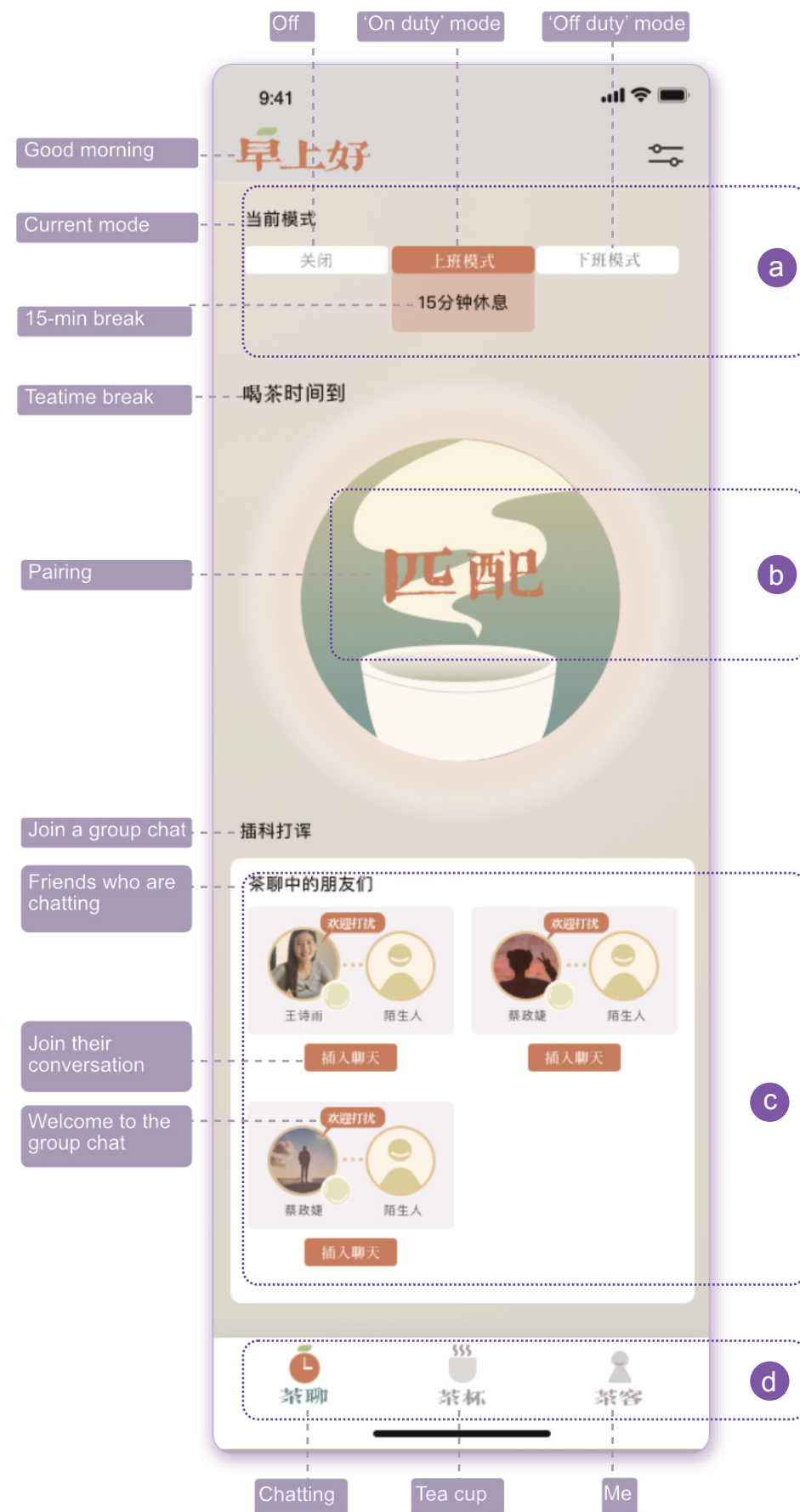


Figure 6-1-2-4. The main screen

4). The main screen

After finishing the short tutorial of the mini program, users would enter the main page. The main screen consisted of 4 main parts:

a. Current mode

This part was made for controlling the pairing function. If users choose 'off', they can not pair or been paired with other users. If they turn it on 'on duty' mode, they can see the time limit - '15-min break', also they can set it on 'off duty' mode for chatting without time limit.

b. Pairing

By taping this big button, the user could start to pair with a friend for chatting. Since it was the most vital function of the mini program, it was put on the most eye-catching place.

