Improving parent-child communication:

creating a relaxed conversation atmosphere during the COVID-19 quarantine period

Abstract

With the influence of COVID-19, people all over the world are facing significant challenges. Families with school-aged children face difficulties in helping the children transition from traditional school to online education while bearing various stress due to the epidemic quarantine measures. The situation leads to an intense parent-child relationship during the quarantine period because of the increased conflicts about the children's learning status, especially for Chinese families, which attach great importance to studying.

Through a literature review on parents' involvement in children's study, the cultural influence on parenting style, and how the epidemic context could impact the children, I have a basic understanding of the context. The design goal was defined by combining the insights obtained from the in-depth interviews with nine families and relevant design theories on designing for children and parent-child communication. The project aims to improve parent-child communication by creating a relaxed conversation atmosphere during the COVID-19 quarantine period for Chinese families with children aged from 9-12 who are about entering their puberty and could have more communication problems with their parents.

With the inspirations of ideas from brainstorming sessions and the Doraemon character, the time travel concept was created and developed to create a relaxed communication atmosphere and provide more communication topics for parents and children at home.

A prototype was developed and tested with four families to evaluate the extent to which it can improve parent-child communication at home. The test results showed that parents believe the design makes sense in helping create a positive communication atmosphere at home and, therefore, could facilitate a better parent-child relationship. From the children's feedback, the long-term attraction to the children in using the product can be a direction for further development and improvement.

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CHAPTER 1   INTRODUCTION

This chapter provides an introduction to the project. It starts with describing the current home education situation under COVID-19 and indicate the opportunities of the project, followed by the defined goal and design scope for this graduation assignment. The third section presented how the double diamond design process framework was applied through the project. It continues with discussing the relevance of the project and ends with the main takeaways.

1.1 Project context

1.2 Project goal and project scope

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image from https://www.scmp.com/

1.1 Project context

1.1.1 Online home education under COVID-19

The Corona-virus disease (COVID-19) outbreak has caused worldwide concerns since December 2019. To minimize the risk of infection, people began to increase awareness and maintain a social distance, leading to various industries experiencing an unprecedented challenge. Also the shift from traditional to online work is challenging given the rapid changes and uncertainties that occur every day during the epidemic. People need to start from scratch and build an effective online working mechanism through trial and error with limited experience or guidance.

Figure 1-1 Many industries are influenced by the epidemic
image from https://www.visitstockton.org

Figure 1-2 People wearing face masks on the street during COVID-19 outbreak
image from https://www.weforum.org

1.1.2 Online home education under COVID-19

The education industry is also inevitably affected by the coronavirus. For instance, students in China are supposed to come back to school after the winter holiday at around the beginning of March. However, due to the influence of COVID-19, all schools postponed the school start date and students were asked to learn at home through online courses. Although online education has a history of

nearly 20 years (Hill, P. 2012) with outstanding technological advantages, the infrastructures around haven't been developed enough to make it the mainstream in the education industry. For students and teachers in the quarantine, suddenly online education has become the only way to continue the learning and teaching activities. They are experiencing a lot of struggles of changing their ways of working due to the huge differences between traditional education and online education.

There is previous research on the challenges of the transitions from conventional schooling to home-based online education (Klamm, H. 2012) within the context that the students made the decision themselves under a normal situation with enough physiological preparation for the transition. Students choose online education at home with the expectation that online learning means a more comfortable environment, away from various pressures of conventional school life, simpler academic requirements, and more freedom to arrange their study time. However, home-based online school education amplifies the deficiencies of students lacking self-motivation and self-discipline, making them in great need of parents' supervision and academic assistance. The transition to online schooling has fewer possibilities to succeed when these students didn't get enough support especially in those families with a poor parent-child relationship. (Klamm, H. 2012) When it comes to the new context, with much more stress under the influence of huge life change due to the COVID-19, people might experience more difficulties in the adaptation process. Little is known about how people should do without new rules and guidelines that fit into the current situation. This situation is particularly challenging for school-age children. They easily get bored when taking online classes and they have difficulties in learning courses

without the assistant and supervision of their parents. (Pan, S. L., Cui, M., & Qian, J. 2020) Therefore, parents are largely involved to support the children to use the devices and help them to keep focused on the study. This puts an extra burden on parents who need to keep their jobs running at the same time.

Figure 1-3 A student attends an online class at home   *image from https://www.weforum.org*

1.1.3 Opportunities in the context

Online education is developing at an unstoppable rate and it continues to revolutionize the modern education industry. (Vprountzos. 2014) The outbreak of COVID-19 accelerates the development as well as amplifies the disadvantages of online education. It is an opportunity to research the needs of different stakeholders in the system and make a strategy to improve online education efficiency by providing design solutions in the new context. As a designer, I have the opportunity to frame the design space, encode the contextual components of the system, and generate a solution to the

(Fegert, J. M., Vitiello, B., Plener, P. L., & Clemens, V. 2020) The students, teachers, and parents are all more tired under these circumstances. The limit on physical outdoor activities under the quarantine period also brings extra stress on people's mental health, leading to less ideal learning efficiency.

identified challenges through the understanding of the new context. (Bauer, J. S., Newman, M. W., & Kientz, J. A. 2014) Ideally, the design can help parents and students navigate the transition from traditional schools to online learning at home better thus relieve their stress during the COVID-19 period. The design can be inspirational and beneficial for the time being and also in the future for the education system, especially when students need to make the transition in their study routine or under extreme life stress. Simultaneously, parents can benefit from this design strategy to help their children learn online at home, based on the rapidly growing trend of online education.

1.2 Project goal and project scope

1.2.1 Project goal

The project explores how to help Chinese families with school-age children to make the transition from the traditional classroom to home online education under the stress of COVID-19 during the quarantine period. Covid-19 has been around for some time and may continue to exist for some time. There is much uncertainty about the future. In addition to being seasonally influenced, the choices of governments and individuals may play a larger role in determining how the epidemic spreads. (Scudellari, M. 2020) Correspondingly, it is difficult to predict how long online education will last. Therefore, this project is not a one-time project. In the long run, it can provide some enlightening attempts to help parents adapt to the challenges and changes in educational concepts in the era of online education. It might also provide knowledge that can be used for online education in" normal" times, as far sick children, etc.

Based on the project goal, the thesis is going to work on following questions:

● What are the main struggles/challenges of students and their parents in the context of online education during the COVID-19 outbreak?

● How do parents and children deal with these challenges now?

● What are their special needs/desires in the online education system during the epidemic period?

● How to create practical guidelines/tools for students and the parents to have a more fun and effective experience under the stress?

● How the final design can be implemented, and if possible, how can this be applied in a similar context where people are forced to transfer to online education?

1.2.2 Project scope

As shown in the statistics, there were more than 1.2 billion children in 186 countries affected by school closures due to the pandemic until April 2020. (UNESCO, 2020) While countries are at different points in their COVID-19 infection rates and online education developments, it's not feasible to target the project at a worldwide level. The target group for this project is Chinese families with school-aged students (from 9-12 years old specifically) involved in online education during the quarantine period under the challenges and stress of COVID-19.

COVID-19's staggering impact on global education

Number of learners impacted by national school closures worldwide
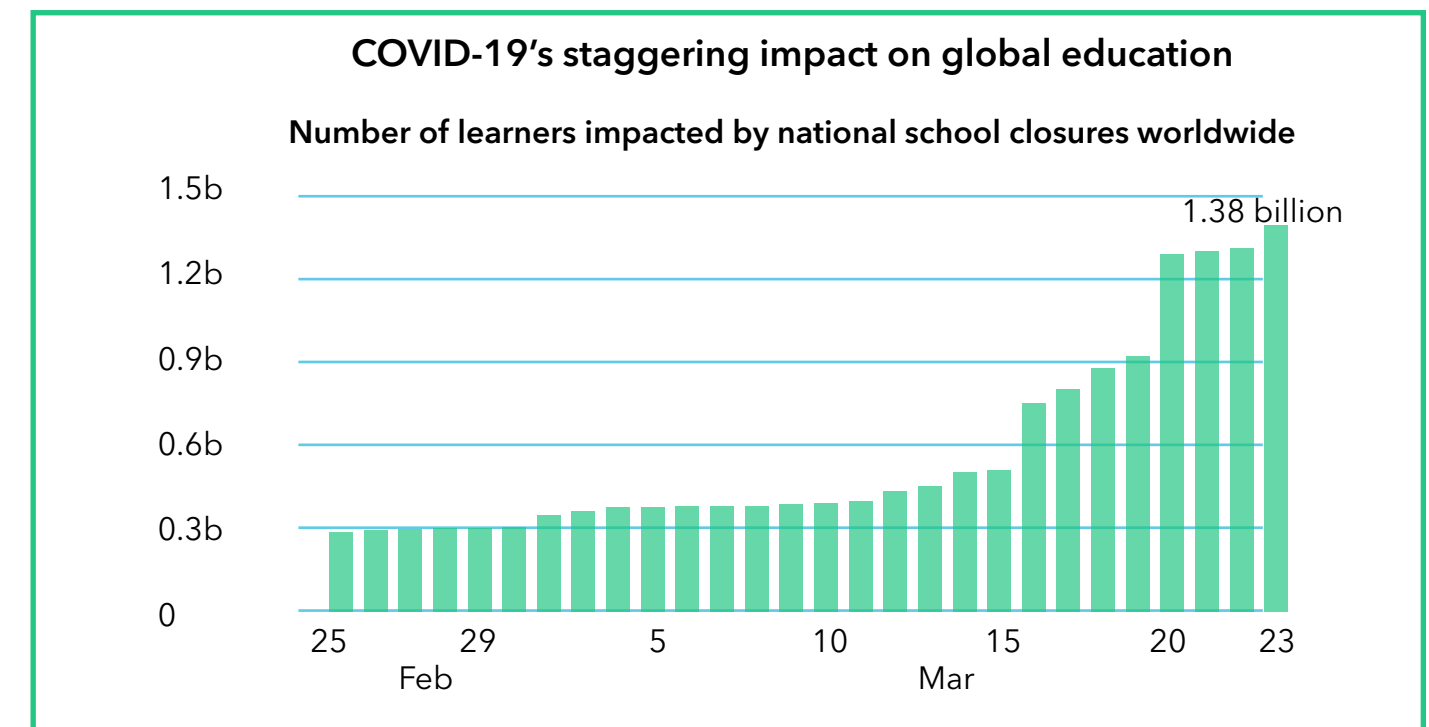
Figure 1-4 Learners enrolled at pre-primary, primary, lower-secondary, upper-secondary levels of education (Including tertiary education levels)
image from UNESCO

Why China?

First, one reason why I choose the China context is that I grew up in Chinese culture, which enables me a deep understanding of the development and current situation of Chinese education. This is essential for the smooth start of the project. Moreover, in the later stage of filed research and design testing, it's easier for me to find the appropriate participants and get deeper insights. I do expect that we may be able to generalize the results (partly) to other cultures.

Second, As the first several countries facing the challenge of a nationwide transition to online education, China is greatly affected by the epidemic in the education industry. All schools were closed since the start of March and according to the monitoring data from UNESCO, in large regions, most schools remain closed until June. It seems that online education is the only option for students and educational practitioners to go on study activities for a long time under the policy of strict anti-epidemic control measures by the government in China. Therefore, it's valuable

and challenging to start the project in China with such an extreme context.

It is not difficult to see from the picture that at the end of April (the time the project was initiated), almost all schools in China were closed due to the impact of the epidemic. Of course, through a series of strict epidemic prevention measures, most schools gradually reopened in the new school year that began in September. However, for a large number of Chinese families with children, the life with online classes during the epidemic, which lasted for half a year, is still of great research value. Next, as the pandemic is still not over, it is seen that in many countries home-schooling is still used.

Global monitoring of school closures caused by COVID-19

China — 278.436.085 affected learners
132, 379.197 females
146,056.888 males

Some schools have re-opened in certain regions, but most remain closed

School type	Females	Males	Total
PrePrimary	21587122	24616068	46,203,190
Primary	47,539,759	54,729,119	102,268,878
Secondary	39766900	44930.653	84697553
Tertiary	23,485,416	21,781,048	45,266,464

Worldwide — 1,568,452,265 affected learners
89.6% of total enrolled learners
185 country-wide closures

● Localized   ● Country-wide   ● Open

Figure 1-5 COVID-19 Impact on Education   *image from https://en.unesco.org/covid19/educationresponse*

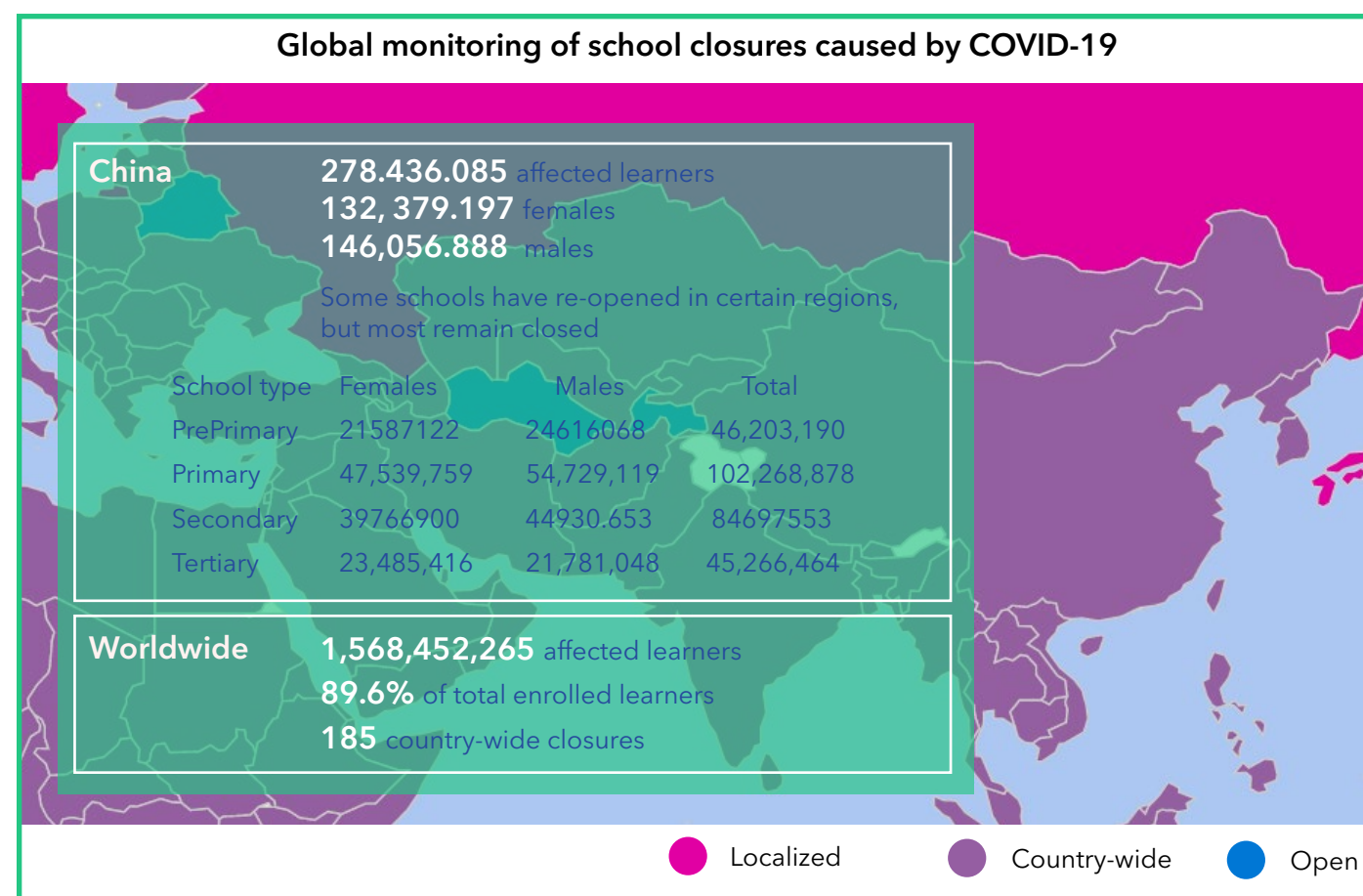Although many technology companies are accelerating the development of online education tools to reduce the impact of the epidemic on students, compared to western countries with long-standing well-established instructional distance education, China's online education industry started relatively late. (Zhang, K.2005) It means that Chinese families may face greater challenges in home education with limited training and guidelines. In addition to learning how to help their children use various online learning software, parents also need to adjust and change their educational methods and philosophies in the given context.

Third, China's online education market has great potential and room for development. According to a survey conducted by the China Institute of Education Finance, households spent about 1.9 trillion yuan ($296 billion) on preschool and primary education in the 2016-2017 academic year, accounting for 2.48 percent of GDP in 2016 and education costs are continuously increasing, both in terms of time and money. When Chinese parents review their annual bills, due to the characteristics of the education industry, such as rigid demand, high frequency, investment and consumption attributes, there is no doubt that children's education expenditure accounts for the largest proportion. (GETChina Insights) In a report last year, Morgan Stanley analysts predicted that the online tutoring market from kindergarten to 12th grade would grow 23-fold to $160 billion in 2030, thanks to technological advances and government regulations that require at least 8 percent of the education budget to be digitized. (Cheng, E. 2019) With Chinese parents paying more attention to education, the industry has been booming even as China's overall economy has come under downward pressure. Therefore, it is of high commercial value to choose China as the starting point of this project.

9 to 12 years old. Why?

Children exhibit different behavioral preferences at different stages of development, which affect their academic performance. In China, most children between the ages of nine and twelve are in grades three to six in primary school. At this stage, children face more difficult academic knowledge than students under the third grade of primary school, while compared with junior students, they still lack enough self-control and understanding ability to study independently. At the same time, as they are about to enter puberty, their attitudes towards study and life are probably affected by some psychological changes. (Klamm, H. 2012) Practical suggestions and assistance for parents are especially important when the children need to deal with both the stress of the epidemic and the psychological changes that puberty is going through. Therefore, children from 9 to 12 years old need more parental help with online learning than any other age group although the very young are less independent.

1.3 Project approach

The design approach for the project is inspired by the Revamped Double Diamond Design Process Framework (Nessler, D. 2018). It provides a structured way to guide designers through the way of tackling a challenge. The original double diamond design (Design Council, 2005) presents a linear process in four phases, which is to discover, define, develop, and finally deliver. Discover is the research phase where relevant factors in the context need to be collected and well understood. Following by definition, the synthesis phase makes use of the insights from the research to define the problem and form a design vision accordingly. The first two phases are a diverging process that aims to open up the eyes and take as many potentials as possible into account. After the research synthesis, it's time to start the development. In this phase,

through ideating and evaluating, solutions are emerging to solve the main challenges. When the design direction is decided, it's the final delivery stage. By crafting, building, and testing, the ideas are finalized and made into something that can be displayed and shared. The last two phases are a converging process, narrowing down all the thoughts into valuable design directions and solutions that make the most sense.

It's noticeable that in the Revamped Double Diamond model, a loop is added in the delivery stage, indicating that it's an iterative process. The change is critical because design in nature is an iterative process, as said by Hyper Island (2016), creativity is the habit of continually doing things in new ways to make a positive difference to our life.

For this project, a set of approaches are selected to be applied and corresponding deliverables are presented in each phase.

In the discovery phase, the combination of literature review and in-depth interviews can help get an overview of the context. The plan of desk research is to explore existing knowledge on how parents support children's online learning in a normal situation and find the design gaps. The literature on children's learning motivation and mental health is believed relevant to provide principles to guide the design process. The outcome of the research is some unstructured insights.

All the data collected in the research phase is clustered, analyzed to form a synthesized overview and therefore lead to a redefined design goal and design directions. In addition to some quantitative analysis tools, design

sessions and role-playing will also be used at this stage to help establish the foundation of ideation. An overview map of the condensed outcome of all the research processes serves as the starting point for the design phase.
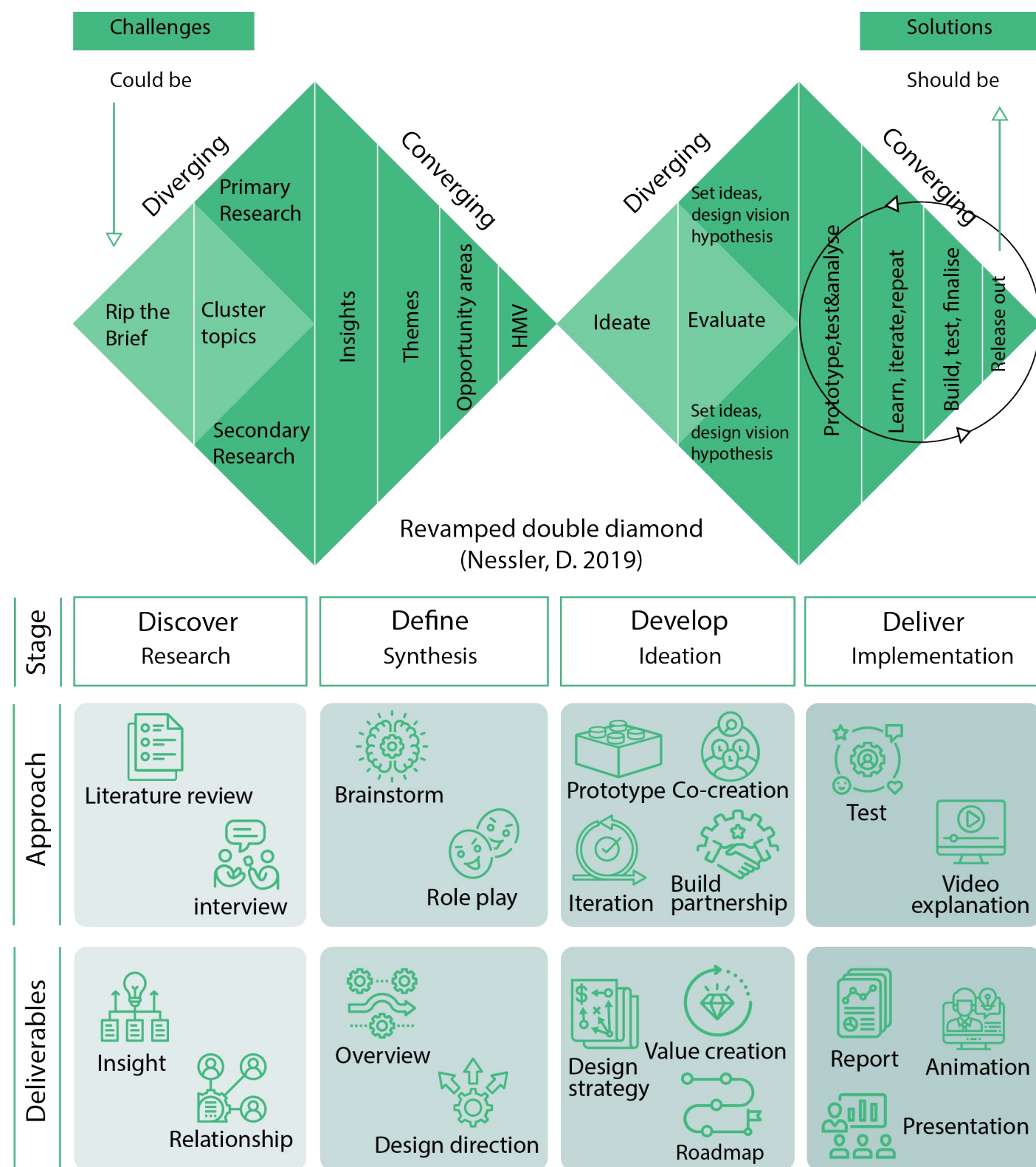
Figure 1-6 Revamped double diamond design process framework

The whole development phase is an iterative process with several collaboration creations and collaboration evaluation sessions. Feedback from the sessions can help shape the most feasible design strategy for further exploration and finalization. At the same time, the added value of the design strategy needs to be clarified and a draft roadmap explains all the possibilities in the future that make it a sustainable and applicable solution.

In the last stage, the chosen design strategy is prototyped and tested to make it fit in the real-world and bring values for the potential audience. The way of presenting the design outcome is a combination of report and explanation animation considering the characteristics of the target group. In this way, the idea can be better understood and perceived.