c. Joining a group chat

This part was designed for a more public experience for users. The user could see his/her friends in this area if he/she was undergoing a chat and set 'welcome to the group chat' for the chatting room. The user could join the group chat by taping 'join the conversation'. Besides, the other one user in the group chat could also be recognized he/she was their common friend, but if not, the portrait of that person would be muted, and it might be a good opportunity for them to make a new friend.

d. The tab bar

The three buttons divided the mini program into 3 parts. The first one-'Chatting' included most of the functions of the mini program, which needed to be seen by users at first sight. The second one - 'Tea cup' was made for updated users to use the extra service. The third one was a gathering of personal information and settings.

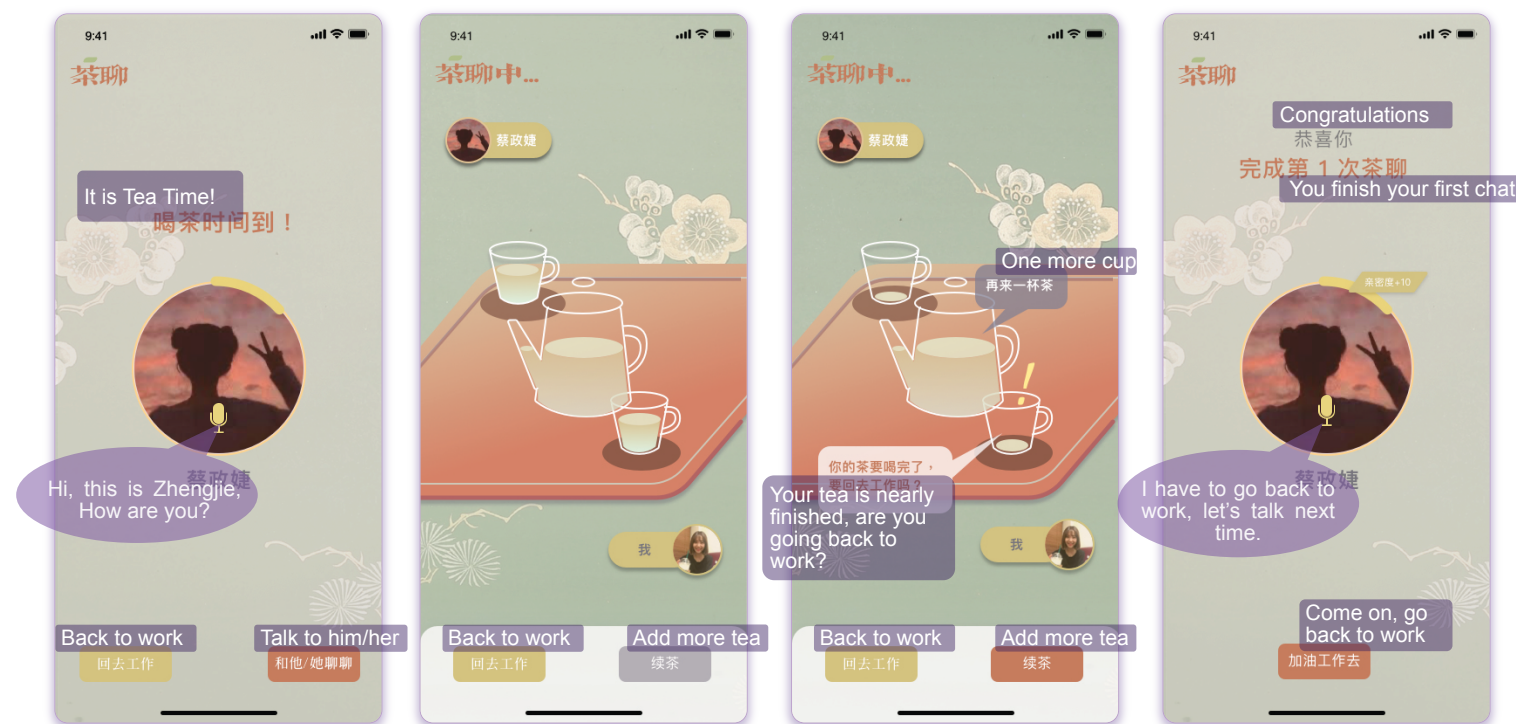


Figure 6-1-2-5. Pairing with another user

5. Pairing with another user and starting a chat

After the user tapping 'pairing' button, a profile photo and a name would be popped up while successfully pairing with another user. Meanwhile, the 'hi' message of that person would also be played. The user could choose to talk to that person or not.

There was a tea set on the interface after entering a chat; each side of the user had a cup of tea. The tea in the cup would be gradually reduced as time went by. A reminder would of 'your tea is nearly finished, are you going back to work' popped up after chatting almost reached 15 minutes. Then the user had the option to leave the chat, or prolong the chat by tap the kettle to add more tea in the cup.

After finishing the chat, a 'congratulation' screen would come out with the 'bye' message from the person you talked to.

If you chose not to talk with a paired person at the beginning, the 'bye' message from you would also be played to the other-side user.

6. Settings

After entering the mini program, the user could also customize the time limit and a group of people for each mode. The greeting message could also be replaced by a new version.

The procedure of how to do these settings was illustrated step by step in Figure 6-1-2-5.

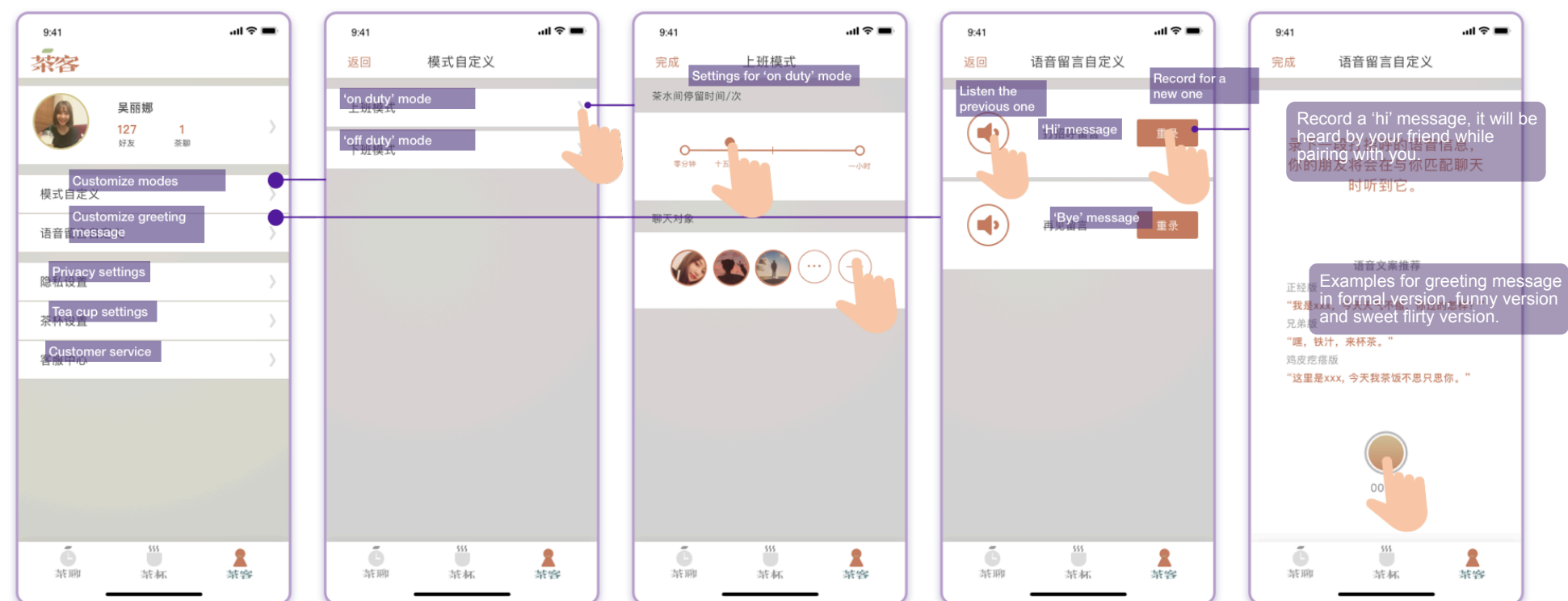
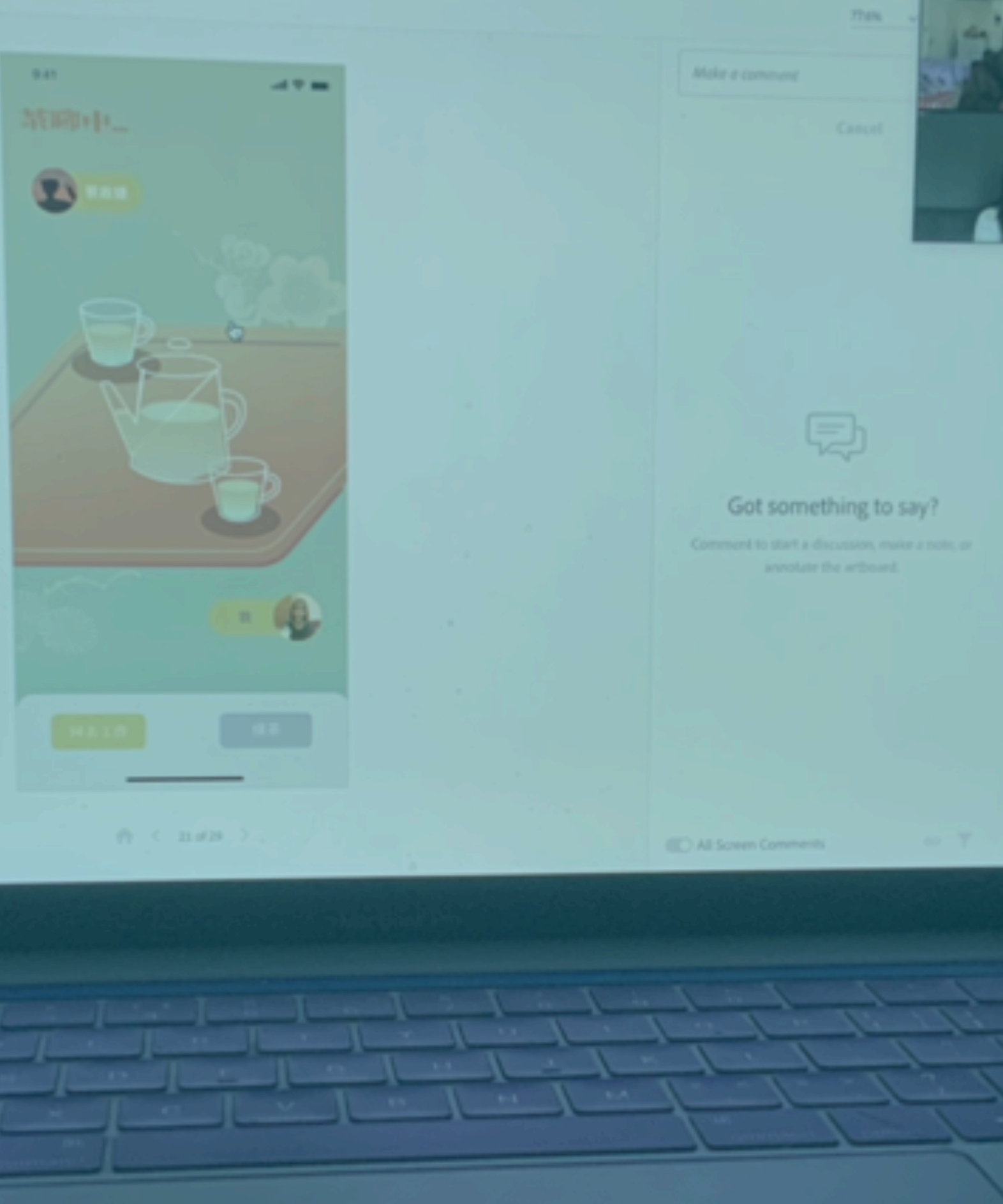