1.4 Relevance

1.4.1 The Global challenges, COVID-19

COVID-19 presents people around the world with a common challenge. Although everyone is in a different situation, no one is immune to the pressures of the epidemic. It changes our daily habits and even affects the values of life and the world. People have no experience in dealing with all the huge changes that happened in such a short period. Epidemic prevention measures limit people's social distance and disrupt people's normal work rhythm. People are trying their best to maintain relatively high work and life quality without physical touch and face to face interaction. In the absence of such hands-on communication and collaboration, I can foresee the challenges this design project will encounter in research and brainstorm sessions. But this is precisely the part that makes the project more exciting and valuable to tackle. As a designer, I can see my values in helping people to fight with a severe situation and providing more possibilities in tackling challenges with a design mindset.

1.4.2 The development of online education

Before COVID-19, education technology was growing and being adopted at a high rate, with global investment in education technology expected to reach $18.66 billion by 2019 (Metaari,2020), and the overall market for online education expected to reach $350 billion by 2025 (Research and Markets,2019).

Although it's a sudden shift from traditional classrooms caused by COVID-19, research shows that the advantages of online learning are likely to keep the adoption of online learning increasing even post-pandemic. (Li, C., Lalani, F) As said by Wang Tao, Vice President of Tencent Cloud and Vice President of Tencent Education, "I believe that the integration of information technology in education will be further accelerated and that online education will eventually become an integral component of school education. "It is foreseeable that online education will continue to develop and grow rapidly even after the end of COVID-19. Therefore, the thesis can shed a light on how design can help people better adapt to the coming era of online education.

1.4.3 The changing educational philosophy

As millennial prepare to or have begun to become parents, they are holding new ideas on children's education. (Walton Family foundation, 2018) The millennial parents grew up in an era of rapid changes in internet and mobile technology. At the same time, changes in cultural and socio-economic factors have made their philosophy of education and their roles and responsibilities as parents different from those of the previous generation. (Walton Family foundation, 2018) Millennial parents have high expectations for schools while they want to share more responsibilities in raising their children to be self-sufficient, independent and confident adults. (Walton Family foundation, 2018) For some Chinese parents, it is inevitable that they will be influenced by educational concepts from western cultures and begin to pursue a more open atmosphere of family education. They are actively reflect on their behavior as parents and are willing to learn about parenting through various information channels such as psychology. (Yang, X., & Jing, J. 2013) With parents willing to actively try different ways to provide a better education for their children and actively learn how to be better parents, this thesis attempts to provide an opportunity

for parents who want to make positive changes in educational concepts, help them deal with challenges under great pressure and make progress in educating their children.

1.4.4 Academic contribution

Academic research on online education and parenting is not a new topic. But because COVID-19 is an event with extremely high uncertainty and will have a huge impact on people around the world for a long period, it is inspirational to explore and think about education and parenting under the new context of the epidemic. Applied research is relatively nascent compared to the existing rich academic research. As a designer, I take the role of bridging from academic potentials to feasible design strategies. Therefore, the academic relevance of the thesis exists in the exploration of home parenting in online education under extreme stress and how principles and guidelines in the literature can be applied in design strategies. Furthermore, the work is likely to contribute to inspiring people to think about how to change the educational ideas in online education eras.

1.5 Take-away

The chapter introduces the context of the project and explains how and why I set up this project. It describes how COVID-19 influenced the education industry. People in the quarantine period were challenged to adapt to the transition to a whole scale online education in a short time. A design opportunity is shown here to research the challenges parents and children are experiencing in the extreme context and how design strategies can provide value in assisting them to go through the stage.

It explains why Chinese families with children aged from 9-12 years old were chosen as the project scope and split the project goal into several concrete questions:

- What are the main struggles/challenges of students and their parents in the context of online education during the COVID-19 outbreak?

- How do parents and children deal with these challenges now?

- What are their special needs/desires in the online education system during the epidemic period?

- How to create practical guidelines/tools for students and the parents to have a more fun and effective experience under the stress?

- How the final design can be implemented, and if possible, how can this be applied in a similar context where people are forced to transfer to online education?

The design approaches used for the thesis were presented along with the Revamped Double Diamond Design Process Framework to provide an overview of the project process

It also explains why the topic is relevant in the current education industry and is possible to inspire people to think about changing the education mindset in the future.

CHAPTER 2   DISCOVER

This Discover chapter was structured into two parts, the literature research, and the user research. The literature research section starts with presenting parents' involvement in children's learning to get into the context, following how the homeschooling would change under the COVID-19 stress. Given that this project's background is based on Chinese parents and children, cultural factors are also emphasized and analyzed. Afterward, critical design principles, as well as parent-child communication theories, are collected to rationalize the final design. The user research section is built upon all the insights obtained from the literature review and goes further to clarify the focus of this project. Through the interviews with parents and children, some personas were created to help construct the design requirements. Finally, the main take-away outlines the main findings obtained from all the research and helped to form a design goal in the next chapter.

image from https://www.unicef.org/

2.2
The different context

Define the particularity of the context and provide the principles applicable under the context

2.4
Positive parenting

Provide theoretical basis and principles in the ideation phase

2.6
Design for children

Select relevant design principles and strategies that could inspire the ideation

2.1
Parents involvement in children's learning

Provide a theoretical basis for subsequent field research and help form targeted research questions

2.3
Cultural influence in parenting style

Specify the context by introducing relevant cultural influence in parenting style and education ideas

2.5
Parent-child attachment and communication

Introduce some theories on parent child attachment and explain how it could be applied in the design

Discover Define Develop Deliver

Diverging Converging Diverging Converging
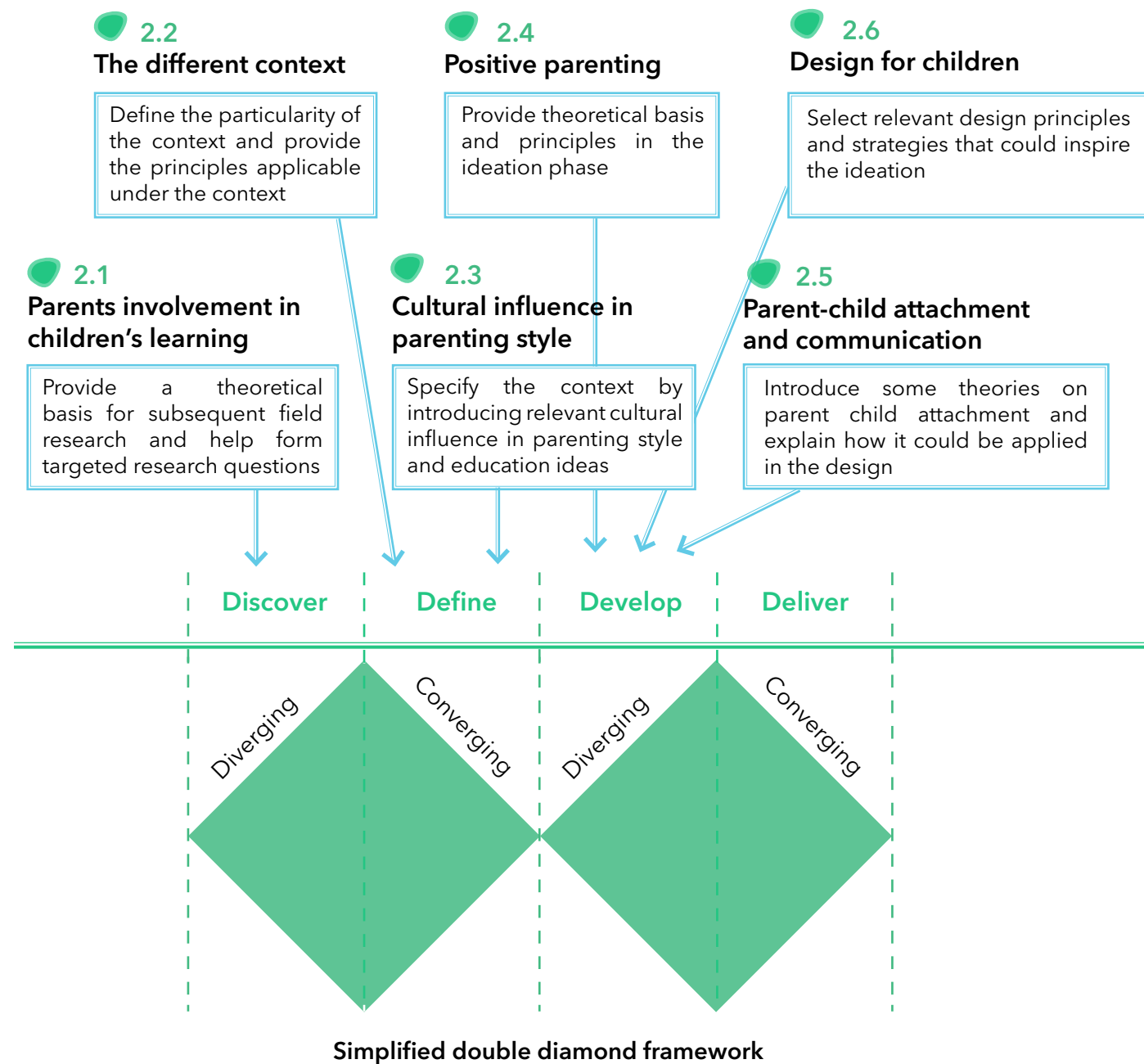
Simplified double diamond framework

Figure 2-1 an overview structure of the literature research

As shown in the picture, the first three parts focus on the discovery and define phase, describing the context and providing the theoretical basis for field research in the next section and therefore help to define the design goal. The last three parts describe contributions to the development phase, describe inspiring design ideas, and provide principles in guiding and evaluating these ideas.

Literature research

To dive deep into the context, this chapter starts with collecting existing research on parents' involvement in children's learning, providing a theoretical basis for subsequent field research, and helping form targeted research questions. The second section discussed the special context, the schooling under the stress of COVID-19. The third part shifts emphasis to a focus on studies related to the influence of cultural factors in parenting style. Bearing the cultural differences in mind, readers can understand the context more easily. In the fourth section, the selected principles on positive parenting can provide a theoretical basis for the ideation and the development of the design. The fifth part explores the literature on parent child attachment theories that can provide guidelines and principles in the design phase. In the sixth section, relevant design principles and strategies were selected to assist the ideation and conceptualization. The chapter concludes with key takeaways.

2.1 Parents' involvement in children's learning

The section describes what parents do to help children study at home in a normal situation and how their motivations to help are influenced. With the COVID-19 related stress, parents' involvement activities and involvement level could be different from the existing literature. The literature helps to formulate more targeted research questions for the field research and it also provides suggestions for parents on how they can help their children with the transition from traditional school to online homeschooling. Some of the suggestions could be useful in the COVID-19 context and it still needs to be verified and tested.

2.1.1 Involvement activities

The general involvement of parents on children's learning is not limited to assist with structure homework activities, (Hoover-Dempsey et al., 2005; Walker, Wilkins, Dallaire, Sandler, & Hoover-Dempsey, 2005), motivate and encourage children, answer children's doubts on relatively difficult issues and communicate with teachers about the children's learning process. (Hoover-Dempsey, K. V., Bassler, O. C., & Burow, R. 1995) Such involvement can support children's attitudes for achievement such as confidence and self-regulation through modeling, reinforcement, and instruction. (Rogers, M. A., Wiener, J., Marton, I., & Tannock, R. 2009)

It's not surprising that most of the involvement is primarily from mothers. (e.g., Biernat & Wortman, 1991; Lightfoot, 1978; Stevenson, Lee, et al., 1990) But what's interesting is that literature shows that fathers can have a critical influence on children's learning (Greif & Greif, 2004) and because they tend to encourage children to explore and take challenges, which will support the children's development a lot outside the home. (Grossman et al. 2002) To guide fathers to play appropriate roles in helping children learn may be a way to improve the efficiency of parents' participation in children's learning.

2.1.2 Factors that influence the involvement level

Parents believe that it's their responsibility to be involved in the children's learning, but the involvement level is influenced by motivational and contextual factors. First, they need to see the positive effect of their involvement. They will engage in more actively if they perceive the involvement is invited and valued, either from the children's request or the teachers' specific targeted and sensitive invitation. And an appropriate expectation needs to be built based on the children's learning ability,

otherwise, the frustration caused by the failure to achieve the expected results will reduce the motivation and raise parent-child conflict. Second, the external factors such as socioeconomic status (e.g., Davis-Kean & Eccles, 2005) and culture (e.g., Hong & Ho, 2005) can influence parents' involvement attitudes and behaviors on children's learning. Especially with the influence of prevention and control measures during the COVID-19 outbreak, many families are under greater economic pressure than usual. With increasing population pressure in China, parents nowadays are attaching more and more importance on children's education with tremendous money investment. Third, factors within the family also contribute to parents' involvement such as parent's level of knowledge and skills (e.g., Grolnick, Kurowski, Dunlap, & Hevey, 2000) and their time and energy. The parental efficacy largely depends on parents' level of education. (Eccles & Davis-Kean, 2005) It's hard for parents with low educational levels to help their children with academic issues and due to the continuously updated teaching materials and knowledge structure, they need to make extra efforts to understand what the children are learning now. Considering the actual schedule of children, most parents have a feeling of guilt because they lack enough time and energy to engage in the children's learning. Therefore, other family members (grand-parents, siblings) are probably also involved in children's learning.

2.1.3 The challenges in the transition from traditional school to online education

Online education has a history of nearly 20 years with outstanding technological advantages. (Hill, P. 2012) There is an increasing number of students choosing to receive online education at home instead of going to traditional school. According to Klamm's research, for the academic aspect, strengths in *self-awareness, self-discipline,*

self-motivation, perseverance, and time management are required for the students who experienced the transitioning from conventional schooling to home-based online education. At the same time, they have to learn new technological skills for online education such as properly utilize the online inquiry strategies for writing and research (Klamm, H. 2012.)

Although in the research, the students make the decision themselves, which means they already have enough psychological preparation for the transition, the insights still can be inspirational in the context of the forced transition to home-based online education duo to the quarantine measures during the COVID-19 period. For the social adaptation aspect, the main change is that the children receive home-based education have largely *decreased social contact with peer friends,* leading to a proactive effort to maintain the previous friendship. And the time they spend with parents is greatly increased. The parents become the first responder instead of teachers for children's learning with more supervision and assistance, which means that the relation between children and parents changes. This can lead to all kinds of effects, like, e.g., relational stress between children and parents.

Considering all these changes and challenges, suggestions are provided for parents as follows according to Klamm's research:

First, the parents require more *empathy and wisdom as an accountability agent*. The parents have little understanding of the nuances of home-based online education so they have a *relational disconnect with their children.* What they can do is to listen to what the children need and be empathic with them and assist in developing plans or construct goals for learning accomplishment.

Second, the parents can guide the *family interaction into a positive direction* with more interactive activities and provide opportunities

for the children to do more peer interaction. These social times can be used as a reward to motivate children to learn.

These suggestions were given in an everyday context without the stress during COVID-19, so it still needs to be verified in the field research that if the parents are confronting the same questions with the challenges mentioned in the literature and if these suggestions could help in the new situation.

2.1.4 The suggestions from literature

In addition to the suggestions mentioned above, the literature also puts forward some practical advice on the cooperation between family and school and how family members can cooperate to help children complete the transition from traditional school to online education.

- Family involvement should be a systemic and sustained commitment that occurs across time, spans many settings, and requires *shared responsibility* from all parties. The involvement starts the earlier, the better. The parents need to keep a shared vision with school and align with the school's strategies and rules to maximize learning and developmental outcomes. (Weiss, H. B., Little, P. M., Bouffard, S. M., Deschenes, S. N., & Malone, H. J. 2009).

- Strategies that can foster a more positive and close parent-school relationship should be formed. (Hoover-Dempsey, K. V., Bassler, O. C., & Burow, R. 1995) And it is valuable to create a strong sense of belonging for parents to involve in school-related activities to improve their motivations to assist the children in learning. Regular communication with school and teachers is recommended for the information about school policies, academic standards, and expectations,

their child's progress in school, etc. (Weiss, H. B., Little, P. M., Bouffard, S. M., Deschenes, S. N., & Malone, H. J. 2009).

- Schools can provide concrete suggestions/training/principles for the parents about how to effectively involved in children's learning (Hoover-Dempsey, K. V., Bassler, O. C., & Burow, R. 1995) More specifically, school-based parenting programs can be designed to assist parents in managing and organizing their lives for effective involvement. Such suggestions must be tailored ac-cording to the knowledge level and characteristics of the children.

- An individual's functioning is integrally tied to the functioning of other family members, which may lead to complementary patterns of behavior. (Brown, H. E., Atkin, A. J., Panter, J., Wong, G., Chinapaw, M. J., & Van Sluijs, E. M. F. 2016) To form a virtuous cycle and promote children to follow a good learning habit, the parents need to be an example of the children especially in a family with more than one child.

It is undeniable that to achieve a better education quality, even in the context of online homeschooling, schools still play a very important role. Parents also need to spend a lot of thoughts on how to better cooperate with the school and jointly create a better environment for their children's study and life. Under the influence of the epidemic, communication between parents and schools is likely to be restricted to limited online communication channels. In this situation, the communication is not easy, which makes things even worse. Regarding how parents and schools are currently communicating, it is still necessary to identify the situation in the field research to determine how these suggestions can help parents more effectively.

2.2 The different context (schooling under the stress of COVID-19)

This form of online education inevitably increases screen time and leads to a sedentary lifestyle, which may have a negative impact on children's physical and mental health. Therefore, parents need to pay **extra attention** *to how to minimize this negative impact. In addition, the form of online lessons may make children bored due to lack of interaction. Therefore, parents need to have appropriate psychological expectations of their children's reduced learning efficiency. The epidemic may make children feel insecure. Therefore, it is beneficial to educate children on epidemic knowledge and provide a safe and comfortable family atmosphere in this special period. Relevant design principles point out that in this situation, it is important to think about the problem from both the child's and parents' perspective, so as to ensure that the design can be accepted and function.*

2.2.1 Stress and physical activities

When children are asked to use different digital devices (phones, computers, tablet PC) to do online learning, they are inevitably *increasing screen time and sedentary behavior.* More sedentary behaviors are *associated with higher depression, lower satisfaction with life and lower happiness in children and sedentary behavior may elicit feelings of loneliness and, consequently, negatively impacts on the mental health of children.* (Rodriguez-Ayllon, M., Cadenas-Sanchez, C., Estévez-López, F., Muñoz, N. E., Mora-Gonzalez, J., Migueles, J. H., ... & Catena, A. 2019). In contrast, more physical activities and reduced sedentary behaviors can help to satisfy basic psychological needs (e.g. social connectedness, self-acceptance, and purpose in life) to improve mental health in children. For example, research shows that team sports can buffer the effects of stressful

life events through peer support and interactions. (Rodriguez-Ayllon, M., Cadenas-Sanchez, C., Estévez-López, F., Muñoz, N. E., Mora-Gonzalez, J., Migueles, J. H., ... & Catena, A. 2019). And the experiences in nature can improve children's capacity to cope with adversity and psychological well-being. (Gustafsson, P. E., Szczepanski, A., Nelson, N., & Gustafsson, P. A. 2012) According to research about family-based interventions to increase physical activity in children, the combination of goal-setting and reinforcement intervention strategies are effective through the mechanism of increased motivation. For example, a family calendar and workbook are proved to be useful especially when the focus is on fun and childlike activity that can unite the family members together. .(Brown, H. E., Atkin, A. J., Panter, J., Wong, G., Chinapaw, M. J., & Van Sluijs, E. M. F. 2016)

The literature on children's emotional and social development suggested that multiple activities such as martial arts, yoga, aerobic, or mindfulness activities can be done in the classroom after a long-time learning activity. These activities can decrease teacher-student tensions, reduce stress, cultivate joy, pride, and self-confidence. (Diamond, A., & Lee, K. 2011) It's reasonable to believe that these activities can also benefit children and their mental health at home during the COVID-19 period.

2.2.2 Less peer interaction

Stay at home largely decreased the time children spend with friends. Especially during early adolescence, peer relationship plays an important role in academic motivation, engagement, and achievement. (Ryan, A. M. 2011) They show an increased psychological investment in the peer group and dependence on friends for support. The feelings of relatedness and belongingness can contribute to positive feelings of self-worth and self-esteem, leading to emotional well-being and

better performance on academic activities. (Wentzel, K. R., Barry, C. M., & Caldwell, K. A. 2004). Younger children are likely to share successes to express joy and have conversations about the school is important for them. In home-based online education, children's way of communicating with friends can only via phone or internet, which probably means that social time becomes less and not as interesting as an actual appointment.

2.2.3 Suggestions from Inter-Agency Standing Committee (IASC) and other literature

The Inter-Agency Standing Committee is an inter-agency forum of UN and non-UN humanitarian partners founded in 1992, to strengthen humanitarian assistance. The overall objective of the IASC is to improve the delivery of humanitarian assistance to affected populations.

Children are likely to feel unsafe and lack enough understanding of the quarantine measures. Therefore, IASC provides some messages and activities for helping the children to cope with stress during COVID-19 period.

- Adults should manage their own emotions and remain calm first and then respond actively when the children want more love and dedicated attention.

- The family should provide a safe and supportive environment and encourage the children to express their feelings.

- The parents/caregivers should provide information about what is happening and how to reduce the risk of infection in a child-friendly, honest way.

- The family should keep the routine as much as possible or create new ones with new learning, playing and relaxing activities. (WHO.2020)

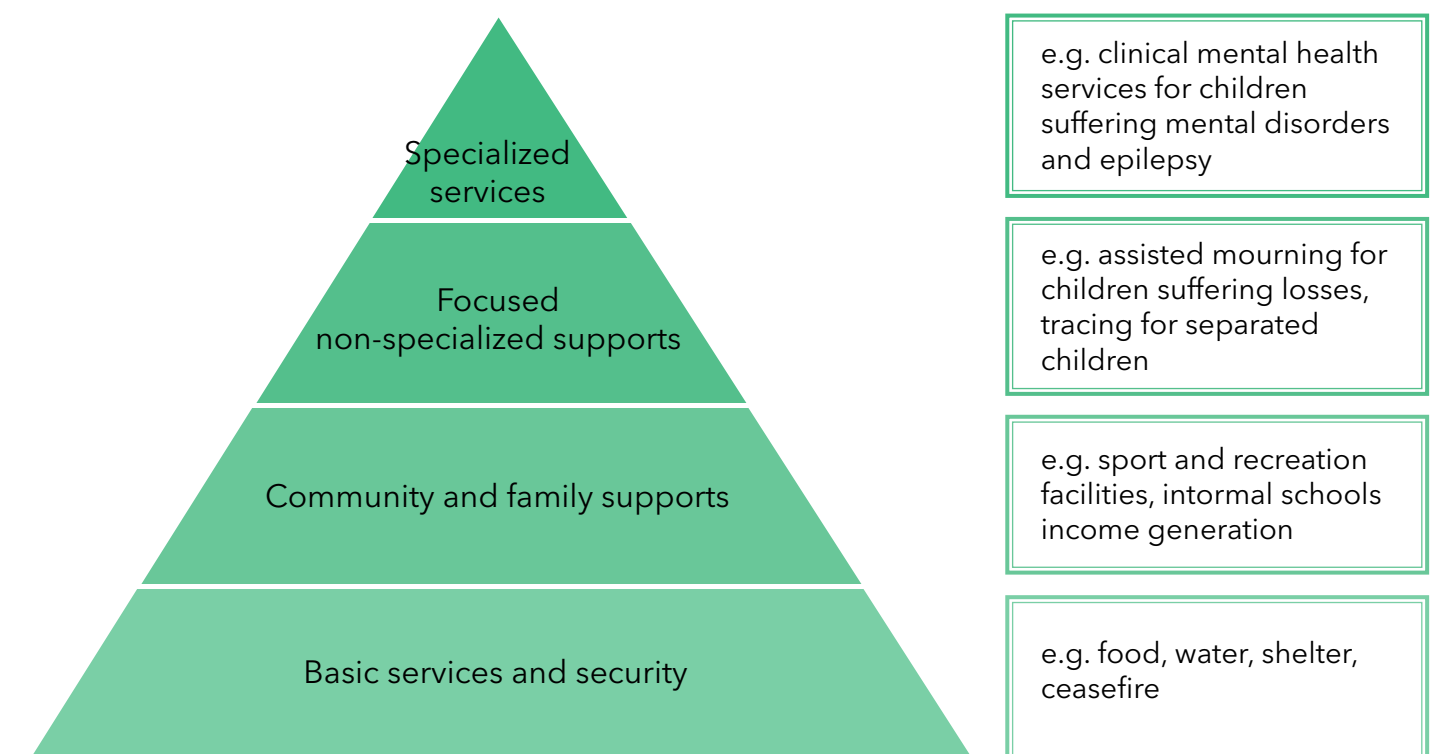| Pyramid level	Example
Specialized services	e.g. clinical mental health services for children suffering mental disorders and epilepsy
Focused non-specialized supports	e.g. assisted mourning for children suffering losses, tracing for separated children
Community and family supports	e.g. sport and recreation facilities, intormal schools income generation
Basic services and security	e.g. food, water, shelter, ceasefire

Figure 2-2 Guidelines for responding to the needs of children in crisis(Jones, L. 2008)

In the guidelines for responding to the needs of children in crisis (Jones, L. 2008), several points are emphasized as follows

- The needs should be considered from the child's perspective with enough understanding of their family and community context as well as the cultural influence of specific events. Some measures could be difficult to conduct in the given environment.

- Special attention should be paid to some support that the child may deny.

- The attention and support activity should continue for a long time even after the crises.

2.3 Cultural influence in parenting style

As the only hope for changing the fate of the family and improving social status, in most Chinese families, children are the absolute focus. Chinese parents are accustomed to expressing love for their children through a high degree of control and strict requirements on their children, which usually leads to tense family relationships and child resistance. Many parents invest a lot in their children's education to reflect the importance they attach to their children or as a compensation for lack of time to accompany their children. These cultural factors need to be kept in mind throughout the research and design process to ensure that the design results fit into the context.

2.3.1 Parenting style model

There are two widely used approaches to parenting style. One is Baumrind's (1971) typology of parenting styles, in which three types of parenting styles are conceptualized–permissive, authoritarian, and authoritative. Permissive parents may demand less of their children and let the children regulate their

activities as much as possible. Authoritarian parents have a set of criteria by which they can try to shape, control, and evaluate their children's attitudes and behaviors. They tend to be highly instructional and value unquestioning obedience. (Soh-Leong Lim & Ben K. Lim 2003) Authoritative parents tend to apply a set of high standards in managing their children, giving them some autonomy while providing emotional support. They try to provide a warm and flexible family environment for the children.

The other is Maccoby and Martin's (1983) two-dimensional framework. The framework tries to merge Baumrind's (1971) configurational approach with earlier orthogonal approaches

(Soh-Leong Lim & Ben K. Lim 2003) It concluded 4 parenting styles based on the dimensions of demandingness and responsiveness- authoritative parenting, authoritarian parenting, indulgent parenting, and neglectful parenting.

As shown in the figure, the dimension of responsiveness is the dimension of warmth, which can be explained in several ways including (a) affection, in contrast to coldness and rejection (Roe & Siegelman, 1963); (b) acceptance, which included positive evaluation, sharing, expression of affection, emotional support, and equalitarian treatment, in contrast, to ignore, neglect, and rejection (Schaefer, 1965); and (c) care, defined by affection, emotional warmth, empathy, and closeness, in contrast to emotional coldness, indifference, and neglect (Parker, Tupling, &Brown,1979). The demandingness dimension is the dimension of control, which can be explained in (a) restriction, characterized by high demand without democratic exchange or negotiation(Stewart et al.,1998);(b) overprotection, characterized by the excessive intrusion, infantilization, and interference in the child's plans and relationships (McFarlane, Bellissimo, & Norman,1995; Shucksmith, Hendry, & Glendinning, 1995); (c) harsh

Indulgent
'whatever you want'

Low expectation
Few rules
Indulgent
Accepting
Avoids confrontation
Warm
Non-directive

Authorutative
'Let's discuss this'

High expectation
Clear standards
Assertive
Democratic
Flexible
Responsive
Warm
Reciprocal
Power-with

High
Responsiveness
Low — Control, strictness — Demandingness
Warmth
Low

No expectation
Few rules
Absent
Passive
Neglectful
Uninterested
Competing priorities
Little time

Neglectful
'I don't care'

High expectation
Clear rules
Forceful
Autocratic
Rigid
Punishment
Limited warmth
Emotionally distant
Structured environments
power-over

Authoritarian
'Because I said so'

Figure 2-3 Parenting styles (based on Baumrind, 1991; Maccoby& Martin, 1983)

discipline (Wagner, Cohen,&Brook,1996);(d) psychological autonomy, characterized by non-coercive, democratic discipline and the encouragement of adolescent individuality within the family (Steinberg et al., 1991).

2.3.2 Parenting style and child outcomes in Chinese families

Research in Western cultures on parenting styles has shown that authoritative parenting leads to positive outcomes in academic performance, social responsibility, mental health, and self-esteem. (Baumrind, 1971; Steinberg et al.,1991; Maccoby & Martin, 1983) But in Chinese culture, some research results are consistent with this conclusion, while others are contrary. For example, in Quoss and Zhao's research in Chinese people,

(1995) democratic parenting did not predict any item on the satisfaction scale, whereas authoritarian parenting predicted satisfaction with the overall parent-child relationship.

In Steinberg et al.'s study(1992), Asian students showed better academic performance than other students. However, this has nothing to do with parenting style but relates to students' beliefs about education and life success. Among peers, families, communities, and social strata, Chinese people place high values and expectations on education. Culture is a major factor in Chinese academic success. (Chao, 1994; Yao, 1985). For Chinese families, educational achievement seems to have its meaning and unique status, culture, and history. (Soh-Leong Lim & Ben K. Lim 2003)

According to Chao and Sue (1996), the essence of Chinese parenting is characterized by two critical indigenous elements of "chiao shun" and "guan". "chiao shun", refers to training, which incorporates educating or inculcating children in culturally appropriate behaviors (Chao, 1994, p. 1112). From a Western perspective, extreme parental control over adolescent decision-making might be seen as infantilizing, but from a Chinese cultural perspective, it can be explained as filial piety. "Guan" means caring for, loving, and governing. It refers to "parental care, concern, and involvement are synonymous with firm control and governance of the child" (Chao,1994,p.1112). Chinese mothers believe that they are the central caretaker of the child and view it as their responsibility to be highly involved in promoting children's success.

Chinese culture attaches a positive association of the "governance" function by teachers and parents. The opposite is indifference or carelessness about one's role. (Chao,2000) For Chinese people, parents control their children mainly because they want their children to succeed, especially in terms of academics. Based on this desire, parents make some sacrifices to meet the conditions necessary for their children to succeed as much as possible. In Chao's (1994) research, Chinese mothers who agree with and respect Chinese traditional obedience culture will be highly devoted to their children's education and show a strong spirit of sacrifice and support.

This kind of success usually refers to academic excellence, going to a key university, finding a high-paying job, or even achieving a certain social status. (Chao & Sue, 1996).

Parenting style and the parent-child relationship are found to be positively associated with children's personality, school, and social performance (Chen et al., 1997), self-concept, well-being, ethnic pride, life satisfaction, and parent-adolescent conflict (Yau & Smetana, 1996) in a Chinese population. (Soh-Leong Lim and Ben K. Lim, 2003)

2.3.3 Parent control

The relevant literature is full of studies showing that Chinese parenting *is high in control and restrictiveness* (Chao, 1994; Lin & Fu, 1990) Influenced by the traditional culture, some parents think that being strict is a manifestation of love. It is in the interest of children's development to set strict demands on them. On the contrary, creating a relatively relaxed home environment is seen by these parents as detrimental to their children's success. Different kinds of control will lead to different results; positive control is beneficial to the growth of children. The study of Lau and Cheung(1987) of Chinese families showed that greater parental control, in this context referring to dominating and interfering, was associated with less cohesion and more conflict, while greater organization (functional in maintaining coordination and order in the family) and greater independence allowed by parents was associated with more cohesion and less conflict. The research showed that Chinese adolescents dislike strict and authoritarian parents and value freedom and personal achievement a lot. Too strict control can cause teenagers' rebellious mentality, they are eager to have more autonomy in making decisions. (Yau and Smetana 1996)

2.3.4 Parental Warmth

Research in Western cultures on parenting styles has shown that authoritative parenting leads to positive outcomes in academic performance, social responsibility, mental health, and self-esteem. (Baumrind, 1971; Steinberg et al.,1991; Maccoby & Martin, 1983) But in Chinese culture, some research results are consistent with this conclusion, while others are contrary. For example, in Quoss and Zhao's research in Chinese people, (1995) democratic parenting did not predict any item on the satisfaction scale, whereas authoritarian parenting predicted satisfaction with the overall parent-child relationship.

2.3.5 The central position of children in the family

Over the last 30 years, influenced by the one-child policy, the birth rate was decreasing in China. The child is the focus of the whole family since their birth and the holder of the family future as 'the only hope.' (Fong 2004) In China, children's central position in family emotional life is becoming more and more unshakable. Due to the increasingly prominent trend of low birth rate, parent-child relationship has become the main axis of family relationship. (Lin, X. 2019) Many studies equate increased expression of children's educational consumption in the family with parental love and psychological compensation, which represents a way for parents to maintain family feelings and establish a sense of belonging. (Ying 2003; Zhao 2006) Parents are keen to invest in education so that children can gain an advantage in competition for academic performance, social status, occupation and even good partners. Increasing children's education consumption is an expression of parental love.

Bearing these cultural Influencing factors in mind, the design can better fit into the Chinese context and it could help in explaining the value of specific features in the final design.

2.4 Positive parenting

The positive parenting principles aim to provide parents some behavioral guidance in educating their children. The principles are developed over 30 years and proved to be effective in practice. Therefore, it is reasonable to believe that these principles are also helpful in guiding the design process of the project.

2.4.1 The principles of positive parenting

The Triple P-Positive Parenting Program (Sanders, M. R) origins from social learning theory and the principles of behavior, cognitive and affective change, aiming to help parents prevent severe behavioral, emotional, and developmental problems in children by enhancing their knowledge, skills, and confidence. To achieve this, there are five core principles of positive parenting forming the basis of the program:

- *Safe and engaging environment*

  Children need a safe and supervised environment to explore, experiment, and play. This is necessary for promoting health development at home.

- *Positive learning environment*

  The program is aiming to teach parents how to respond positively to child-initiated interactions (e.g., requests for help, information, advice, and attention) and therefore to cultivate children's ability to solve problems independently.

Assertive discipline

Strategies like selecting ground rules for specific situations; discussing rules with children; giving clear, calm, age-appropriate instructions and requests; presenting logical consequences; using the quiet time (non exclusionary timeout) and timeout; and using planned ignoring are good alternatives to ineffective discipline practices (such as shouting, threatening, or using physical punishment).

Realistic expectations

Parents should work with their children to explore suitable development goals and expectations that are consistent with the child's actual situation. Parents who have high expectations for their children are likely to abuse their children. (Azar & Rohrbeck 1986).

Parental self-care

Parents' self-esteem and sense of well-being can also affect their parenting behavior. It is reasonable to develop parenting skills based on maintaining personal self-care.

Enhanced skills

Self-regulation skills	Mood and coping skills	Partner support skills
Monitoring children's behavior	Catching unhelpful thoughts	Improving personal communication habits
Monitoring own behavior	Relaxation and stress management	Giving and receiving constructive feedback
Setting developmentally appropriate goals	Developing personal coping statements	Having casual conversations
Setting practice tasks	Challenging unhelpful thoughts	Supporting each other when problem behavior occurs
Self-evaluation of strengths and weaknesses	Developing coping plans for high-risk situation	Problem solving
Setting personal goals for change		Improving relationnship happiness

Figure 2-5 Core enhanced parenting skills introduced in Triple P-positive Parenting Program (Sanders, M.R.2012)

Basic skills

Parent-child relationship enhancement skills	Encouraging desirable behavior	Teachina new skills and behaviors	Managing misbehavior	Anticipating and planning
Spending brief quality time	Giving descriptive praise	Setting a good example	Establishing ground rules	Planning and advanced preparation
Talking with children	Giving nonverbal attention	Using incidental teaching	Using directed discussion	Discussing ground rules for specific situations
Showing affection	Providing engaging activities	Using ask, say, do	Using planned ignoring	Selecting engaging activities
		Using behavior charts	Giving clear, calm instructions	Providing incentives
			Using logical consequences	Providing consequences
			Using quiet time	Holding follow-up discussions
			Using timeout	

Figure 2-4 Core basic parenting skills introduced in Triple P-positive Parenting Program (Sanders, M.R.2012)

As shown in the figure, the principles highlighted by the green block are believed to provide guidance and arguments for the design ideation and detailing in a later phase. This will be explained in detail in section 4.3 (Concept).

2.5 Parent-child attachment and communication

By introducing the parent-child attachment and specifying how it can influence the children's development, this part aims to inspire ideas and provide theoretical back-ups for creating a more relaxed parent child communication atmosphere at home.

2.5.1 Parent–child attachment and family storytelling

The *attachment theory* by John Bowlby's insists that children are biologically preprogrammed to seek safety, and they do so by trying to maintain a sense of affinity with the "attachment figure" (usually their parents). (Frude, N., & Killick, S. 2011) There are increasing evidence showing that the history of a people's attachment plays an important role in their whole life. (Fraley, R. C., & Shaver, P. R.2000) A secure attachment history enable people to build good relationships with others.

To help build and maintain a secure attachment could be much valuable for the development of children. (Frude, N., & Killick, S. 2011) It is worth emphasizing that the quality of the engagement activities between children and parents is more important than the amount of time they spend together. (Holmes, J. 1993) It might involve a *positive response* from the parents to the children's behaviors. Parents and children should interact with each other with evident interest and delight in a joint activity. And family storytelling can provide plenty of opportunities for such positive interactions. (Frude, N., & Killick, S. 2011)

Family storytelling is a way to strengthen weak *parent-child bond* or repair damaged parent-child attachment. (Frude, N., & Killick, S. 2011) This is because storytelling provide the opportunity for parents and child to witness each other's response to different characters and stories, therefore to *enhance their mutual understanding* while *strengthening their attachment bond*. Parents can synchronize their children's behavior through some interactive play, be attentive to the children, feel the

delight of the children, and appreciate the children's ability in the process. (Frude, N., & Killick, S. 2011)

2.5.2 Parent-adolescent attachment and healthy development

There is some evidence to suggest that attachment security not only influences the development of young children; it also impacts adolescents' healthy development. (Allen, J. P., McElhaney, K. B., Land, D. J., Kuperminc, G. P., Moore, C. W., O'Beirne–Kelly, H., & Kilmer, S. L. 2003) A secure attachment between parents and adolescent facilitates adolescents to develop their cognitive, social, and emotional competence better, leading to more positive relationships and experience with family and friends. (Ducharme, J., Doyle, A. B., & Markiewicz, D. 2002)

Parents need to maintain a secure attachment with children during adolescence. Research has suggested that parents can achieve this through parental sensitivity and attunement, especially in autonomy needs. (Allen, J. P., McElhaney, K. B., Land, D. J., Kuperminc, G. P., Moore, C. W., O'Beirne–Kelly, H., & Kilmer, S. L. 2003) It is also vital for parents to maintain their abilities in supporting a 'goal-directed partnership' with the children. There is no doubt that it is challenging for parents because conflicts between parents and children increase during adolescence. It is unnecessary to avoid conflict entirely because it is based on parents' higher requirements for their children's ability development and responsibilities. (Galambos, N. L., Barker, E. T., & Almeida, D. M. 2003) It exists in a healthy relationship. The key is that parents should still maintain 'relatedness' when they disagree with their children based on critical issues. When children feel attachment security, they can express their opinions confidently and be empathetic to others' opinions. (Allen, J. P., McElhaney, K. B., Land, D. J., Kuperminc, G. P., Moore, C. W., O'Beirne–Kelly, H., & Kilmer, S. L.

2003) In summary, it is valuable to achieve parent-adolescent attachment security for the healthy development of adolescents. This theory may be effectively used in the design by adding tips and tricks for parents to communicate with their children.

2.5.3 Parent–child conversation about shared emotional experiences

One of important ways for children to form their theory of emotions is having family conversations about emotions and memories. (Wang, Q. 2001) In a study about the differences between American and Chinese mother–child conversations about shared emotional experiences, it was been found that Chinese mothers tend to show a low-elaborative style in which they put much emphasis on repeating the facts and behavioral standards. They often give comments on children's feelings and aim to 'teach the child a lesson'. This leads to the children giving little responses to the mothers' inquiries. (Wang, Q. 2001) In contrast, American mothers presented a high-elaborative style. They built their memories and collaboratively create stories together through elaborating and adding on the shared experience according to each others' responses. (Wang, Q. 2001)

From the literature, it is valuable to think about how to establish a more relaxed and meaning atmosphere in Chinese parent-child conversation.

2.5.4 Memories on parent child conflict

When the children enter puberty, why children and parents have conflict could be the child's physiological changes in puberty, the increase of child's autonomy, and the decrease of emotional dependence on parents. (Dykas, M. J., Woodhouse, S. S., Ehrlich, K. B., & Cassidy, J. 2010) Most conflicts are not because of

important events, but because of disagreement between children and parents in daily trivial matters. (Smetana, J. 1996) Although the conflict inevitably puts stress on parents and children, it was found that conflict can facilitate parent and children development. (Dykas, M. J., Woodhouse, S. S., Ehrlich, K. B., & Cassidy, J. 2010)

Interestingly, when adolescents rebuild their memories of the conflicts with parents, they could perceive it in a more positive way in the case that the adolescents' internal working models of attachment are secure. In contrast, if adolescents rely on insecure attachment to reconstruct the conflictual interactions, their memories are incline to be more negative than the original perception. (Dykas, M. J., Woodhouse, S. S., Ehrlich, K. B., & Cassidy, J. 2010)

This could inspire the ideas on how to deal with parent child conflict through the rebuilding process of children's memories on the conflictual interactions.This shows that if the conflict is not communicated and resolved in time after the conflict occurs, the child may be biased towards negative interpretations of this memory, which is not conducive to the child's physical and mental health. Therefore, this function of replaying in time after a conflict helps solve this problem and reduces children's possibility of holding negative emotions in their hearts.

2.6 Design for children

Unlike designing for adults, designing for children requires extra consideration. A design that does not consider the child's cognitive abilities will not bring joy,or can not be understood but will only bring frustration. This section extracts some design elements, design strategies, and evaluation methods from the literature that may inspire the ideation stage.

2.6.1 Design features that can attract children

These days, children have been surrounded and raised with all the internet and technology, which makes them pretty savvy and have high requirements on the products they use and love. (DeBara, D. 2018) Before designing, understanding the children's interests, expectations, and goals in using products can inspire the designer while ensuring that the design is more readily accepted and loved. (Naranjo-Bock, C.2011)

Themes, Character

Incorporating a cartoon character or mascot in products designed for children is proved to be an effective strategy to appeal to the children. (DeBara, D. 2018) Many popular cartoon characters or book character themes are incorporated into toy design because personality and characterization are vital in appealing children, according to Rydland et al.'s (1999) research on toy preferences. It is also concluded by Griffiths (1999) in a study that " A successful character has immense power, and this can be timeless. " As explained by DeBara (2018), the character can strengthen the connection between the children and the products, making the design relatable and approachable. Especially those characters with a face can make the design more memorable through the personality it expresses. (DeBara, 2018)

Themes like cartoon or book characters could be incorporated in a design using the voices, actions, or other properties of the character. (Light, J. C., Drager, K. D., & Nemser, J. G. 2004) Besides, to introduce popular children's characters, it's also good to develop a customized character to engage the children and facilitate interaction when an existing cartoon character is not applicable. (Light, J. C., Drager, K. D., & Nemser, J. G. 2004)

Therefore, introducing a character in the final design to guide the children through the using process could be an option, aiming to enhance the design desirability for children.

Colors

Children from 9 to 12 years old are not those younger ones that can be attracted merely by incredibly bright and vibrant colors. (DeBara, 2018) They are stepping a stage where they believe that they are not kids, although their motor, cognitive, social, and physical skills keep developing. (Naranjo-Bock, C. 2011) On the one hand, graphics with high-chroma colors or sharp contrasts, darling, and experimental colors and patterns are still quite intriguing for children in this stage. (Fishel, C. M. 2001)

On the other hand, they have also begun to embrace and pursue more simplistic and minimalistic design trends. (Naranjo-Bock, C. 2011) At the same time, children started to pay more attention to the specific objectives when using a product than just exploring around. (Naranjo-Bock, C. 2011) They tend to appreciate those visuals that can make them feel strongly connected to a group or community. (Naranjo-Bock, C. 2011) Accordingly, it is essential to design in a way that makes children engage with their specific interests in a fun and effective manner so as to be in line with children's expectations. (Naranjo-Bock, C. 2011)

Thus, the colors in the design need to think carefully and, if possible, to identify the color preferences of the target user with several mood boards could be a choice.

Sound/ voice

According to the research on children's toy preferences, it was found that sound plays a vital role in attracting children. It provides the *confirmation of action, entertainment,* and functions as a critical contributor to enhance

children engagement. (Heppel, 1999) Some design features are suggested to be investigated that could function effectively to improve appeal of a product: (a) *A sound effect library* (e.g. popping, giggling,beeping) that can improve interactivity and fun; (b) *songs, music, and musical instruments sounds* for pleasure and entertainment; (c) the *voices of popular children's characters* to increase interest or facilitate dramatic play (Light, J. C., Drager, K. D., & Nemser, J. G. 2004)

Based on the literature, sound can be added to provide feedback on children's interaction with the design and increase the joyfulness in the using process.

Ethical consideration

Compared with adults, children are more likely to be attracted to products with entertainment attributes and become addicted. Their planning and execution are not enough to control the use time well. (Liu, F. 2018) Some interactive product designs enable parents to use the control center to limit their children's time to use a product. For example, some products use content walls to prevent children from operating when exceeding the set usage time. These content walls usually require users to complete some recognition tasks, which are easy for parents but incredibly difficult for children. (Liu, F. 2018) This is also a common way to control the time children use interaction products (especially electronic products).

Bearing this in mind during the ideation phase for this project could be meaningful, while more importantly, such product features should be tested with children to see if it can be accepted and work well.

It's also for the parents

Undoubtedly, designing for children must consider the parents' thoughts and preferences, not only because the parents are

the ones who ultimately decide whether to buy the product, but also because the parents are the users of the design. (DeBara, 2018) It is not easy to satisfy both parents' and children's needs, but some strategies can help to balance the preferences for both parties in one design. For example, a design can show the attributes for children by applying favorable colors and fun images while appealing parents through emphasizing the benefits for children in the functions. (DeBara, 2018)

2.6.2 Gamification

In addition to essential product characteristics such as sound and color, some design strategies are also widely used in designs for children. Among these strategies, one widely used and proven to be useful for children and adults is gamification. Relevant literature explains how to achieve a long-term behavior change through meaningful gamification and the core drives that attract people in fun games and how this can be applied in a non-game context. This can provide inspirations for the design of this project.

Achieve long-term behavior change through meaningful gamification

Gamification means the use of game mechanics and dynamics from games in a non-game context to lead to a similar involvement. (Wu, M. 2011) Gamification can introduce the motivation to activities that people like to do but lack of enough motivation. (Simões, J., Redondo, R. D., & Vilas, A. F. 2013) It has been increasingly used in education (Simões, J., Redondo, R. D., & Vilas, A. F. 2013), business (Robson, K., Plangger, K., Kietzmann, J. H., McCarthy, I., & Pitt, L. 2015), and social well-being. (Kazhamiakin, R., Marconi, A., Martinelli, A., Pistore, M., & Valetto, G. 2016) to promote people's motivation and engagement and therefore change behavior.