Figure 6-1-2-9. Settings



Chapter 7

Final test and evaluation

The previous chapter described the implementation of the Final design prototype. In this chapter, I would utilize this prototype to investigate user experience. A concrete explanation of the final test was given in this chapter. According to the test and evaluation, the recommendation was as the outcomes at the end of this chapter.

7.1 Final test

This section explained how the design as presented in the previous section had been tested and why; the goal, the selected participants, the method and the results.

1) Goals and questions

| Goals | Research questions |
|--|---|
| To verify the usability of the final design prototype. | <div>1. Can participants understand how to use the prototype without assistance while testing?</div> <div>2. Can participants finish all the tasks without inconveniences?</div> <div>3. What are the barriers that the participants face?</div> <div>4. What are the opportunities for improvement of the prototype and concept?</div> |
| To assess the desirability of the final design | <div>1. In what way do they experience the concept?</div> <div>2. To what extent and how do they appreciate when envisioning the use in the intended context, that is young people quarantined?</div> |

2) The participants

Four participants, who were young adults between 22 years old - 25 years old (1 male & 3 female), were invited to experience and evaluate the prototype. Two of them (1male & 1 female) experienced quarantine in Wuhan from the end of January to April but went back to normal life. The other two people were experiencing pandemic in the Netherlands and America; they spent most of their time at home and took online courses.