A *reward-based system* has been widely used

among the gamification systems via different approaches such as points, levels, achievements, and badges. (Nicholson, S. 2013) However, such strategies can only work for short-term activities or be used to teach people skills. (Nicholson, S. 2013) When a reward is used to motivate people to engage a behavior, and no internal motivation is attached to the action, people would probably lose the motivation to change their behaviors when the reward is taken away. (Deci, Koestner, and Ryan, 2001).

To achieve long-term behavior change, it is needed to internalize the behavioral changes caused by gamification benefits, making it a new habit. (Kazhamiakin, R., Marconi, A., Martinelli, A., Pistore, M., & Valetto, G. 2016) One way to achieve this goal is to introduce the *game mechanics of challenges*, providing games embedded with various and dynamic incentives. (Kazhamiakin, R., Marconi, A., Martinelli, A., Pistore, M., & Valetto, G. 2016) Specifically, meaningful and engaging challenges can be made via personalizing and contextualizing goals and prizes according to players' preferences, individual state, and use history. (Kazhamiakin, R., Marconi, A., Martinelli, A., Pistore, M., & Valetto, G. 2016)

Similarly, Nicholson (2013) also emphasizes facilitating users building *meaningful connections* between their interests and backgrounds and the wanted behaviors in the gamification activities. In this way, it can also make the behavior changes in the gamification system transformative and less dependent on external rewards.

As shown in the figure, Nicholson developed a recipe to increase the meaningfulness of gamification. Among the six factors, four factors are thought (exposition, reflection, information, and engagement) could be helpful and be applied in the design phase.
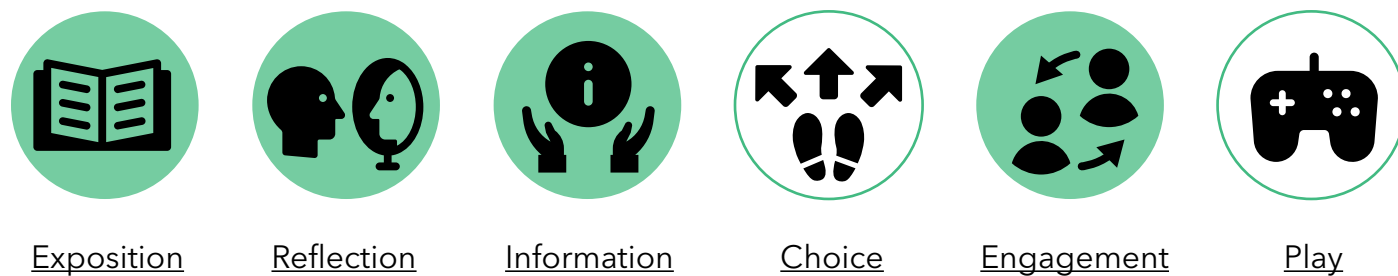
Exposition Reflection Information Choice Engagement Play

Figure 2-6 A RECIPE for Meaningful Gamification (Nicholson, S. 2015)

Exposition

Exposition, or a narrative story, can help people engage and explore in the activities. A good fit story can help the users to make transitions between different stages and activities more smooth. It can also guide the users on the way to the reflection.

Reflection

Reflection is a vital part of learning things. It is essential to help users realize what they have gained in the process and stay with the behavior when the rewards are gone and connect it to daily life. Users can make the best of reflection by reflecting with others and learn from their perspectives.

Information

Information provides users knowledge on what is going on for people to pick out relevant factors that they are pursuing rather than accept the awards points or levels. For example, visualization of the changes in a gamification design can help users understand the process and find those critical factors. This is a crucial way to facilitate people to continue the behavior without the rewards in the gamification.

Engagement

Engagement aims to engage different people in the gamification system to learn different perspectives in the design, which can increase

their chances of finding meaningful things and attach them to the real world.

In summary, all these factors help users create their goals in the gamification and help them achieve their goals. During the process, they can even create and build the rewards or badges they want, which would make them more engaging in the activities.

Drives that attract people in fun games

The octalysis gamification framework, created by Chou, Y. K, (2012) based on his years of research and study in gamification, aims to identify the core drives in people that motivate them to do specific activities. As shown in the picture, four drives that could be useful in the project will be explained in detail.

Accomplishment (Development and Accomplishment)

This is the essential drive of people to make progress and tackle the challenges. As indicated in the last part, 'challenge' is vital in this drive because it gives meanings to all forms of rewards (such as points, badges, and leaderboards.) (Chou, Y. K. 2019)

Ownership (Ownership & Possession)

Once the users feel ownership in the activity, they are motivated to make it better and want more. And the more the users spend on customizing and building in the system, the more they feel ownership. This is the core drive

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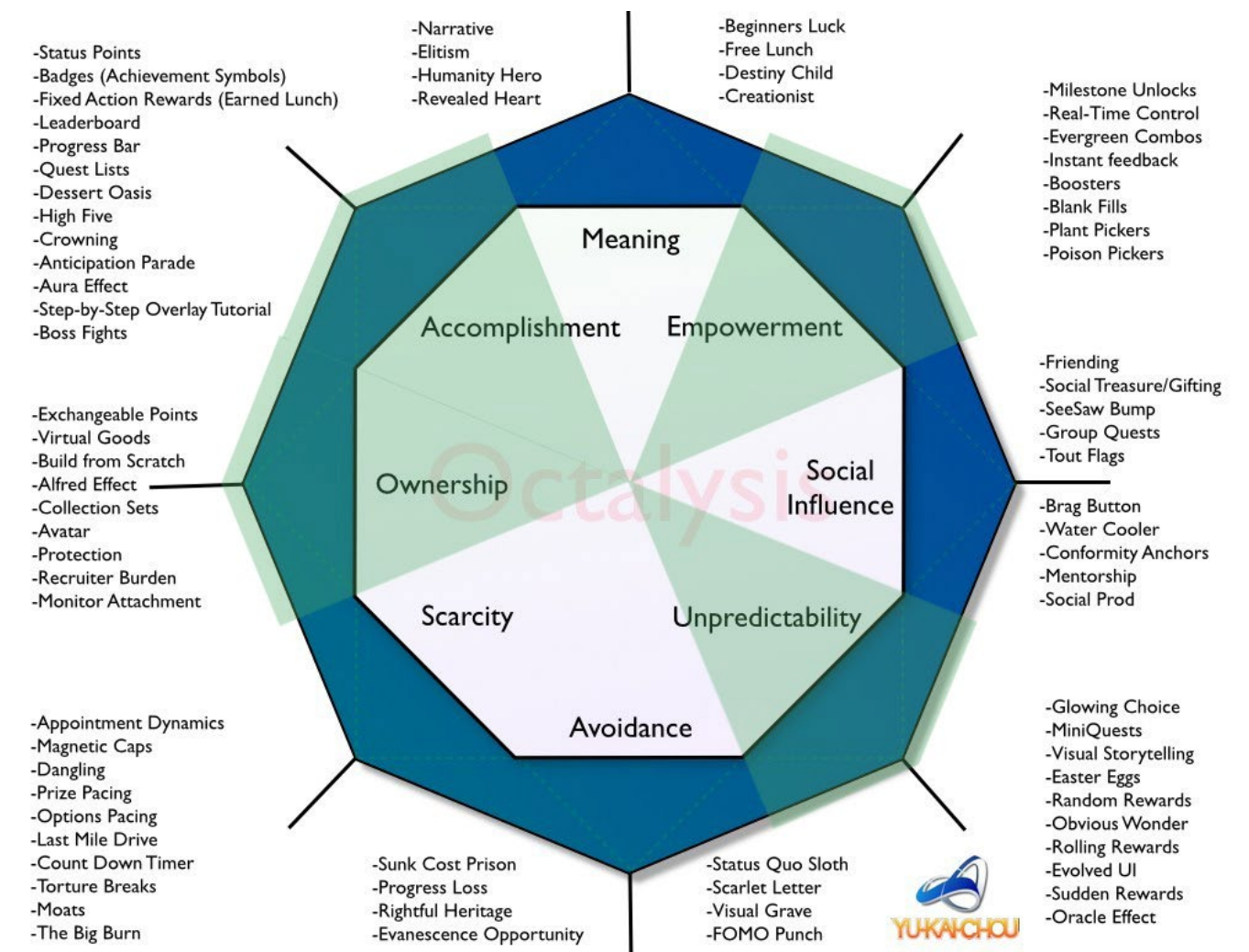
Figure 2-7 A The Octalysis Framework (Chou, Y. K. 2019)

that makes people keep collecting pieces to gain the desired outcome. (Chou, Y. K. 2019)

Empowerment (Empowerment of Creativity & Feedback)

Empowerment of creativity and feedback is where users take part in a creative process and continuously trying. In this way, they express their creativity, see the outcomes, and receive feedback. In the settings, users do not need more incentives to keep engaged in the activities but produce fresh combinations and get fun from themselves. (Chou, Y. K. 2019)

Unpredictability (Unpredictability & Curiosity)

The unpredictability and curiosity drive is that people want to figure out what will happen

in the next step. When users can not predict the result, they could be tracked in the loop to think about it. This drive has been used in some programs to engage people through an irrational section in the activity. (Chou, Y. K. 2019)

2.6.3 Evaluate the design with children

The test is an essential step in the whole design phase to ensure it aligns with the target user's needs and guarantees a better design result in the end. (Boag, P. 2020) When the target user of a product involves children, the design evaluation becomes more complicated than the evaluation with adults because it needs to take into account the various requirements and purposes that the product may have.

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Therefore some new or evolving evaluation methods are used. (Markopoulos, P., Read, J. C., MacFarlane, S., & Hoysniemi, J. 2008) Determining an evaluation method and proposing a framework to facilitate it at the beginning of the entire design project will be more likely to produce the best results. (McKnight, L., & Read, J. C.2011) Due to the children's short attention span, usually, such a test should be completed in a short time and provided more motivation or reward for the children to take part in. (McKnight, L., & Read, J. C.2011). Among the many models that can support design testing, the PLU model (P, players; L, learners; U, users) specifically helps testing products designed for children with multiple design needs.

PLU model

The PLU model (Read, 2004) is designed to help understand the way children interact with technology. The three relationships between children and interactive products are mapped to three types of interactive technologies appropriately. (McKnight, L., & Read, J. C.2011) Specifically, children's roles can be described as players, learners or users, while technology can be described as Entertainment, Education, and Enabling. (McKnight, L., & Read, J. C.2011)

🟢 Children as *Players*

The core purpose in this relationship is to amuse or entertain the children. The product is regarded as a plaything by the children.

🟢 Children as *Learners*

With an educational aim, the product should be able to instruct, challenge, and reward, thus successfully being an alternative for educators.

🟢 Children as *Users*

The essential requirement for products in this relationship is to make things easier for the children.

As shown in the figure 2-8, this model can be used to map out the attributes of products for children and children's perception in the three aspects of Playing, Learning and Using, so as to evaluate the match between the concept of the design and the actual experience to a certain extent. (McKnight, L., & Read, J. C.2011) As suggested, before using the model to evaluate ideas, it is important to think about the requirements of the design. For example, products with entertainment requirements should be evaluate in terms of use experience and fun while learning products focus more on the evaluation on pedagogical suitability and learning outcomes. And for enabling tools, the primarily evaluation should be for usability. (McKnight, L., & Read, J. C.2011)

Since this project is a design for parents and children, and the design test for children is relatively tricky, using the PLU model is reasonable. It may promote the final design of higher usability and desirability.
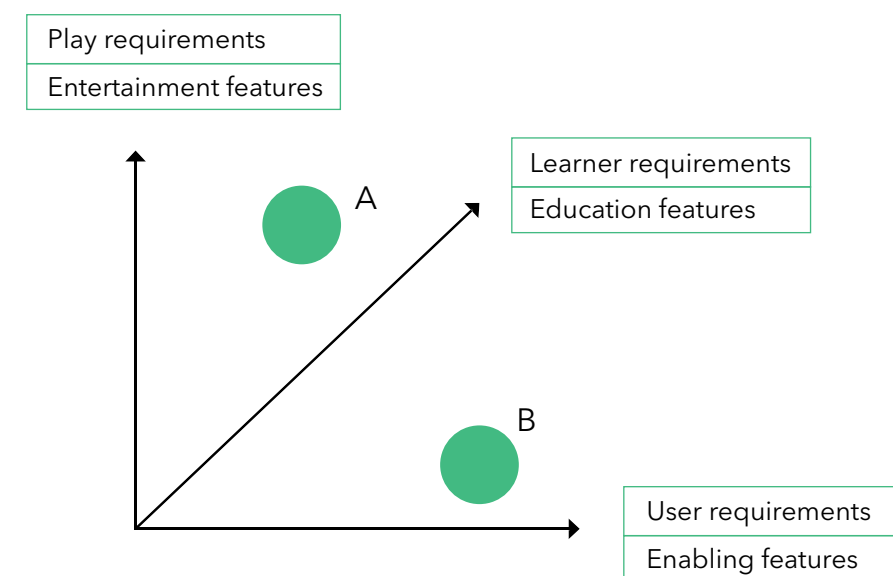

Play requirements
Entertainment features

Learner requirements
Education features

A

B

User requirements
Enabling features

Figure 2-8 The PLU model (Read, 2004, in Markopouloset al., 2008)

Section summary

In this section, literature is collected to better define the research topic and provide design principles and guidelines in the ideation phase. Understanding parents' involvement in children's learning is a starting point to get into the context. Considering the COVID-19 context, design principles in the literature help guide through the design phase by taking into account children's special needs during the period. The cultural influence in parenting style is an important factor for this project. It further clarifies the research background of this project and some traditional concepts of Chinese family education that need extra attention. Positive parenting principles and children's learning motivation serve as guidelines and inspirations for later phases. The literature on parent-child attachment sheds light on how parents and children can positively interact with each other and recall the memories of the conflict in a secure parent-child attachment to make it function positively in children's development.

When designing for children, multiple factors need to be taken into account to make sure the design meets the expectation and needs of the target audience. Specifically, basic design features like the color and the sound should be in line with children's preference. The relevant gamification mechanism provides theoretical support for the final design. And the PLU model is planned to be used in the evaluation stage with children to get useful feedback.

Because the situation is new and full of uncertainty, almost nobody has experience in it and there are no established rules and guidelines to follow. Education is more challenging than before for both parents and children. In previous literature, there are a lot of suggestions provided for parents and schools. However, with the fundamental life factors changing, people have different behavior patterns from the normal status. Therefore, it's not sure if these suggestions still make sense.

In order to use the literature more effectively and find the most valuable design goals in the context of COVID-19, field research is needed.

2.7 Interview with parents

The section describes the qualitative research process of the project. It starts by clarifying the research question. The second part explains the development and improvement of the interview guide and rationales the sampling strategy used for the research. This is followed by the basic demographic information of the participants to show the possible factors that can influence the research results. The third part gives a detailed explanation of the insights obtained from the interview and how this relates to the literature in the last section. And it follows by the personas built from the insights. This section ends with the main takeaways.

From the literature review in the last section (2.1 Parents' involvement in children's learning), I have some basic understanding of parents' behavior and get quite a lot of suggestions on how to better facilitate parents in helping children in their study. On the one hand, the user research can identify if parents' involvement in helping children's study is different between the normal situation and the COVID-19 period. And when differences are found, it probably can be an excellent point to target.

On the other hand, the suggestions from the literature can be asked in the user research. This can help to make decisions on valuable literature suggestions that work for the Chinese context. Also, field research can help explore the question more specifically in the epidemic context and then define the design scope for this thesis.

The reason for choosing qualitative research rather than quantitative research is because the purpose of this research is to achieve a detailed understanding of phenomena, with the focus on content and depth rather than numbers and quantity. This research investigates the parents' behavior, attitudes, and values on helping with children's study at home during the COVID-19 quarantine time in China. The focus of the research is on the home-schooling of third to sixth graders in primary school. The research began with constructing an interview guide based on the literature review and the research aim of this project. Nine semi-structured interviews with parents were conducted to capture the context. To obtain more accurate and effective interview results, the interview guide has iterated continuously in this process. After being documented, the data was analyzed and explained.
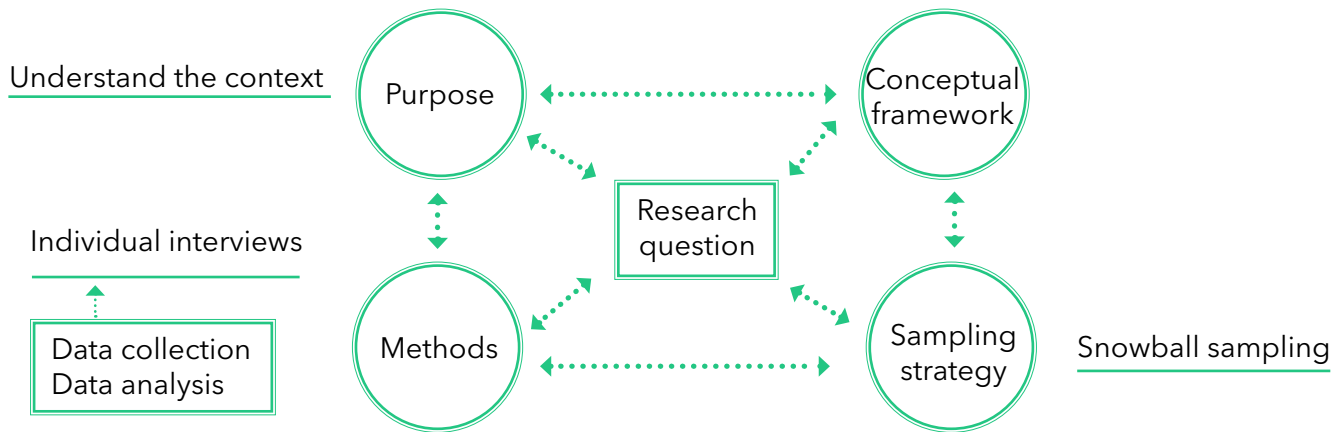

Figure 2-9 Research structure adapted from Robson, 2011 and Maxwell 2013)

2.7.1 Research question

The research question of this project is how to help parents to better facilitate their children in online learning at home during the quarantine period under the influence of COVID-19.

From the literature, various challenges are identified when making the transition from traditional school to online education. However, how the challenges differ from literature remains unknown. To figure this out, four main questions of the research are formulated as follows,

- What are the main challenges of children in the transition to online education at home during the COVID-19 quarantine period?

- What are the challenges of parents in helping children with their studies during the COVID-19 quarantine period?

- How do parents solve these challenges now?

- What is the ideal situation of parents in helping their children with studies at home?

2.7.2 Interview procedure

An interview guide was developed according to the research question. Starting with the three initial interviewees, nine parents were involved through snowball sampling. The interview guide was continuously iterated and slightly modified during the interview process.

All the interviews were audio-recorded and transcribed. All the data were coded and clustered in ATLAS. The full interview guide and a detailed codebook can be found in appendix.

Interview guide

The first step is to work on the development of an interview guide for conducting the semi-structured interviews. The interview guide provides topics or subject areas within which the interviewer is free to explore, probe, and ask questions that will elucidate and illuminate that particular subject. (Patton, 2002) Considering that I need to get a deep understanding of the topic through 9 interviews, so the interview guide was carefully designed to make the best use of the limited time, it also helps make interviewing several different people more systematic and comprehensive by delimiting in advance the issues to be explored. (Patton, 2002)

In the interview, the most important question is that parents' challenges in helping children with their studies during the COVID-19 quarantine period. However, before that, it's good to know the main challenges of children in the transition to online education at home during the COVID-19 quarantine period, which might to a great extent affected the parents' framing around the issues and allows for a deeper understanding of how parent think about their parenting behavior (Braun, 2013). And then, questions were asked about how parents deal with the challenges now especially how they deal with conflicts with children caused by learning issues. The interview guide ends with the topic of parents' desires and wishes on homeschooling and the parent-child relationship.

> **What are the challenges of parents in helping children with their studies during the COVID-19 quarantine period?**
>
> - How was your life influenced by COVID-19 during the quarantine period?

Figure 2-10 Part of the interview guide (the full interview guide can be found in the appendix)

To gain deeper knowledge and keep participants talking more probes and follow up questions were added. To know more about the reason behind, participants were asked why they thought about a certain thing. For example, one participant mentioned that she was used to criticizing her child for his inappropriate behavior and rarely encouraged him. So a follow-up question is why did she do so. The question triggered the participant to think deeper about the reason behind her behavior. She replied that in her opinion, severity was the only sign of love for children. Being easy on the child is hurting him. She tends to be stricter with the boy because it makes him keep working hard or he will become lazy. She is not good at encouraging children partly because of her character. She believes she needs to be authoritative with her child, and her strong personality makes it difficult for her to say encouraging words, even sometimes she thinks she should. In this way, more information about parents' educational philosophy was found, which would help to identify design opportunities and develop targeted design concepts later.

Some questions were added or deleted during the interview process to get the most out of the limited interview time. For example, after the first several interviews, the school arrangement for the online course schedule is quite clear and all the participants live in the same city, so relevant questions were omitted in later interviews. The example about parent's education idea was presented in the figure 2-11.

Almost all the participants put physical and mental health first in the follow-up question, but this was not consistent with their answers for other questions. So I realized that the question itself may be instructive because the participants do not want to project a very utilitarian image that focuses only on children's learning and not their physical and mental health. So in the later interviews, this question was deleted, alternatively, the participants' answers to other questions were analyzed and summarized to get their values and expectations of children in education.

A participant mentioned her way of finding professional help in children's learning and this led to the finding that parents lack the channel to find professional education suggestions. The tools and platforms they used can help build a more complete image of the parents through these daily behaviors and habits, which can be a starting point of building solutions. So the question about how parents find help on educational problems was added in the interview guide to gain more insights.

The full interview guide can be found in appendix.

Sampling strategy

For this research, snowball sampling was used to get interview participants. Snowball sampling is arguably the most widely used sampling method in qualitative research in all disciplines of social sciences. It is used as a primary tool for accessing information to help researchers enrich sample groups. (Noy, C. 2008) It's suitable in this case because the target group of the research, parents of pupils in grades 3-6 under the stress of COVID-19 quarantine, is a population that is closely connected through their children and a similar situation in which they are involved. (David L., Morgan 2008) And snowball sampling is also the most feasible method during the COVID-19 period because it can be conducted easily online without complex

planning or plenty of time and money. (Voicu, Mirela-Cristina 2011) With the assumption that parents in a relatively low educational status and with moderately low economic status face more challenges in helping children's studies compared to rich and highly educated parents, the first several participants were carefully selected to make sure that they are the appropriate ones to conduct the sampling and locate the correct target group. In total 9 interviews with parents were conducted to get an understanding of the primary school online education context in China during COVID-19 quarantine period. The general information about the participants was shown in the graphs.

The kids of the participants are from 9 years old to 12 years old. Children at this age are starting to enter adolescence and experience some behavioral and psychological changes. Especially for those in the 6th grade, they are in the important transition stage from primary school to middle school. Parents need to pay extra attention to their studies.