3). The method

The participants were invited to the face-to-face prototype test by using online meeting software individually. There were three steps in this final test (Figure 7-1-1) Although two of the participants

were in the research target group of my previous research, with the changing situation about the pandemic, they were not in the certain context of the final design. Therefore, before the test, the participant was first asked to read a scenario; it could inspire them to imagine a context. And he/ she needed to play the role of this persona. After that, the QR code of the prototype and a task list with seven tasks (in Appendices) was given to he/ she; the participant needed to finish the tasks while using the prototype. The prototype was tested without any previous introduction and assistance during the process. After finishing the test, a half-hour interview about his/her feeling and thoughts of the experience was conducted. The interview ques-



Figure 7-1-1. The process of final test

tions were in Appendices.

4) Data collection and analysis

For collecting data, participants were asked to share the screens with me while using the prototype, and all the process of this final test was recorded for review and transcription. A task completion list was filled after the record videos were reviewed. Since all the tests were executed in Chinese, all the transcriptional conversation were in Chinese; only the vital

quotes were translated into English. Based on which themes they were related to, the filtered quotes were clustered. After that, the generated insights were concluded.

5) Test results

The result would be described from the following two parts:

Usability

Since a usability test was conducted of the previous version of the prototype in the prototype development phase, with the improvements of the prototype, the usability of the final design was very good. It could be seen in the task completion list that half of the participants were able to finish all tasks smoothly. One participant skipped one pro-

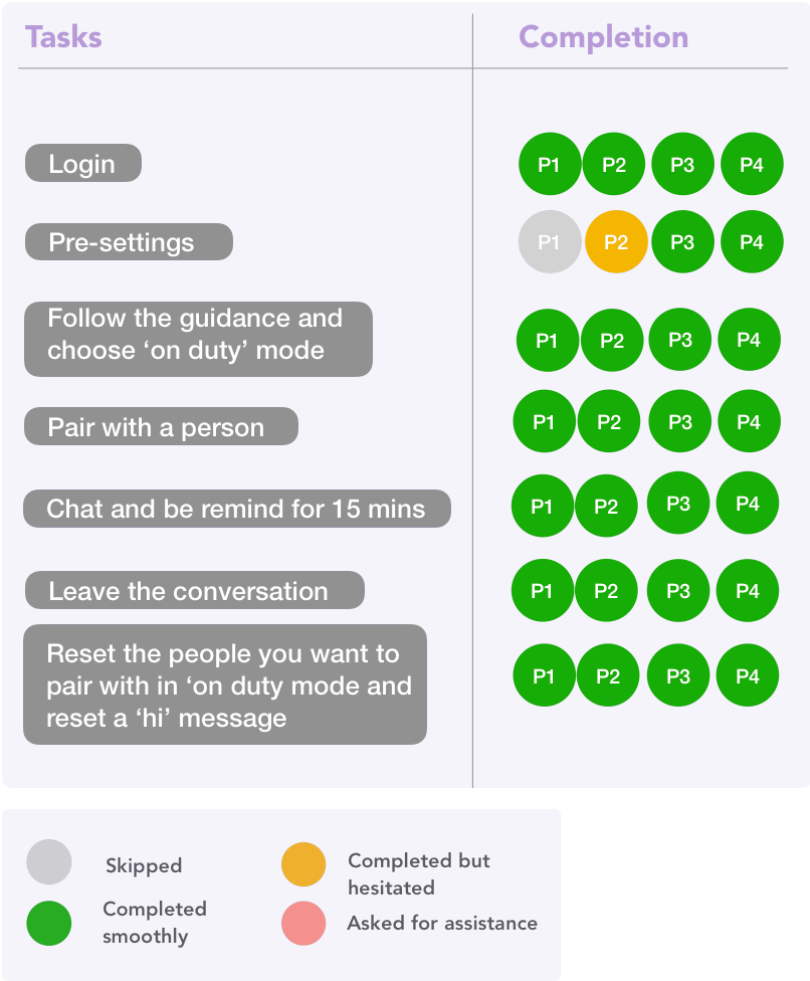


Figure 7-1-2. Task completion list

cedure in presetting part, and one participant hesitated in this part because of the same problem - they did not want to record their voice for the 'greeting' message. The reason of that was they were too shy to record it in front of me (I was watching in front of the screen during the test). For the best parts of the prototype, they all gave positive feedback; they thought the guidance was very specific and useful to understand the design.