Thanks to the family planning policy, which began in 2010, more and more families in China are having two children. The age gap between the parents and their second child may be larger in these families, which may lead to greater communication barriers. This means they may face greater challenges in their children's education.
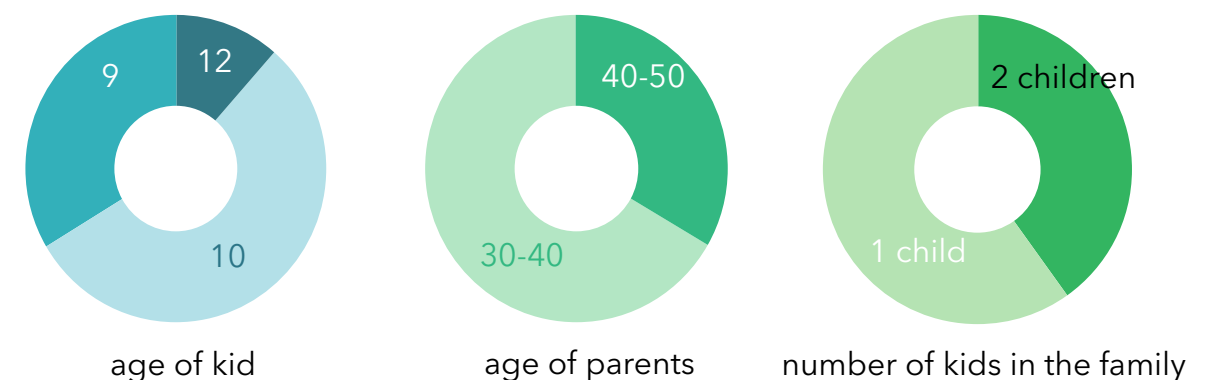
Figure 2-11 Examples of the adjustment of the interview guide during the interview process

age of kid   age of parents   number of kids in the family

Figure 2-12 Demographics of the participants

education related

no education related

girl

boy

both parents

grandma

father

mother

job of parents

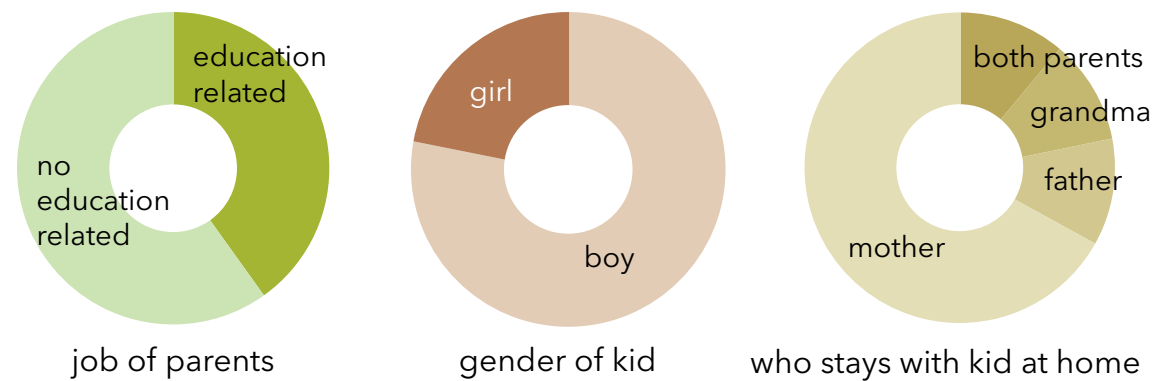gender of kid

who stays with kid at home

Figure 2-13 Demographics of the participants

There are 4 participants who are doing educational related jobs, their way of educating the children might be influenced by their jobs. For most families, the mother is responsible for children's studies mainly. However, for some families, parents cannot stay at home to accompany the children to study. children stay with other family members like grandma.

Parents have different educational attitudes and strategies for boys and girls. Due to the influence of traditional culture, most parents have higher and stricter requirements for boys. This might lead to more conflicts between children and parents.

2.7.3 Analysis

Given that the interview data is very complex, it is wise to categorize the data and establish connections first. The established relationship is then combined with the previous section's literature to find the insights from the interview. All data is clustered first. In this step, valuable data was chosen to be explained while maintaining the original answers' richness and authenticity. The clusters were summarized into categories to observe the data at a higher level. Further, the generalized categories were turned into super categories. Thus, all the interview findings are divided into three topics: challenges of children, challenges of parents, and wishes of parents.

As shown in the figure 2-14, the first two topics show how the children and parents are influenced in the current situation while the wishes indicate the ideal position.

Super-catogary	Catogary	Cluster	Density
children's challenges in online courses at home	lack of enough understanding ability	children are less efficient without face to face communication with teacher	9
		children feel upset when they can't understand the lecture	
		children feel depressed when they can't master new knowledge	
	negative emotions	children feel pain to study but they have to do it	4
		children cry because they can't figure out the homework	
		children don't want to do homework because it's too much	3
		children lack motivation to study the subject they are not good at	
	low self-control ability	children konw what they should do but they lack self-displine	5
		too many distractions at home	
children's like and dislike	Lack of self-awareness	children don't realize that they don't have a good command of a certain knowledge point	
	like positive feedback	children are enthusastic when being encouraged	3
		children like reward system	
	like sharing	children like to share interesting things with parents	5
		children like to share their sense of accomplishment with parents	
	like interesting course	children like extracurricular courses	
	don't like being forced	children don't like mandatory activities	4
communication with teachers/other parents	communication with teachers	parents ask teacher for help on learning problems	
		parents don't communicate with teachers because they can handle the child's learning	3
		teachers communicate with parents when the children didn't do the homework well	5
		parents don't want to communicate with teachers because they think that would bother the teacher too much	4
		parents understand and respect teachers more	6
	communication with other parents	parents learn from their friends on education method	
		parents share education experience with friends	4
expectation on children's learning	search for professional help	try to find professional help in education	
	high expactation	always not satisfied with children'e learning	
		hope the child to be the best student	3
		prepare extra tasks for children	
		want children to study independently	6
	No strict requirements for academic performance	don't care about ranking too much	
		don't strictly ask children to be the NO.1 at school	
		want to enrich children's knowledge	

Figure 2-14 Examples of the super category, categories and clusters (the full version can be found in the appendix)

From the perspective of the children, they are facing the challenges of taking online courses caused by the epidemic and the resulting forced adaptation to changes in living habits. For parents, all the challenges of children influence how parents help children in their studies. Their opinions on online courses and the overall parenting style at home have an impact on the communication between parents and children. All these challenges and the reflection of the parenting behaviors trigger the parents' expectations on children and the wishes of a better parent-child relationship.
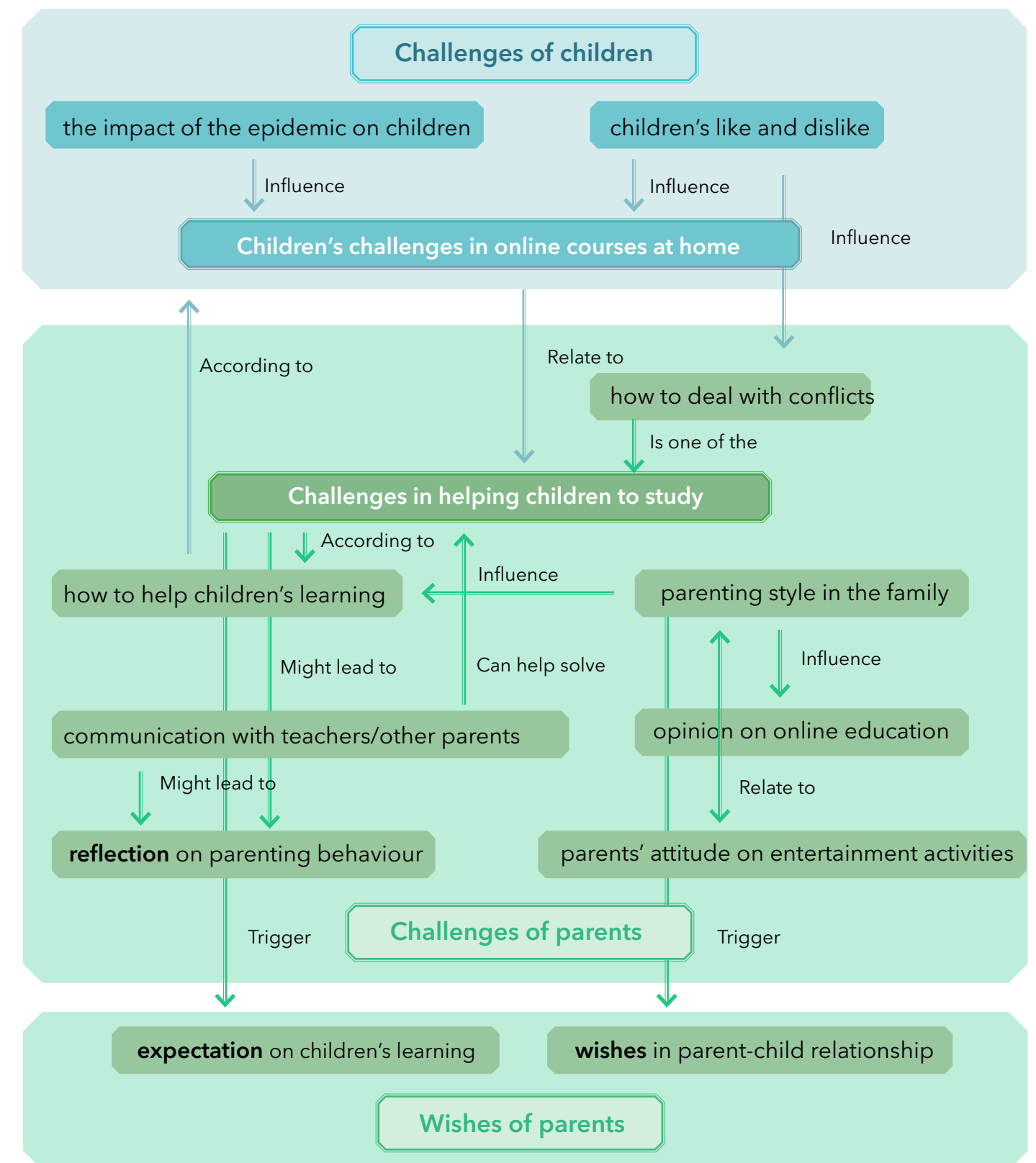

Figure 2-15 the relationship among super categories

2.7.4 Findings

Background information about the online education context

A general online course schedule (for 3rd grade to 6th grade)

| | Online courses | | Breaks |
| | Watch TV shows | | Tutor |

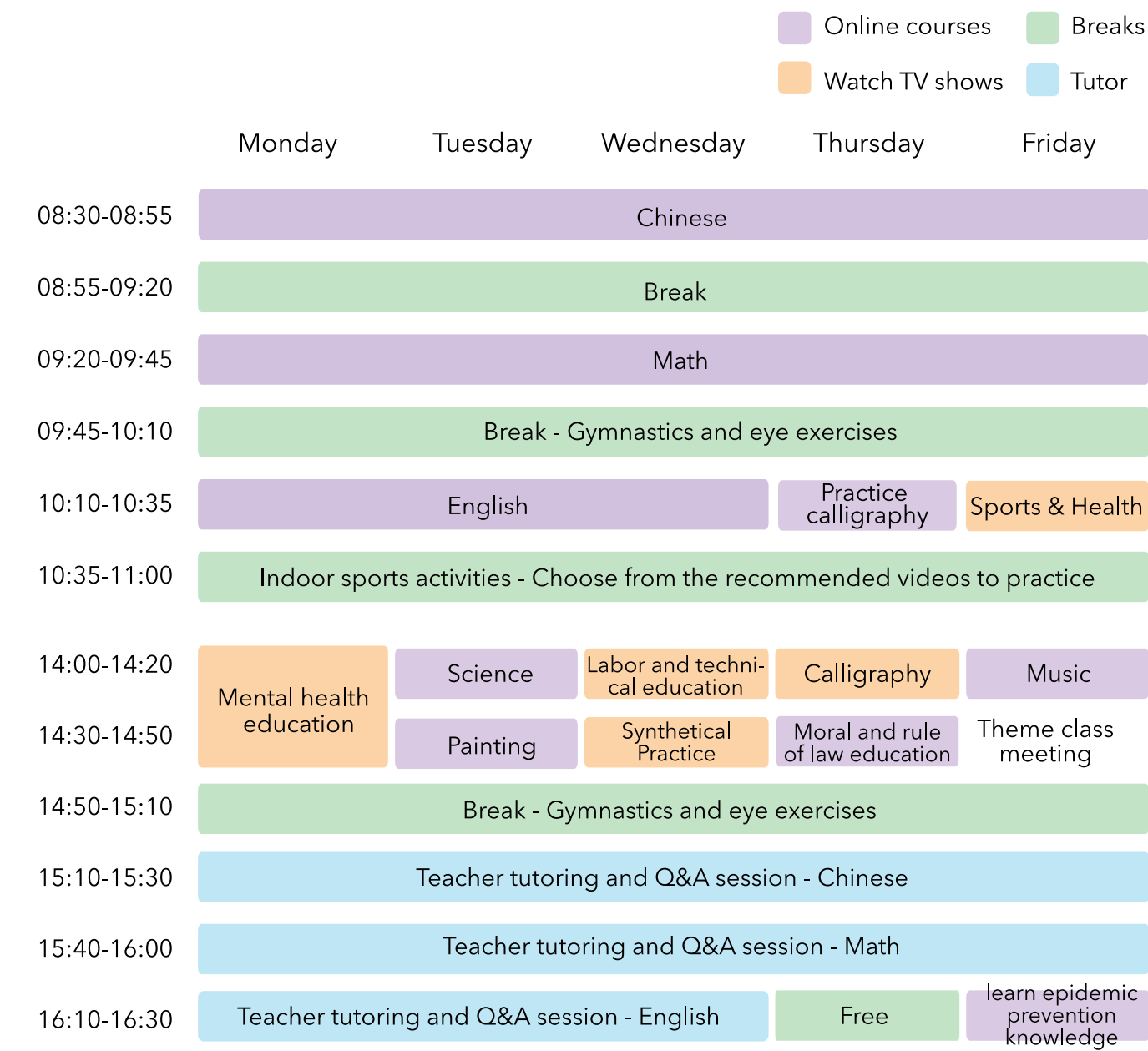|	Monday	Tuesday	Wednesday	Thursday	Friday
08:30-08:55	Chinese				
08:55-09:20	Break				
09:20-09:45	Math				
09:45-10:10	Break - Gymnastics and eye exercises				
10:10-10:35	English			Practice calligraphy	Sports & Health
10:35-11:00	Indoor sports activities - Choose from the recommended videos to practice				
14:00-14:20	Mental health education	Science	Labor and technical education	Calligraphy	Music
14:30-14:50		Painting	Synthetical Practice	Moral and rule of law education	Theme class meeting
14:50-15:10	Break - Gymnastics and eye exercises				
15:10-15:30	Teacher tutoring and Q&A session - Chinese				
15:40-16:00	Teacher tutoring and Q&A session - Math				
16:10-16:30	Teacher tutoring and Q&A session - English		Free		learn epidemic prevention knowledge

Figure 2-16 A general online course schedule for students of 3rd grade to 6th grade

- For primary students, they are asked to watch pre-recorded video courses online. Each course is about 10-20 minutes. The teacher does 1 hour tutoring or answering questions in the evening. The teacher assigned homework for students and checked the completion every day. Most of the learning tasks can be done in the morning.

- The students only focus on the main courses (Chinese, Math and English). Although there are resources provided for other courses (music, painting, P.E.), they usually just ignore these courses.

- Most children need to take extracurricular online courses during weekends.

Challenges of children

The challenges for children are mainly in three aspects, the challenges in online courses, the impact of the epidemic and their likes and dislikes. (which could lead to disagreements between children and parents therefore increase parent-child conflict).

Compared to the literature in (2.1.3 The challenges in the transition from traditional school to online education), Besides facing challenges in self-awareness, self-discipline, self-motivation, perseverance, and time management, children are unprepared for these changes, which increases the difficulties for them to take online classes at home. These difficulties will make their resistance to study become stronger.

This negative emotion may further affect the parent-child relationship and may increase parent-child conflict. Regarding the impact of the epidemic on children, the decreased outdoor activities and peer interaction indeed have a negative effect on the children, which are in line with the literature in (2.2.1 Stress and physical activities and 2.2.2 Less peer interaction). At the same time, some children feel more relaxed to study at home, which is a positive aspect of the online education transition. What is new from the literature is that the children already have a strong awareness of epidemic prevention, which means that increasing the prevention awareness might not focus on the final design. And the children's likes and dislikes would be explained in detail in the next section. (2.7 Interview with children)
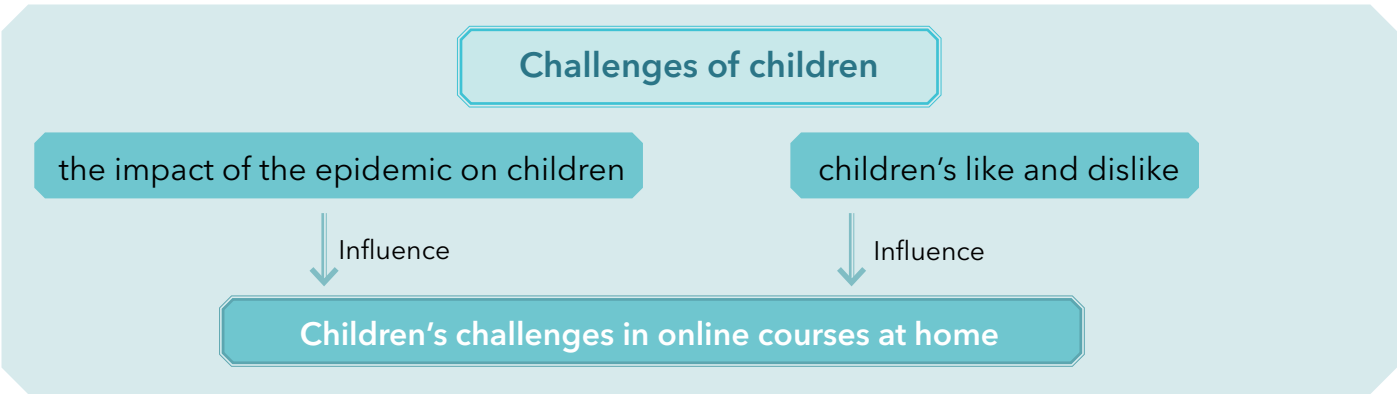
Figure 2-17 Children's challenged in online courses at home

the impact of the epidemic on children's life

● **strong epidemic prevention awareness**

'She has the consciousness of taking good sanitary measures. She told me she knew how to wash her hands properly and showed me. She insisted on wearing masks all the time. She **takes this issue very seriously.**'

● **more relaxed lifestyle**

' We have a different schedule now. We get up at around 5:40 am and set off to school at 6:20 in the morning on school days. Recently, my daughter usually gets up at 7 o'clock, sometimes at 7:30. She is happy that she can **get up later** these days and have enough sleep.'

'She is more **relaxed** at home. She eats snacks when taking online courses. That's impossible on school class.'

less outdoor activities

'She said she didn't want to go out because her friends stayed at home and no one went out. Even I asked her to go outside, she didn't want to. She's used to staying at home and is not willing to move.'

Almost all the children have quite strong prevention awareness due to the education from school and social news of COVID-19 during quarantine time. So parents don't need to worry too much about it.

children's challenges in online courses at home

low self-control ability

'There were too many distractions at home . Sometimes I do the housework while he is in the online class. His eyes are on the screen, but he's actually hearing what I'm doing. He can't concentrate on his courses.'

'He knew in his heart what he should not do but sometimes lacked self-control. He can't do what he has promised to me.'

negative emotions

'He cries at home because he can't finish his Chinese homework. He doesn't like Chinese at all. He always suffers when he learns it.'

'The teacher lists all assignments in group chat every day. When he saw so much homework, he didn't want to start.'

'Learning these subjects is like taking Chinese medicine to her. Although the medicine was bitter, she had to take it.'

lack of self-awareness

'Children sometimes don't realize that they don't have a good command of a certain knowledge point. He always thinks that he mastered the knowledge but when I ask him to figure out the exercise, he found that he actually can't do it.'

lack of enough understanding ability

'Sometimes he could not understand the knowledge after watching the video course several times. Some of the problem solving steps in the recorded video lessons are not detailed enough, so children encounter difficulties in under standing.'

For children in 9-12 years old, it's hard for them to learn efficiently on their own without face to face communication with the teacher. They have a relatively relaxed and lazy lifestyle at home and they are easily attracted by entertainment devices at home. Most children can't understand the course well and keep concentrated on the course. The biggest problem is that they are very resistant to doing their homework. This is in line with literature about the challenges that children would encounter in the transition from school to home online education. As the literature indicated, the children need to struggle to learn new skills to adapt the changes.

Children's like and dislike
This will be explained in detail in the next section (interview with children)

Challenges of parents

The challenges in helping children to study and communication with teachers/other parents will be described in this section. The rest of the elements in this figure will be explained in the persona in the next section. (2.6.5 Personas)

The challenges parents encountered in helping children to study mainly in line with the literature in (2.1.2 Factors that influence the involvement level), which are the negative feedback from children, not enough ability and capability (limited time and energy under COVID-19 stress) to help, and the overall family atmosphere. Together with other stress caused by the epidemic, all these challenges make the parents more easily experience emotional breakdown when getting along and communicating with the children.

As for the communication with teachers, parents almost don't contact teachers because they don't want to put too much pressure on them. Basically, it's only when the child has a learning problem that the teacher contacts the parent. This is not consistent with the literature (2.1.4 The suggestions from literature) that suggests parents and schools should strengthen communication in the transition to online education. At the same time, the communication between parents and other parents mainly revolves around sharing experiences related to children's education and communication. Although the communication with teachers and other parents indeed influences how parents deal with the challenges in helping children study, the limited time of the project makes it hard to include the problem and tackle it in the design solution. So the answer to this problem would not be discussed in this design and could be a recommendation in further exploration.
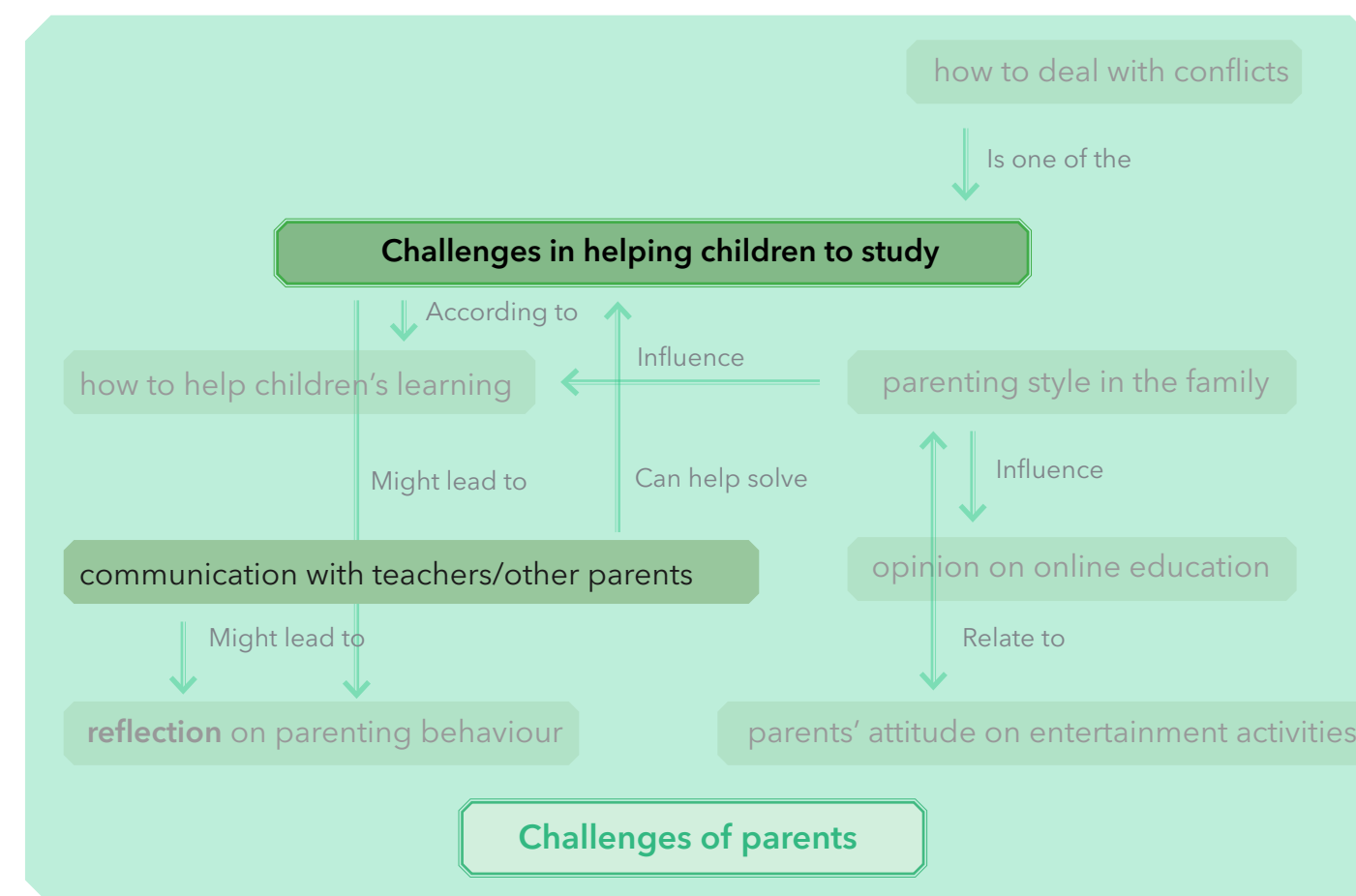
Figure 2-18 Challenges of parents