Desirability

About the desirability, some relevant quotes were clustered into positive parts and negative parts. The quotes in green boxes were the positive ones, and the quotes in red boxes were negative ones.

About the entire design concept

The feedbacks were entirely different from different people. Participant 1 and participant 2 (both of them were in Wuhan and the quarantine was ended) showed little interest about the entire design; they thought Chacht was a normal chatting app with no significant difference compared with others. Other two participant (participant 3 were in the Netherlands, and participant 4 were in America, both of them were taking online courses) gave very positive feedback. Participant 3 thought the design was needed currently, and participant 4 thought it was special.

‘Generally, I think it is a normal chatting app plus time limit function.’

‘It is replaceable, Wechat can not only phone call, but also video call.’

‘There was no other platform could see whether your friends (is free to talk or not), you can just talk to (them) directly.’

The part they liked and disliked

The ‘greeting message’ part and the ‘join in a group chat’ part are the most popular parts of the concept because they were fresh and interesting for them. Also, the visual style was welcomed by participants. No specific part was pointed out as the disliked part.

‘I like it (the greeting message).. because it is funny. Firstly, they are my acquaintance, familiar with, then, hearing the greeting from familiar people makes me happy, also, you have some versions of greetings, I think is very fresh, no other social platform provide a greeting before starting a talk.’

‘I do want to try to talk to the stranger (a friend's friend),it may be very interesting, but may be awkward.’

Usage in real context

All of them said they would try the mini program if it was really existing, but the popularity of the mini program was significant for its experience.

‘I will try it, I think it is attractive for me at least. But I am not sure whether I can pair my friends.’

‘I’ll use it during quarantine, I was eager to try everything interesting.’

‘I’ll try it for days, but it depends on its popularity, if my peers not use it, I have nothing to play on it.’

7.2 Evaluation

There were two main goals for the evaluation:
To evaluate whether the concept can achieve the design goal.
To evaluate whether the design can achieve the design visions and requirements.

About the design visions, four visions were evaluated individually.

Vision 1 - Together

The ‘greeting message’ part could considerably bring people a sense of connection and togetherness, and the effect might depend on the attitude of the users while recording greeting messages.

‘..it can make you feel..you are still connect with the world, not been isolated...’

‘If I hear very creative greeting messages, I think maybe I will go to reset my message, but I can not come up an idea in a short time (during testing), so I did not do that.’

‘It supports me talk in a group, that made me feel (I am) together with other people.’

‘It depends on the content of the message, if the message is similar to what I recorded just now, very normal, not designed, happy, or funny opening sentences, then, it is just like a normal ‘hi’, not like a ritual.’

Vision 2 - Public

This mini program could provide users more connection with other people, which is more ‘public’ in a way comparing being alone, but it could not bring the real sense of being outside in a public space.

‘..it can make you feel..you are still connect with the world, not be isolated. But it is not public, that is a different environment if you stay outside...the part ‘I can enter another person’s chatting room is more public.’

Vision 3 - Unexpected

Chachat could, to some extent, brought the unexpectedness to users. The effectiveness could be influenced by the range of social circle which the users set for themselves at the beginning.

‘After all, it matches randomly, I have over 100 of friends, it is a great uncertainty (to pair another person)...also, there are a lot of people I do not always (have opportunity to) talk to.’

‘they are all the people I choose to talk to, I know who are in that group...I’ll only set few people I am very familiar with, others.. I was afraid to be awkward...’

Vision 4 - Dutiful

The ‘time limit’ for a chat was a benefit for the users who were busy with work/study and had goals for reaching to recharge themselves remind their duty. It might be less influence for the users who were not busy or had no aim for work/study.

‘Of course, it already urged me to go back to work, let me not waste time.’

‘if I was really busy, I would count every minutes in my mind, em, when I took a shower I played music, I would listen how many songs I played..i would think..maybe too long for shower, then get out (of the bathroom) immediately.. for me, if I felt really headache about...anxious about that, that must be important. It told me ‘it’s time’, that could be a good excuse for ending the chat.’

‘In case you run into a very decadent friend, or the friend with low efficiency, he drags you down, then your efficiency is reduced. I have encountered this situation before...’

‘It differs, if talk to a person who are not on the same page with you, or the person do not give any advice to others, not listen to others, only talk about herself/himself, is meaningless.’

'My heart is like a rock, If I want to go back to work I'll do that, if I want to chat, I'll definitely ignore the reminder. It also depends on the chat itself, if I talk to a person I do not want to talk for long time, of course I'll leave immediately even before 15 mins but it is kind of impolite.'

'(if) I have work to do, then I will directly go to work without chatting, maybe I am not your target user, because I do not chat in tearoom while working...I go to tearoom only when I need water or coffee.. it is a public space, other people are working maybe you will be seen by your boss, you know...we usually chat by testing during working hours, maybe it is only our company, other company may have more relaxing company atmosphere, it depends on different company.'

'I think 15 mins are too short for me, I will add tea many times if the person on the other side not refuse me.'

Design goal

Chachat could provide young adults with more opportunities to talk to peers and friends while working/studying from home. It provided them with a relaxing experience during the quarantine.

'.. It is really lacking of this kind of thing. If I want to talk to someone online, the habit (influence me) before quarantine was - try not to disturb others. But during quarantine, every body is at home, you could actually call them, but the habit restricts you. However, 'calling' (this form of connection) is changed, for now sending e-mails, or what's app, wechat message becomes a 'pressure' for others, (these behaviors means) you want to ask for help, or talk a very important task, maybe it is better to give a phone call.'

'Chatting with friends is a very relaxing experience for me, I could get more energy back to work.'

7.3 Recommendations

Recommendations for the design

1. Interaction on the chatting interface

Two of the participants mentioned that they expected more interaction while chatting. One participant said that she usually talked with peers and sent pictures for discussing, and another participant said she preferred to use video call. For further development, the chatting interface should contain more functions, such as texting and video calling.

2. Time limit

One participant mentioned 'what if I want to talk to 3 people within 15 minutes individually'. This inspired me of that the users should have the choice to manage the chatting time as they want, an updated version could be - the user could set the amount of the tea every time before he/she was entering the chat.

3. The physical product - 'Tea cup'

An extra service- the smart cup could be further developed. The updated users could use the physical cup to control the time limit for the chat by control the drinking speed.

Since of the limit of time, the extra service - smart cup was not implemented in the concept. This idea was introduced to the participants in the final test and gained positive feedbacks; all of them thought the idea was intriguing.

Recommendations for testing

1. Do not watch the participants when they were testing the prototype.

As mentioned in usability part of the test result, one participant met some inconveniences since i was watching her, another participant skipped the procedure since he thought it was awkward to record a 'hi' message in front of me. For the future test, it should be taken into consideration.

2. Try to Imitate a real situation

When testing with participant 1 and 2, the role who they paired with was played by me, it made the participants hard to experience the 'unexpectedness'. This improper test set up could influence the test result.

Recommendation for the prototype

It would better to have the animation of 'tea reducing' and 'add more tea'. Since these are attractive parts of the concept, a real animation could benefit the prototype experience.

Chapter 8

Discussion and conclusion

This final chapter included the conclusions on reflecting the design goal and a discussion of project limitations, followed by the recommendation for future work.

8. Discussion and conclusion

Reflection on the design goal

The design goal is:

To help quarantined young adults in Wuhan with a mild mental health problem by providing them chances to have more communication with peers/friends.

'To help quarantined young adult in Wuhan...'

Because of the changing context, the context in Wuhan was different. For the young adults who were staying in the Netherlands and America, the context was currently similar to the intended context. The very positive feedback from the participants located in these regions could, to some extent prove that this part was achieved.

'...with the mild mental health problem.'

From the evaluation result, the design could help young adults have a short time development of their mental states since it could make them feel relaxing and being recharged. But for the long term experience, there was still some uncertainty. As for 'men-

tal health problem', since mental health was a long-term assessment. 'Can the design benefit mental health problem' could not be evaluated in a short time test, and it might need more psychological evaluation methods.

'...by providing them chances to have more communication with peers/friends.'

The final design was a social network tool for users to have more informal chatting experience. This part met the design goal well.

Limitations

Limitation in the user research

The user research was conducted during the COVID-19 pandemic, meaning that nearly all activities were conducted online. Although some of the online collaboration platforms could provide the basic need of the conducting sessions, there were still a lot of inconveniences for the participant compared to the sessions in the physical world. For example, the difficulties of writing and drawing online usually discourage participants' passion for creation and communication.