Challenges in helping children to study

Children behave differently at school and home. They may work hard at school but without the supervision of teachers, they are too lazy to study at home. Children make various excuses to use phones for a longer time and procrastinate when doing homework. When they can't finish the homework they might lie about the completion of homework and cheat on learning tasks. ❶ This negative performance makes parents irritable and angry with children. Parents feel frustrated and lose patience when children can't reach the expectation. When parents can't control their emotions, they start to yell at children and even beat them, which leads to children's resistance to parents. ❷ Children refuse to communicate with parents and stay in their own rooms when taking online courses. Children enter puberty and are rebellious. They even lock the door and prevent parents from entering the room. When they encounter difficulties in learning they don't want to ask parents for help. Children's resistance might make them behave worse on learning. ❸ Therefore, the child and parents are caught in a vicious circle.
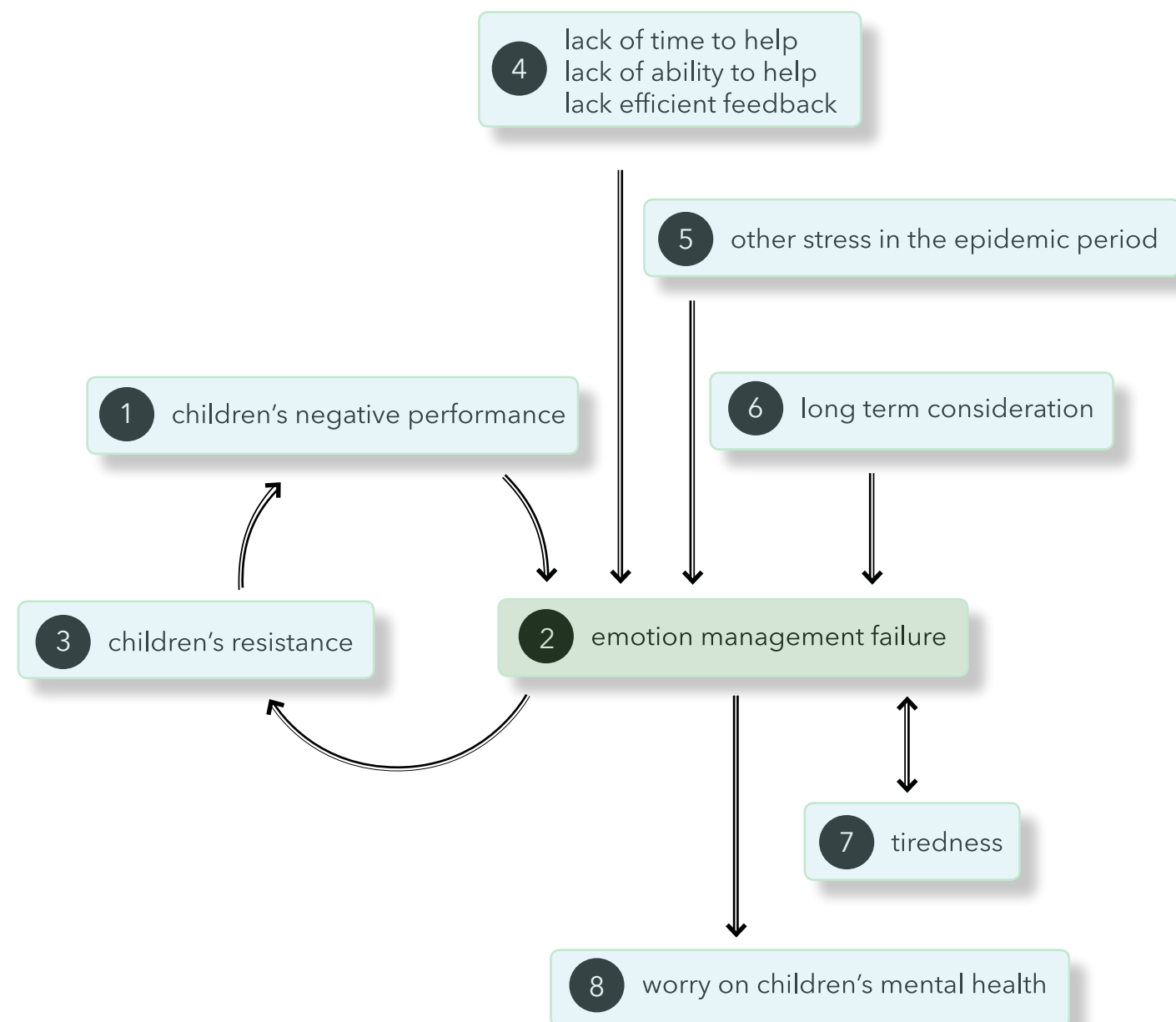
At the same time, some parents don't have enough time to involve in their children's studies. They need to work during the epidemic period and experience greater work pressure than usual. When they try to help children with learning, parents find the way children are taught is different from the way they are taught, which makes it difficult to communicate with children. For parents with lower education, they can't answer the questions of children on their homework. During the online education period, there are no exams so parents have no idea about to what extent the children master the knowledge and there is no comparison with other children. They are anxious about this. ❹ Other stress in the epidemic period like bad news of epidemic, messed sleeping schedule and financial stress also contribute to emotion management failure. ❺ Given the situation that no one knows when the children can go back to school and sixth grade is an important transition between primary school and middle school, parents feel more anxious. ❻ When parents are always angry about children and all the ways didn't work, they feel depressed and tired of children, especially for those parents who stay all day with children. This tiredness in turn increases irritability. ❼ And sometimes parents dare not to be too strict with children because they worry that this will hurt the children so much and influence their mental health in the future. ❽

The most apparent difference between the challenges parents faced in a normal transition from school to online education with challenges they face in the COVID-19 situation is that they can more easily experience emotion management failure when helping the children study. Thus, helping the parents deal with the emotional breakdown could be a valuable design direction.

Figure 2-19 Parents' challenges in helping children to study

❶ children's negative performance

procrastinate

*'He spent **2 hours writing only 39 words** yesterday morning. I asked him what he had done during the two hours. He replied that he was in a trance. He wasn't playing with his phone or IPad, he was just staring into space. Today he spent **1.5 hours writing only 4 sentences.'***

different attitude

*'She has a different attitude towards us and towards the teacher. Sometimes she doesn't listen to me when I teach her. She is **more obedient to her teacher.'***

lie/cheat

*'The whole course that day was about **77 minutes** but the teacher found that my kid only was online for **1 minute**. When the teacher sent the screenshot of how long every student was on the courses, I just knew the situation. I was angry not only that he didnt finish his homework, but that **he had lied to me.'***

❷ emotion management failure

irritable and frustrated

*'I get very angry when I see he hasnt finished his homework. I am very **emotional and crazy** in such situation.'*

*When I lost patience, I started **yelling** at him. I began to **express some negative emotions** to him.'*

beat children

*'I'm thinking that shouldn't **beat** him. I realized that there was something wrong with my parenting style. I never thought he would run out of the house.*

3 children's resistance

lock the door

*'He asks for **private** time and space. I don't know what he is doing with the phone. Once he got the phone, he **locked the door** of his room to **prevent** us from entering.'*

refuse communication

*'My son is now **keeping a distance** from me, and I can hardly get close to him, let alone communicate calmly with him. When I asked him why he did this, he just **didn't answer.'***

don't want parents to involve in study

*'He usually **refuses us to sit beside** him to supervise his study. I criticized him when he made mistakes in writing his homework or when he was not writing neatly. He doesn't like me to do so. This brings him a lot of **pressure.'***

'Even if she does not fully understand this knowledge, she does not want to take the initiative to ask. Because if she asks me a question, usually I'll come up with a few similar questions for her to do. She thought it was too much trouble.'

*'When I explained a problem to him but he didn't understand, he **didn't ask me**.*

But when he was figuring out a similar problem, I found that he couldn't solve it.'

*'Sometimes she **doesn't listen to** me because she thought that what I talked was different from what her teacher told her.'*

4 lack of time to help
lack of ability to help
lack efficient feedback

time

*'I actually tutored him for very **limited time**, that is, a short time after dinner or in the morning.'*

ability

*'I'm getting old, although sometimes I know the answer to that question, I don't know if I'm doing it the right way. I don't know **how to explain the process** to him, and what I said may not be the same as what the teacher said. '*
*'Now when I look at his homework, some of the questions are like **brain teasers**, and I can hardly answer them.'*

no feedback

*'I just watch him to study all the day and there is **no comparison to others**. There is no test to indicate that what position he will be in his class ranking and **if he has mastered the knowledge well. '***

5 other stress in the epidemic period

economic stress

*'I'm worried about whether my salary will be paid as usual. It's important to our family's life situation. I'm also worried about **getting laid off. '***

'In the past, my husband and I both went out to work to make money. My husband is now the main source of in-come for our family. I am only a temporary worker, and the salary of about 1000 yuan a month is far from enough to support the family expenses. '

epidemic news

*'When I saw that many people were infected, especially when many medical staff were infected, I was very **depressed.'***

work/housework

*'With the children at home every day, the **house gets dirtier** than usual. I have to clean the house more often. Usually I just need to prepare a lunch for my little son. But now I have to prepare three meals a day. Every day is stressful.'*

6 long term consideration

vital 6th grade

'This half year is very important because it determines whether he has a chance to enter a good middle school, which will also influence if he can enter a good high school. But we have no idea about when he can come back to school.'

7 tiredness

*'I have taught him the same knowledge many times, but when I tested him again, he still couldn't do it. I feel very depressed. I'm really **enough of this** but I have no way to change the current situation.'*

8 worry on children's mental health

*'If the way of education is not proper, we cannot imagine how **serious the consequences would be**. I worry about his mental health. I'm afraid he had a **psychological shadow** when he was growing up.'*
*'If I just beat and scold them, he might be in a bad mood, which is not good for his health. At that time, I was very regretful and scared. 1 was very afraid that I would **lose him.'***

Communication with others on children's learning

It's suggested in the literature that parents should increase communication with teachers and schools to learn about academic standards and child's progress during the online education period. However, from the interviews, almost all the parents don't take the initiative to communicate with teachers or ask the teacher for help in education problems because they don't want to bother the teacher too much.

Some parents communicate with other parents on how to educate the child and they reflect on their own behavior during the process. Some parents don't communicate with others because they believe every family has a similar situation during the special period, so it doesn't make any sense to communicate.

When parents encounter difficulties in children's education, they actually don't know how to get access to an educational professional. They usually watch some videos online and try it out for several days and give up. Or they try to find professional help, but it's too expensive for them to pay for an education lesson for parents.
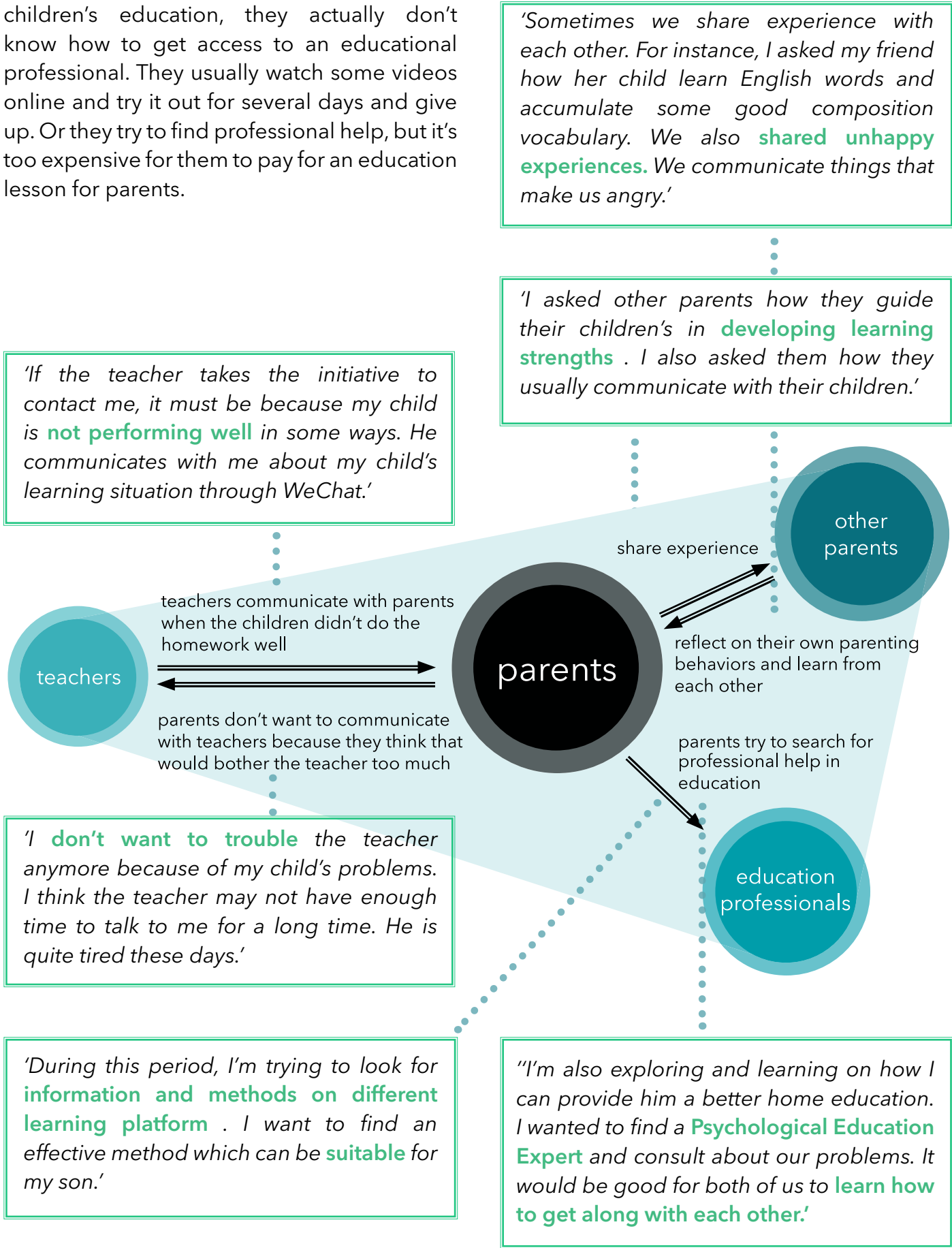
'Sometimes we share experience with each other. For instance, I asked my friend how her child learn English words and accumulate some good composition vocabulary. We also shared unhappy experiences. We communicate things that make us angry.'

'I asked other parents how they guide their children's in developing learning strengths . I also asked them how they usually communicate with their children.'

'If the teacher takes the initiative to contact me, it must be because my child is not performing well in some ways. He communicates with me about my child's learning situation through WeChat.'

other parents

share experience

teachers communicate with parents when the children didn't do the homework well

teachers

parents

reflect on their own parenting behaviors and learn from each other

parents don't want to communicate with teachers because they think that would bother the teacher too much

parents try to search for professional help in education

'I don't want to trouble the teacher anymore because of my child's problems. I think the teacher may not have enough time to talk to me for a long time. He is quite tired these days.'

education professionals

'During this period, I'm trying to look for information and methods on different learning platform . I want to find an effective method which can be suitable for my son.'

''I'm also exploring and learning on how I can provide him a better home education. I wanted to find a Psychological Education Expert and consult about our problems. It would be good for both of us to learn how to get along with each other.'

Figure 2-20 Parents' communication with teachers or other parents

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During the interview, participants began to reflect on their behavior while answering questions. Three interviewees mentioned that through the interview, they realized that they had some behaviors that need to be corrected in the education of children, and correspondingly, they had some ideal visions for the future family education. Their wishes could be inspirational for the design directions.
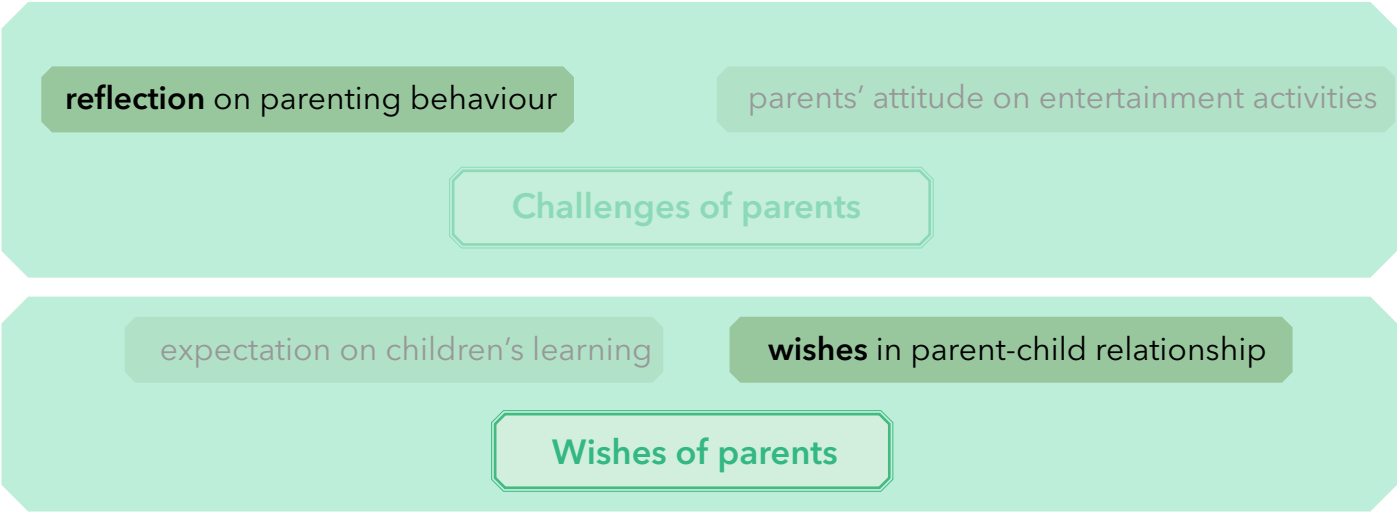

reflection on parenting behaviour   parents' attitude on entertainment activities

Challenges of parents

expectation on children's learning   wishes in parent-child relationship

Wishes of parents

Figure 2-21 Wishes of parents

Reflection on parenting behavior and wishes in parent-child relationship

The conversation between children and parents on learning issues are unequal. Parents are used to asking their children to obey the arrangements that parents have planned for their children. When the children are disobedient, parents think this is unfilial behavior. **1** During the interview, parents began to reflect on their educational behaviors. This made them start to realize the inequality of such communication. Therefore, when asked about the ideal parent-child relationship, parents answered that they want to establish an equal communication relationship with their children. They don't want to force the child to do something but to make a decision together with the child. Parents hope that sometimes they can break the limitation of the roles of parents and get along with children like friends. **5**

Some parents realize that they are too strict

with their children in their studies, which puts a lot of pressure on the children. Most of the interviewees admit that they are responsible for the conflict with their children in the studies. Parents can't understand why children can't even solve such simple problems, so they easily get angry with their children. Some parents find that because they are too involved in the child's learning and the child has become dependent. Children only finish simple tasks in their homework. They don't want to think about a little more difficult problem, they just want to wait for help from their parents. **2** Therefore, parents desire an open conversation with children to be understood and trusted by children. They want the children to have an understanding of the difficulties of being a parent. Parents want their children to know that everything they do is for their children to have a better future. **6** If children can understand and trust their parents more, they are more likely to

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establish a more intimate relationship with their parents. This will have a positive effect on children's learning. **3**

In some families, couples hold different opinions on the education of their children. Usually one of the couples thinks that the other dotes on the child too much. When one of the couples wants to punish the child for failing to do their homework, the other comes to stop it. This results in the child always relying on the less strict parent. **7** Through the interviews, it's found that children prefer being encouraged in their studies. However, influenced by traditional educational concepts, some parents realize that they are more likely to criticize their children's shortcomings and lack of encouragement for the children. These parents know that they should encourage

their children to learn more positively, but they do not know how to do it. **4** Parents want to learn more knowledge on how to educate children and they want to be a good example of their children. The ideal situation is that parents and children can learn and make progress together. **8**

It is not difficult to see that most of the reflections revolve around communication between parents and children. Accordingly, the parents' wishes are to have better communication with children and build a more positive parent-child relationship at home. The principles and guides in the literature (2.4 Positive parenting and 2.5 Parent-child attachment and communication) about parent-child communication would help achieve their wishes.
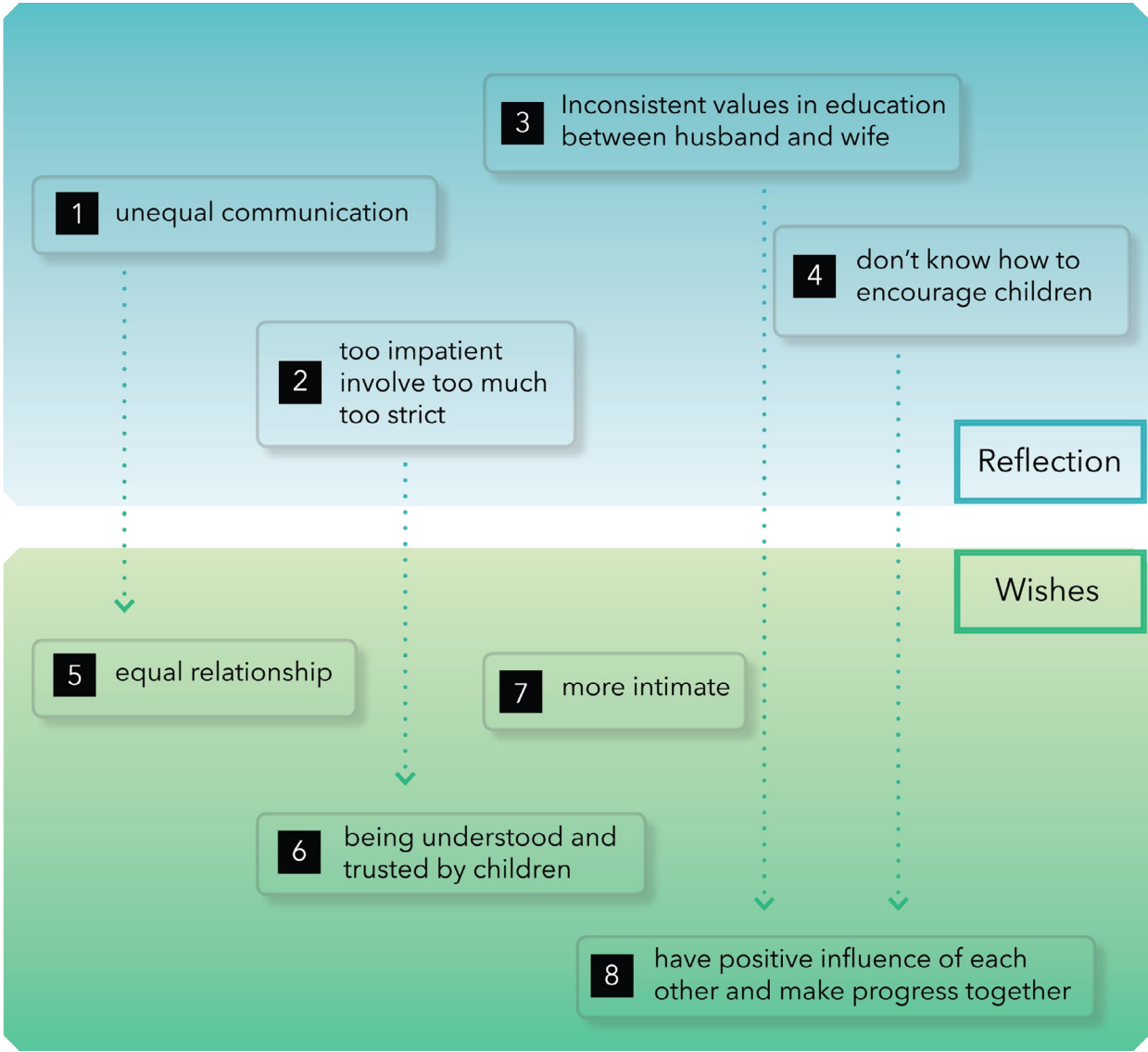

Figure 2-22 Reflection on parenting behavior and wishes in parent-child relationship

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1 unequal communication

🟢 **children must listen to parents**

'When I yelled at him, he also yelled at me. From the perspective of traditional culture, his behavior is **unfilial.** *I'm his mother, he should listen to me instead of confronting me. He should listen to me no matter what I say.'*

🟢 **parents decide things for children**

' Maybe he feels that's (two day's extracurricular courses during weekend) too much, but I feel that's good. All extra-curricular courses are to assist him in his academic performance.'

5 equal relationship

'I hope we can respect each other and communicate equally. We can learn together. I don't want to **suppress** *him with the* **authority of the parent**. *I don't want to* **force** *him to do things. I want us to be equal. I wish we could talk things over together instead of me guiding him as a parent.'*

2 too impatient involve too much too strict

🟢 **too impatient**

'When I lost patience, I started yelling at hire. I began to express some negative emotions to him. This is a what I really want to change now. '

🟢 **involve too much**

'I understand that in fact, time is sufficient at her own pace. I can't help but worry about her all the time. She is slow in doing everything. I just want to push her faster.'

🟢 **too strict**

'I now sometimes regret that I was too strict with him, leaving him in a very tense state every day.'

'Maybe I'm too critical. I always think there is room for improvement in his personality and academic performance. Maybe I expect too much from him.'

6 being understood and trusted by children

'Parents and children can discuss more. After all she is still young. I hope that she can understand that all I do is for her good gradually.'

I won't fully support the teacher without understanding my child's situation and ideas. I want to build a sense of security for my child.'

If he is confused, I hope to be the first person he wants to talk to.'

7 more intimate

'I hope we can be more intimate. He used to hold my hand and never leave me, but now we hold hands less and less. I think it might because I'm too strict with him so he is getting away from me.'

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3 Inconsistent values in education between husband and wife

'His father is not as strict as I am to him. When my son said he did not want to eat, my husband allowed him to do so, and he would not force him to eat. When we have conflicts in his study, my husband is on my son's side, and the two of them are against me.'

4 don't know how to encourage children

'I am also not a mother who is good at encouraging children. She suggested that I should encourage him more. But just can't do it. Whenever 1 see his attitude to study is not serious, I can't say any encouraging words.'

8 have positive influence of each other and make progress together

● **form a common goal**

'If we can reach a consensus or form a common goal in his study, I believe he will have an excellent performance.'

● **learn together**

'But I told him that we all need to adjust ourselves slowly and learn to control ourselves. We need to make an effort together '

● **be an good example of children**

'Children are too good at imitation. Sometimes when I lose my temper or have a bad attitude, he will learn to lose his temper from me or even go further. If parents can spend less time on their mobile phones and maintain good reading habits, then the children will imitate this behavior and spend more time reading books.'

2.7.5 Personas

During the analysis, two dimensions are chosen to show the differences among parents. The horizontal axis refers to the time spent on children's study. "Much" means that the parent stays at home during the quarantine time and has enough time to accompany or supervise the child to study. "Little" means that the parent needs to work during the epidemic period so they don't have limited time to spend on children's study. The vertical axis is about parents' expectations of children's study.

"Ambitious "parents have high requirements for children's study while "Satisfied" parents are generally satisfied with the child's learning status and learning performance. There is no corresponding persona in the lower-left corner because, in all interviews, no interviewee meets the corresponding characteristics. Three personas are presented here to indicate the behavior and attitude differences in these two aspects to help understand the context.
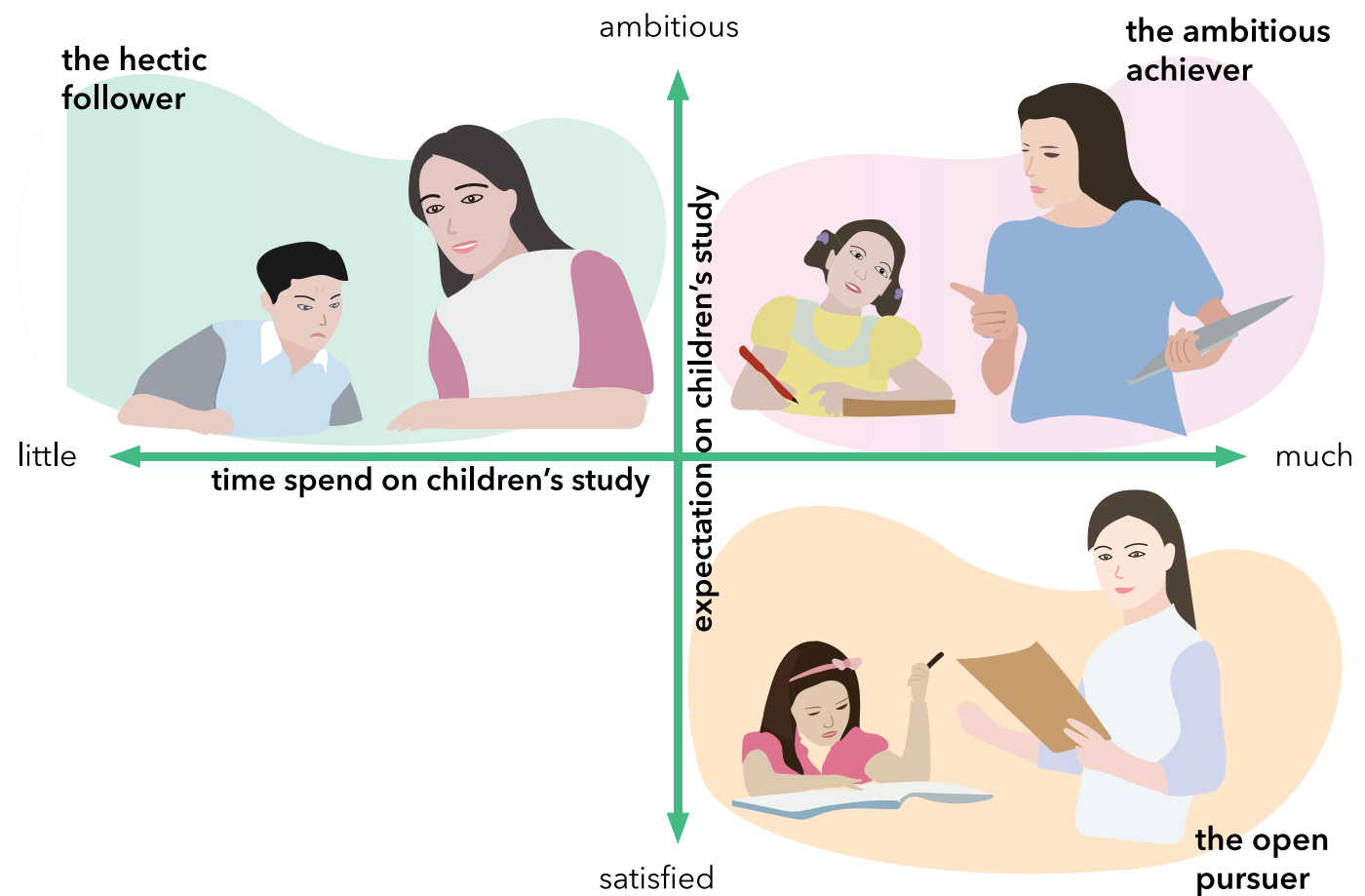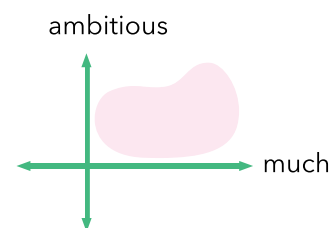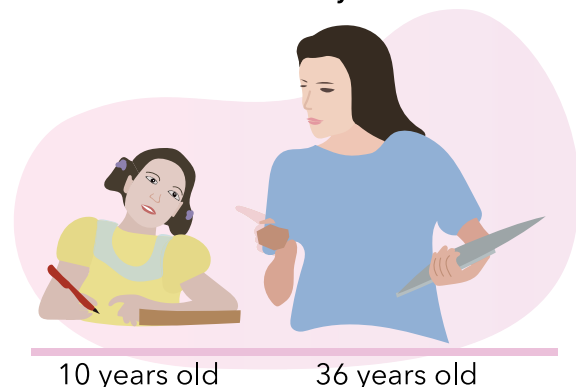

Figure 2-23 An overview of the personas

the ambitious achiever

'It may be because I have only one child, and all my attention is focused on her. My daily life revolves around her. '
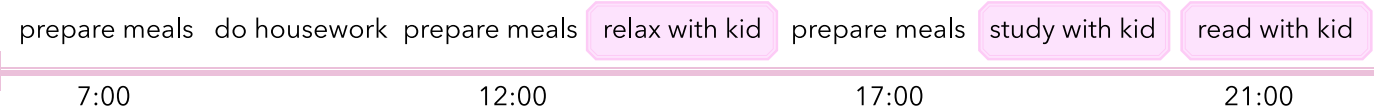
Shuyi Lin

10 years old   36 years old

ambitious

much

how to help on child's study

- Read with the child
- Teach new knowledge and help the child with diffilult questions
- Assign extra homework to make up for children's weakness in learning
- Search for learning materials to broaden child's horizons and enrich her knowledge

prepare meals   do housework   prepare meals   relax with kid   prepare meals   study with kid   read with kid

7:00   12:00   17:00   21:00

attitude on child's entertainment

' *The most important thing for her is to study now. However, some recreational activities may be helpful to her study and also beneficial to her body. So I asked her to do some outdoor activities to relax her eyes because the long hours of online class hurt her eyes too much.'*

how to solve conflicts with children

' *I usually combine punishment and encouragement. Sometimes she can only remember for a while, and then he forgets my words. I have tried various methods, but none of them were very effective .'*

parenting style

' *My schedule is based on her. I accompany her to study. When she doesn't need me, I do some house-work, prepare meals and read books.'*

expectation on child's study

'I put a lot of time and energy into my daughter. I also invested a lot in cultivating her hobbies. I am always not very satis-fied with her life and study habits. I believe she can be better.'

opinion on online education during quarantine period

'Online education has some limitations while it's also an op-portunity for the children offset their weakness. I like to have the period to plan extracurricular learning content for her. I appreciate for this opportunity to spend more time with her.'

how to find help to solve educational problems

' *I read articles online on adolescence education and follow educational Wechat Officila Accounts to learn some knowledge. But I haven't found a way to guide me through the special period of her learning.'*

the ambitious achiever

The ambitious achiever is characterized by high expectations for the child's study while spending too much time on the child's learning.

She is an ambitious person, which is also reflected in her expectations of children. She has invested a lot of effort into planning her children's education. In addition to the courses required by the school, various extracurricular interest classes and tutoring courses are also important. She believes that in today's increasingly competitive social environment if you do not do more, you will be left behind.

During the epidemic, due to the impact of work arrangements and the emphasis on children's education, she stayed at home with her child to study. Spending the whole day with the child and the high requirements on study cause pressure on children, making her subconsciously want to escape this kind of supervision. Because she pays too much to the child, and she can't feel the child's obvious progress in daily close contact, which sometimes makes her frustrated. Especially when the child does not follow her plan or question about her guidance on learning issues, the huge sense of loss and not being understood by the child makes her question about her education method. Especially when the child is in the rebellious stage of puberty, and this stage is also an important turning point for the child from elementary school to junior high school, she often suffers from how to guide the child to change in the way of learning and thinking. She actively searches and learns new educational methods and ideas on various platforms, but she is not sure whether these apply to her child. Due to the lack of systematic guidance, these methods are also difficult to maintain for a long time.

Her daily child-centered life sometimes left her tired. She occasionally yearned for her own time to do something else, a brief escape from the routine. She is too immobilized to get along with her children. She needs new inspiration and stimulation to improve the parent-child relationship. She feels that her efforts were undermined by differences between her and her child's learning goals. She believes that a common goal will enable her to help her child better, and the child will perform better as a result.

Needs

- New inspirations to improve parent-child relationship
- Form common understanding on the learning goal with the child
- An opportunity to step out of the current life and re-evaluate the expectation on the child

the hectic follower

Yunxi Liu

'My mind can no longer concentrate on work, especially at the first several days of the online courses. I can't help but worry about my son's learning'

ambitious

little

11 years old   48 years old

prepare meals   go to work   at work   prepare meals   **check homework**

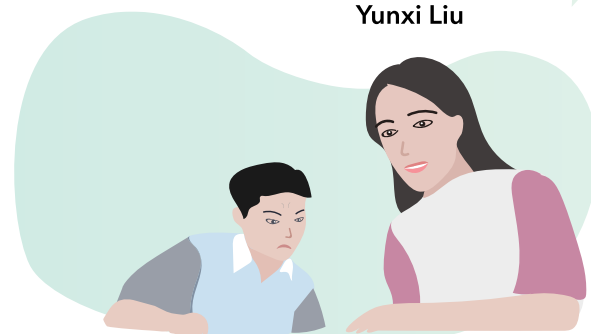7:00   12:00   17:00   21:00
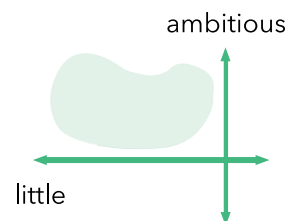
how to help on child's study

○ Check the completion of homework
○ Supervise/Push children to study
○ Try best to create a good living environment for the child to concentrate on study

attitude on child's entertainment

'It's impossible to ban him from playing video games. I can't help getting angry whenever I see him playing games. I know that he is still a kid, he always wants to play. I allow him to play game once in a while when he behaves well.'

how to solve conflicts with children

'I tried to convince him first, and if that didn't work I would beat him. I regret it every time I beat him. I occasionally worry that if I punish him too much, he will act aggressively.'

parenting style

' I'm responsible for his study at home. His dad doesn't involve in his study.' 'Most of our conversations are about learning. Our relationship is good when we don't talk about learning. But when it comes to learning-related issues, both of us are irritable.'

expectation on child's study

After all, he is a boy, he must do well in study, get into a good university, and be self-reliant in the future. Even if he can't be the first in his class, I hope he works hard enough.'

opinion on online education during quarantine period

' Indeed, some of the responsibilities and workload are put on me during the quarantine time. I'm quite stressed because of his studies. He uses the phone all day. I can't believe that he used it only for studying. He is so addicted to mobile games. '

how to find help to solve educational problems

' I have followed an education expert on the short video platform (kuaishou) these days. The expert is experienced in various education problems but it' a paid project. I think it's a little expensive, so I'm still hesitating about whether to buy this course.

how to find help to solve educational problems

I don't know if I should change my parenting style and how I can change it during his adolescence.'

the hectic follower

The hectic follower is characterized by high expectations for the child's study while lacking the capacity to accompany and help the child in learning.

She is almost fifty, and the gap between her and her child may be wider than those younger parents. She was deeply imprisoned by the traditional educational concept and tended to think that only strictness was the expression of love for children. Her communication with the child is also more conservative, most of the topics are around learning. Even when the child talks about other topics, she tries to bring the topic to study, which leads to an extremely tense family atmosphere whenever the topic is discussed. Children in this situation often choose to refuse to communicate. This made her extremely anxious, trying to find breakthroughs and changes but unable to find effective channels based on currently available tools.

Due to her not rich family condition, she still had to go out to work during the epidemic. The increased pressure at work caused by the epidemic and the inability to stop worrying about her child's study even at work made her feel powerless in both work and life. Since the relatively low level of education is not enough for her to guide her child in the study, she can only check whether the child has finished his homework in a short time after coming home from work and constantly push him to study. She tends to believe that children should obey their parents unconditionally. On the one hand, everything parents do is to provide

better learning conditions for children; on the other hand, obeying their parents' requirements is a manifestation of respecting the old and filial piety in traditional culture. She has high demands on her child because the child is the hope of the whole family. Unlike wealthy families, children can have more choices. The only way for her child to change his destiny and lead a better life is to excel in his study and enter top universities. She hopes that the child can at least live better than herself. She tried her best to provide her child with good material living conditions within the scope of her ability, even at the cost of her own quality of life. Therefore, when the child does not perform well or cannot meet her expectations, she can't control her extreme anger and even beat the child. After each severe punishment, she usually regrets her impulse. However, based on the image of authority she wants to establish in front of the child, it is difficult to take the initiative to apologize to the child. The negative or fear that the child shows after being punished also makes her worry that these will cause psychological harm to the child.

Needs

● A tool to guide effective and positive communication with the child within limited avaiable time (the short time after work every day)

● A starting point to try out new education ideas and gradually change the mind in education

● A tool to help reduce pressure

the open pursuer

Yue Ma

'I spent lots of time with her. Because she knew she could always rely on me, she doesn't want to be independent.'

much

satisfied

10 years old   38 years old

how to help on child's study

- Push the child to study when necessary
- Help check the homework
- Read or listen to stories with the child
- Arrange some extracurricular interest courses for the child

prepare meals   work from home   prepare meals   exercise with kid   prepare meals   supervise kid's study

7:00   12:00   17:00   21:00

attitude on child's entertainment

' I think doing some recreational activities can help her build motivation to study and make her happy. But when she is indulging in a kind of entertainment, I will remind her to finish her homework first.'

expectation on child's study

'Every child has a different ability to learn. I hope she can do her best. I am basically satisfied with her current academic performance.'

how to solve conflicts with children

'When we have a conflict, we are emotionally charged, and fighting only makes things worse. I usually choose not to talk to her anymore, and when we calm down for a while, the conflict will resolve itself.'

opinion on online education during quarantine period

' I am very happy that she can study at home in a relatively relaxed state. Although her learning efficiency is not as high as at school, I believe that when she returns to school, she will quickly make up for the courses she missed during this time.'

parenting style

' I sometimes force her to do things that I think are good for her, such as making her do exercise every day to keep healthy. But she resisted. I think there are still some problems in our communication. She doesn't want to talk to me now.'

how to find help to solve educational problems

' I didn't worry too much about her academic performance, but I realized that we have spent too much time together all the time leading to her poor self-reliance. Now it's really time for her to improve her independence, but I haven't figured out how to do this kind of guidance.'

---

the open pursuer

The open pursuer is characterized by being satisfied with children's academic performance and having lots of time spent with the child.

She is used to spending a lot of time with her child's study and life and believes that this is beneficial to the child's growth. She holds a more open attitude in terms of education than the other two types of parents. She believes that the current education model puts a lot of pressure on children and compresses their time for entertainment. But limited to school requirements and comparison with others, it is not easy to make children learn more easily and happily. This makes her constantly contradicted. She thanked the form of online education during the epidemic to allow children to learn in a more relaxed state at home, which is closer to her ideal education concept. The child's performance in learning did not worry her too much, partly because she had a full understanding of the child's learning ability and learning potential, so the expectations of the child in learning were within a reasonable range. But she is still concerned about the next stage of the study. The current performance of the child is generally satisfactory, which does not mean that this learning method is still applicable after entering junior high school. She realizes that children sometimes rely too much on her in life and learning. From a long-term perspective, it will make the child likely to face challenges in junior high schools where the learning difficulty gradually increases.

She doesn't want to force her child to learn or do other things, but sometimes she has to. This inevitably makes them conflict. After a conflict occurs, they usually do not resolve it in a positive way but wait until their emotions have calmed down and ignored the cause of the conflict. She thinks this is a communication problem with children, and she longs for a healthier communication method and deeper communication with children.

Needs

- Have more positive conversation with the child
- A guidance to help build a more relaxed learning environment at home

The persona selected for this project

In the previous section, there are three persona. Each persona has very different characteristics in time spend on children's study and expectations on children's study. Therefore, a design solution to solve the problems faced by all the three persona at the same time will be less effective and feasible. Therefore, for this project, the open pursuer is chosen as the target group. The reasons of choosing it are as follows:

- Compared with the other two personas, the open pursuer is less confined to the traditional strict educational philosophy, which puts overwhelming stress on children's academic performance with the ambitious expectation on children's school scores.

- The open pursuer is younger than the other two personas in age, and they are less resistant to changing or improving the current education methods. They are willing to actively explore the educational concepts of trending and try these methods, which also means that the design solutions of the project are more acceptable for them.

- As the millennial generation is or is about to enter the role of parents, it is foreseeable that parents will hold a more open attitude in educational concepts. Therefore, based on long-term

considerations, open pursuer will represent the characteristics of more parents in the future Chinese society. These people will be less likely to use academic performance as the most important indicator to evaluate children and the main factors in determining the success of educating children.

2.7.6 Summary

This section demonstrated the insights from the interviews with parents based on the literature review. Some of the insights were integrated into three personas and prepared for the brainstorming session in chapter 4.1 (Brainstorm session).

The too much pressure during the COVID-19 period, together with children's negative feedback on their involvement in the children's studies, make parents more easily experience emotion management failure when dealing with the parent-child relationship, and the conflicts between parents and children in communication could increase. During the interviews, many parents started to reflect on their parenting behaviors and wished to build a more positive parent-child relationship and communication atmosphere. At the same time, from the interviews with parents, I have a primary understanding of children's challenges during the COVID-19 period, which is that they have to learn new skills and improve their self-discipline to adapt to the changes. When they experienced difficulties during the process, they are more likely to be surrounded by negative emotions and respond negatively to their parents' approaches. However, the insights were gained from the parents' perspective, which means that their feelings might slightly differ from their parents. So it is necessary to do interviews with children to capture the picture from the children's lens.

2.8   Interview with children

As mentioned in the last section, answers from parents are not always representative of what the child thinks because the child and the parent may interpret the same question from different angles. Also, the insights in the last section were about the challenges of children in the online learning process. This section expects to learn about how children perceive the parent-children relationship and the communication with parents at home during the quarantine period and what they expect from their parents.

I did several interviews with children (from 9 to 12 years old) and sent out some questionnaires. The questions of the interview and questionnaire are mainly about 3 parts. The first part is about the current state of communication between children and parents at home and why it is causing tension in their relationship. The second part is about how the children feel about the conflicts with parents and how they deal with it. And the third part is about what children like to do with their parents and what they expect from their parents in a positive parent-child relationship. According to the insights got from the answers, a persona was made to present the important thoughts of the child, providing the basics and inspirations for the design phase.

2.8.1 Research question

The research questions in this section are

- How did the children perceive the parent-child communication at home during the COVID-19 quarantine period?

- How the children feel about and deal with the parent-child conflicts at home?

- What children expect from parents in a positive parent-child relationship?

2.8.2 Interview procedure

Interview guide

Considering that the child may not be able to answer the questions within the limited interview time without preparation, all the children were given a simple questionnaire based on the interview questions two to three days before the interview to help them sensitize themselves with the interview content in advance.

The shapes and elements on the sensitizing material provide children with some inspiration and reference to help them better recall the scenes and details of communicating with their parents so that the children can provide more useful answers in the interview.

A small survey for children

Please write down or draw your answers to the following questions

1. Communication
- When you feel upset about the learning, how did your mom or dad encourage you?
- In what kind of situation your parents would criticize you?
- What are the topics that you love to share with your parents?
- What do you dislike discussing with your parents?

2. Conflict
- Did you have conflicts with your parents recently? What caused the conflicts?
- How did you feel about after the conflicts, and how did you do with it?