Limitation in the design

The effectiveness of the design was different according to the diversity of people. For example, the design was welcomed by the person who was busy and needed to finish a deadline but not attractive for the person who never chatted during working hour.

Limitation in the test and evaluation

Since the limit of time, the final test was only conducted with 4 participants; even these four people were experiencing two different contexts. Two of them experienced quarantine six months ago, but had back to normal life, two of them spent most of their time at home currently because of the pandemic. The test result showed differences according to the participant. Therefore, the authority of the result needed to be considered.

Recommendations

Test and evaluation

For future testing, more samples were needed in the test and evaluation; especially the samples from the intended context of the design.

Future opportunities

Since the influence of Covid-19 pandemic, working and study from home became more and more common for people globally. And it became a hot topic recently. A large sum of the online working platform steps into people's sight with rapid development and iteration.

This project researched on the young people's mental health while working/study from home, which provided a particular point of intervention. The design could be improved if I could collaborate with the company who developed these online working/ social platform.

References

- [1] Council, D. (2005). The 'double diamond' design process model. Design Council.
- [2] Van Boeijen, A., Daalhuizen, J., van der Schoor, R., & Zijlstra, J. (2014). Delft design guide: Design strategies and methods.
- [3] Zu, Z. Y., Jiang, M. D., Xu, P. P., Chen, W., Ni, Q. Q., Lu, G. M., & Zhang, L. J. (2020). Coronavirus disease 2019 (COVID-19): a perspective from China. *Radiology*, 200490.
- [4] "Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV)". World Health Organization (WHO).
- [5] COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU). Coronavirus Resource Center in Johns Hopkins University.
- [6] World Health Organization. (2020). Transmission of SARS-CoV-2: implications for infection prevention precautions: scientific brief, 09 July 2020 (No. WHO/2019-nCoV/Sci_Brief/Transmission_modes/2020.3). World Health Organization.
- [7] Le, T. T., Andreadakis, Z., Kumar, A., Roman, R. G., Tollefsen, S., Saville, M., & Mayhew, S. (2020). The COVID-19 vaccine development landscape. *Nat Rev Drug Discov*, 19(5), 305-306.
- [8] Maragakis, L. L. (2020). Coronavirus, Social and Physical Distancing and Self-Quarantine. John Hopkins Health.
- [9] Systrom K, Krieger M, O'Rourke R, Stein R, Dellaert F, Lerer A (11 April 2020). "Rt-Covid-19"
- [10] Zhao Manfeng (赵满丰). "Archived copy" 国家中心城市 [National central cities]. usa.chinadaily.com.cn.
- [11] "2013 Wuhan Transportation Annual Report" The government of Wuhan <http://jtj.wuhan.gov.cn/zwgk/xxgkndbg/>
- [12] Barbisch D, Koenig KL, Shih FY. Is there a case for quarantine? Perspectives from SARS to Ebola. *Disaster Med Public Health Prep* 2015; 9: 547–53.
- [13] Miles SH. Kaci Hickox: public health and the politics of fear. 2014. <http://www.bioethics.net/2014/11/kacihickoxpublichealthandthe politicsoffear/> (accessed Jan 31, 2020).

[14] Lamers, S. M., Westerhof, G. J., Bohlmeijer, E. T., ten Klooster, P. M., & Keyes, C. L. (2011). Evaluating the psychometric properties of the mental health continuum-short form (MHC-SF). *Journal of clinical psychology*, 67(1), 99-110.

[15] Singh, N. N., Wahler, R. G., Adkins, A. D., Myers, R. E., & Mindfulness Research Group. (2003). Soles of the feet: A mindfulness-based self-control intervention for aggression by an individual with mild mental retardation and mental illness. *Research in Developmental Disabilities*, 24(3), 158-169.

[16] Sanders, E. B. N., & Stappers, P. J. (2012). Convivial design toolbox.

[17] Tol, W. A., Barbui, C., Galappatti, A., Silove, D., Betancourt, T. S., Souza, R., ... & Van Ommeren, M. (2011). Mental health and psychosocial support in humanitarian settings: linking practice and research. *The Lancet*, 378(9802), 1581-1591.

[18] Wessells, M., & van Ommeren, M. (2008). Developing inter-agency guidelines on mental health and psychosocial support in emergency settings. *Intervention*, 6(3/4), 199-218.