3.Expectation
- What is your favorite thing to do with your parents? and why do you like it so much?
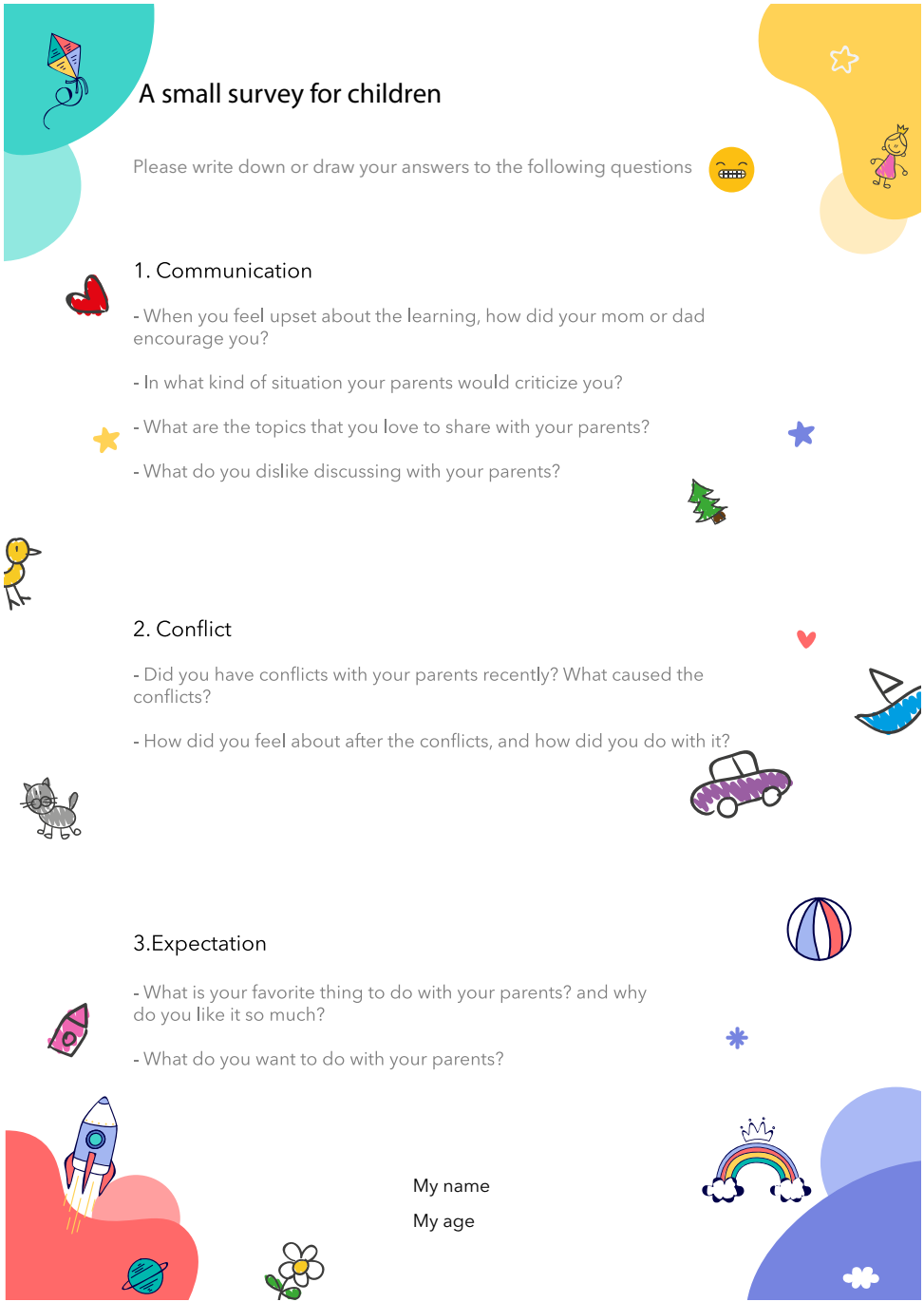- What do you want to do with your parents?

My name
My age

Figure 2-24 the sensitizing material for children

Simultaneously, considering that the child's attention may not be able to concentrate for a long time, the interview time is controlled within half an hour to ensure that the child will not get bored with the interview and give a perfunctory answer. On the basis of this questionnaire, the interview questions will be adjusted and improved in the interview process according to the answer of the interviewee.
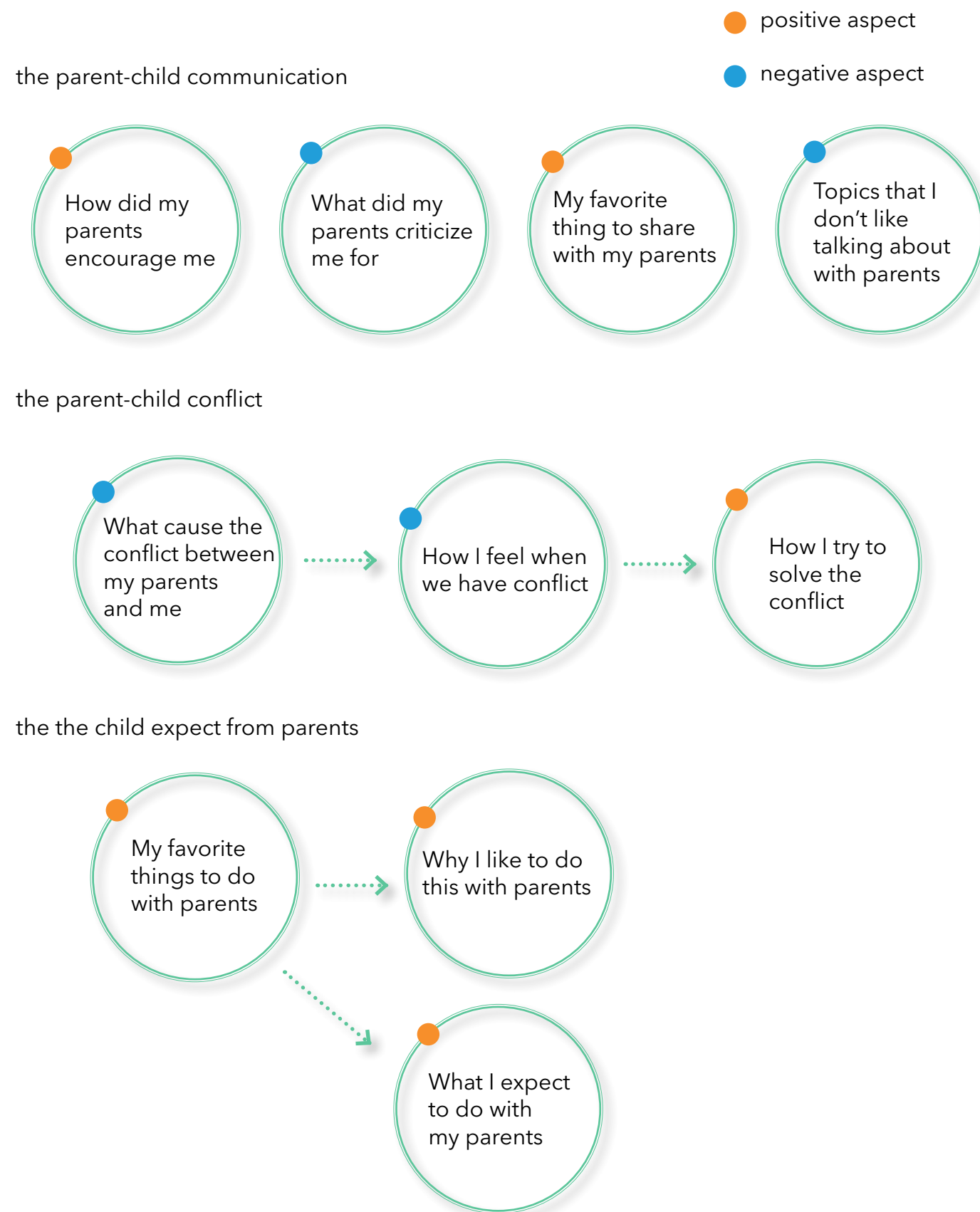
● positive aspect
● negative aspect

the parent-child communication

the parent-child conflict

the the child expect from parents

Figure 2-25 the structure of the interview guide

66

Sampling strategy

As mentioned in the last section (2.6.5 Personas), the persona 'open purser' was selected for this project in the ideation phase. Accordingly, all the parents of the children interviewees are basically met most of the characteristics of this persona. This requires a basic understanding of the interviewee's family background information. Therefore, snowball sampling was used for selecting the right persons to interview. By contacting nine parents who had previously interviewed, five children who met the requirements were found with their help.

2.8.3 Findings

Based on the same questions as the interview guide, 30 online questionnaires were sent and retrieved. Combined with the information obtained from the interview and the answers to the online questions, the following findings are obtained. (The number in the figure represents the number of people who gave this answer)

Parent-child communication

In the eyes of most children, delicious food and change are still the things that make them happy. Parents are also more willing to encourage their children to perform better in academical performance or behaviour performance in this way. Also, most parents give their children verbal encouragement to show their trust and expectation of their children. Of course, some children say their parents never praise them. It is easier for parents to see their shortcomings and criticize them than to praise them.

Figure 2-26 the parent-child communication (from the perspective of the children)

67

It can be seen from the picture that children do not like to talk to their parents about learning-related things, their shortcomings, and comparisons with peers. The learning-related issue is also one of the most frequent topics that the parents criticize their children. This confirms to a certain extent what is mentioned in the literature (2.5.2 Parent–child conversation about shared emotional experiences) that Chinese parent-child communication is mainly focused on behavior standards. The parents' primary purpose is to guide the children's behavior through these conversations and not pay much attention to emotional experience. This may also explain why children are reluctant to have this kind of dialogue with their parents. In most cases, children experience negative emotions in such a conversation.

Children like to talk about funny stories, shared hobbies, or delicious food with their parents.

Children feel happy when talking about these topics because they are relatively relaxed. The parenting style in such conversations is closer to the high-elaborative style mentioned in the literature (2.5.3 Parent-child conversation about shared emotional experiences), emphasizing the positive relationship between parents and children. In the talks, parents and children positively respond to each other's responses and share experiences to create a memory together.

Parent-child conflicts

In the children's view, the main reason for conflicts between them and their parents is the low completion of homework or parents' dissatisfaction with the time they spend on games. For most children, although various negative emotions and experiences surround them after the conflicts with parents, they do not take the initiative to solve the conflicts.
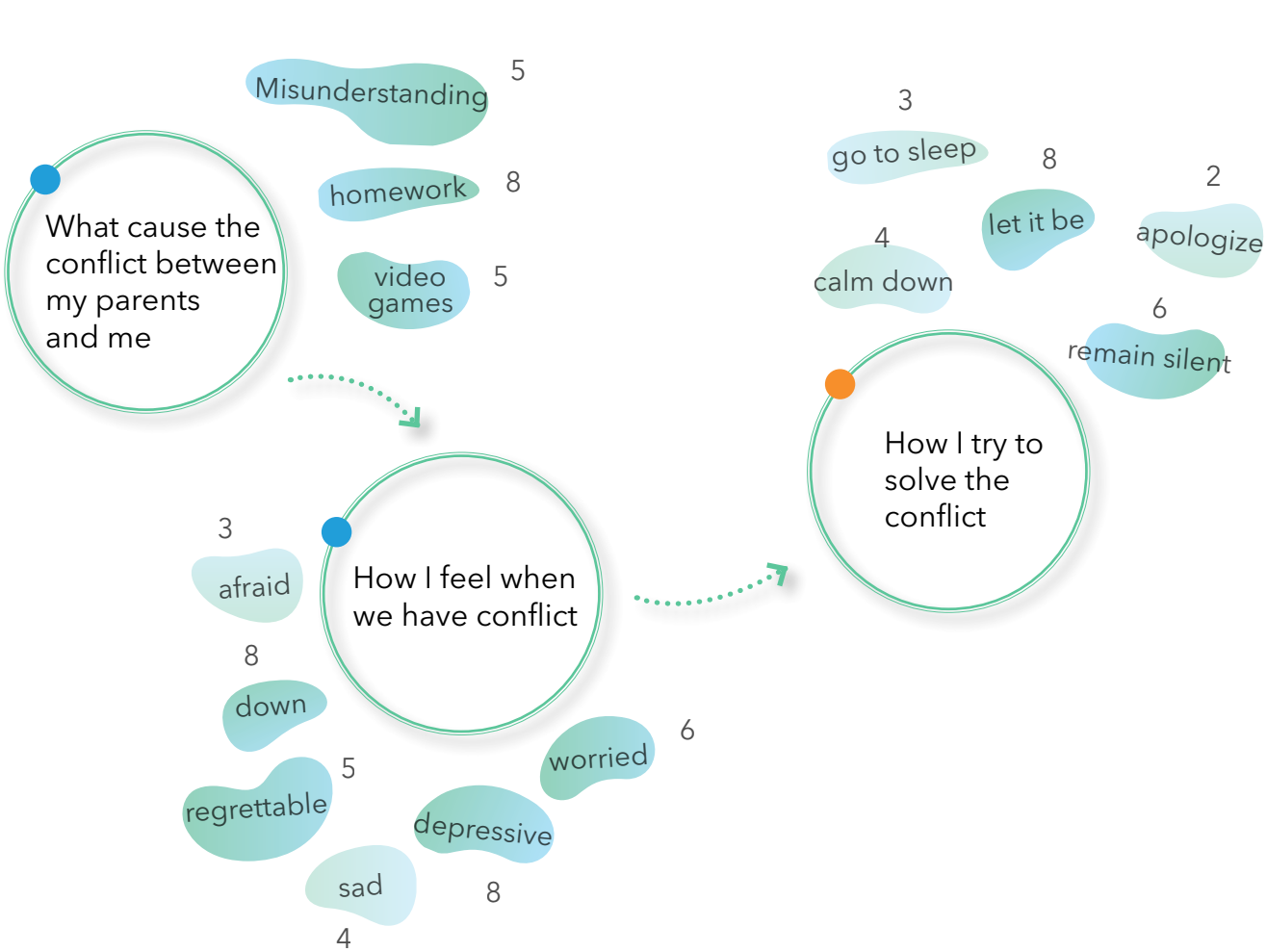
They have no clue on how to deal with such disputes in a positive way. It would be good that a direct and straightforward communication opportunity can be provided for both children and parents to face the conflicts and discuss it. In this way, parent child conflict may be solved and be a positive factor in parent-children attachment development. (2.5.2 Parent-adolescent attachment and healthy development and 2.5.4 Memories on parent child conflict)

What children expect from their parents

As indicated in the figure, children are into some recreation activities with their parents, such as play games, spend holidays or watch TV together. In such activities, the children feel a warm and comfortable feeling and find it interesting. Even some of the activities are not extremely exciting; children still enjoy the time they spend with their parents out of enormous stress, and intense atmosphere resulted from too much focus on the learning issues. All the activities mentioned by the children are in line with suggestions from the Triple P-Positive Parenting Program (Sanders, M. R) (2.4.1 The principles of positive parenting) in enhancing parent-child relationships, including spending brief quality time, showing affection, and so on.
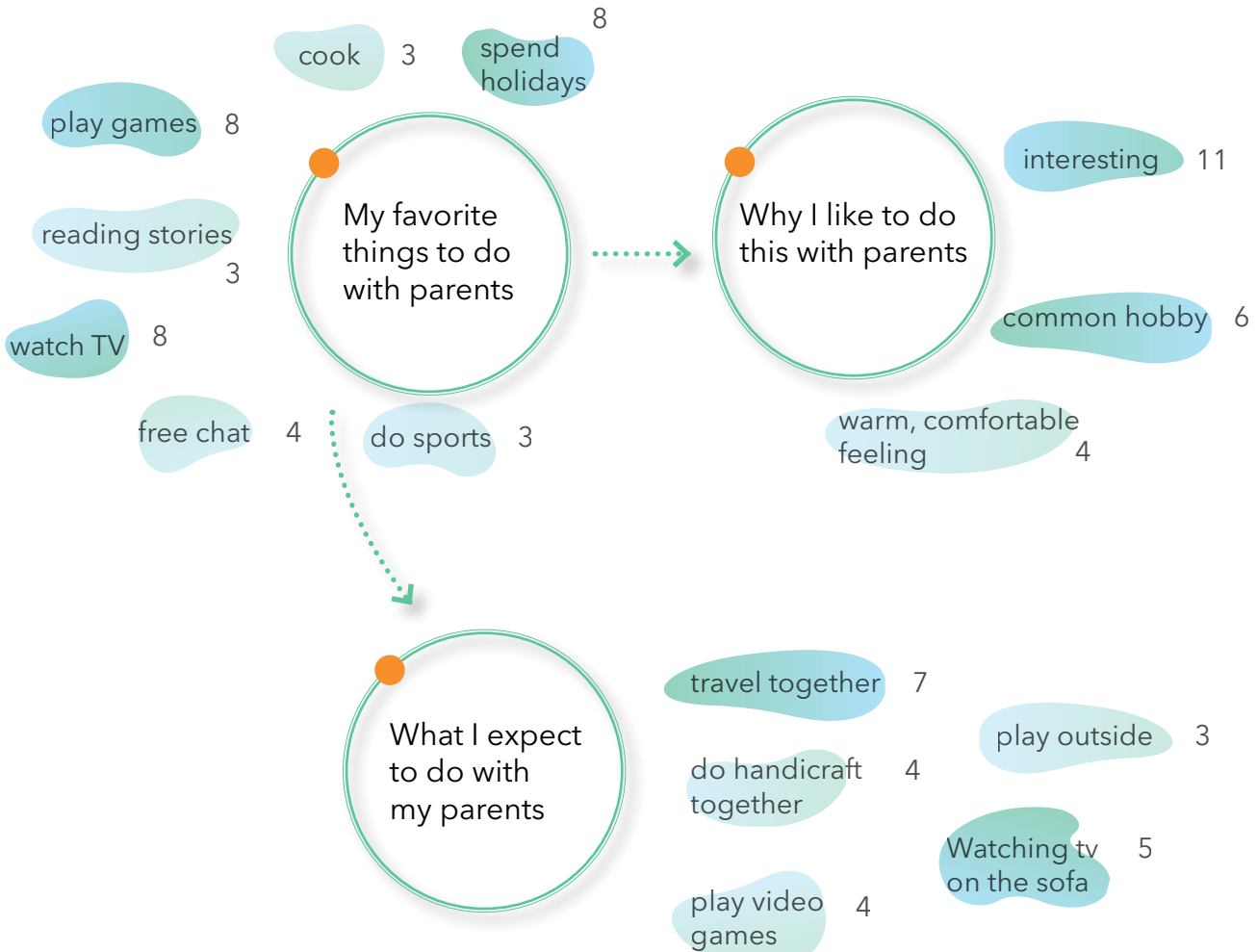

Figure 2-27 how the children think about the conflict

Figure 2-28 what children expect from the parents

Elements for ideas

sense of ritual	delicious food
surprise	make food/carft together
curiosity	free exploration
sense of accomplishment	run/chase
soft	joy of victory

Figure 2-29 the elements that can raise children's interests

To make sure the children have the desire to use the final design, it's necessary to identify their interests. From children's answers to the interview and questionnaires, some elements are summarized to arouse their interests. With the literature in the last section (2.6.1 Design features that can attract children and 2.6.2 Gamification), all these elements can provide inspirations and directions for the final design.

 # sense of ritual

Children love a sense of ritual. Whether it's a holiday or a birthday, a special commemorative day that is different from everyday life gives them something to look forward to and creates positive memories.

 # surprise

Children are always attracted to all kinds of surprises. It should be valuable to incorporate some elements that can surprise children in the design.

 # curiosity & # free exploration

Curiosity is the inner motivation for children to do something. When children have a strong interest in this design with unknown elements, they will maintain the enthusiasm to explore.

 # sense of accomplishment & #joy of victory

When children complete a task or win a game, they feel delighted. Especially when children play games with their parents, it makes them feel happy and proud to have won.

 # soft

Soft toys give children a sense of security, which helps them feel a positive family atmosphere.

 # delicious food

Children can't resist the temptation of good food. Sharing delicious food with parents or when parents make special food for them make children feel happy and joyful.

 # make food/craft together

When children and their parents make delicious foods or handicrafts together, they feel positive interactions with their parents. Children can show their abilities in this process and be appreciated by their parents. At the same time, when they encounter difficulties in the production process, parents' help can give children a sense of security. Children will increase their respect for their parents, which helps to improve the parent-child relationship.

 # run/chase

Whether in games involving physical activities or competitive video games, running and chasing are more attractive to children, and they like to feel excitement in the process.

2.8.4 Personas

To apply insights from the interview more effectively in the ideation phase, some information and behavior characteristics are selected and incorporated into the following persona.

Too much focus on learning topics made her feel like a tight string, and it was easy to have unpleasant conversations or quarrels with her parents. When she quarreled with her parents over learning-related issues, she would be very sad, and would no longer want to communicate more with her parents until they calm down. Taking the initiative to apologize is not an easy task for her, because most of the time she feels that her parents have too many extra demands on her, causing her to have more burdens and pressures.

Although she is accompanied by her parents most of the day, she still feels lonely because she stays at home without the company of classmates and friends. She makes friends with the characters in the book by reading, or by playing with pets. When reading about interesting characters or people she admires or having some surprise moments in getting along with pets, she is very happy to share with her parents. But she feels that sometimes her parents are not very interested in her sharing. When she is too addicted to these hobbies, she will reduce her study time and distract her energy for study, which makes her parents worry.

The child is looking forward to the interaction with parents beyond learning. She is eager to participate in the cooking process. On the one hand, delicious food always brings her pleasant experience; on the other hand, she enjoys the relaxed time with her parents. She enjoys spending traditional holidays together or doing various commemorative activities with her parents on birthdays that are different from daily life, and the accumulation of these ceremonies and surprises often has a positive impact on her relationship with her parents. Talking about weekend travel plans or future travel plans is also an exciting thing for her. The memories of past travels are usually good and are also a period when the parent-child relationship is very harmonious.

Kexin

10 years old

' My parents sometimes criticize me for not being serious about my study, but sometimes I can't understand them because I feel that no matter how well I do, they always have reasons to criticize me.'

activities at home besides study

' When I was at home, I felt very lonely and no one played with me. I spend a lot of time with my pet. Although he cannot understand me, I can feel he loves me and he's my best friend. I will teach he new skills and show it to my parents. But my parents sometimes complain that I am delayed in studying because of playing with pets.'

communication with parents

' They keep talking about my study. Most of our conversations are about homework and learning. They always say that grades are very important because it will affect my future. In fact, I don't understand why grades must be related to my future. They constantly compare me with other children and continue to praise other children, which makes me feel sad.'

feelings when quarreling with parents

' I feel extremely sad and upset after I quarreled with my parents. I can't stop but cry because I feel wronged. I can only hide in my room and close the door to calm down. I don't want to take the initiative to talk to them. When I woke up the next day, I would forget about it, and occasionally we would fight for a few days without talking.'

things don't want to do with parents

' My parents always force me to do some exercise to keep healthy, which makes me disgusted. In fact, I don't hate this sport very much, but they forced me to do it, so I completely lost the fun of exercise.'

things want to do with parents

' I sometimes wish I could help my mother prepare lunch and do simple things like washing vegetables, which makes me feel relaxed. But my mother didn't want me to help because she thought I should study and she didn't think I was up to it. As long as they don't force me to talk about study, I want to do many things with them. I want to discuss some travel plans with my parents or we can do some outdoor activities on weekends.'

happy moments with parents

' I like to take a walk after dinner with my parents. Watching tv together in the evening is also a relaxed moment at home. However, they only allow me to watch tv for half 1 hour every day. Sometimes we play poker together. If I win, I will be very happy; if I lose, I will be a little depressed and lose interest.'

2.8.5 Summary

In summary, this section has shown how the children feel about the parent-child relationship and communication at home during the COVID-19 quarantine period.

To answer the research question mentioned in this section:

How did the children perceive the parent-child communication at home during the COVID-19 quarantine period?

It can be concluded from the interviews that children want to get away from the conversation atmosphere, which focuses too much on learning-related issues. They prefer more relaxed topics that can bring them enjoyment and feel the warmth of the family. It would be nice to provide parents with some tips according to the literature (2.4 Positive parenting and 2.5 Parent-child attachment and communication) to create a positive parent-child communication atmosphere.

How the children feel about and deal with the parent-child conflicts at home?

As mentioned earlier, it is undeniable that parent-child conflicts have brought negative emotions to both children and parents, and this emotion has a worse impact on the family atmosphere during COVID-19 quarantine than usual because they need to stay with each other most of the day. Since most children don't know how to resolve this conflict, they usually choose to avoid the problem or wait for the mood to calm down. This is not an active and healthy approach. Therefore, if parents can properly guide their children and discuss conflicts with their children, it will be possible to improve the quality of parent-child communication and promote children's healthy development in the long run. (2.5.2 Parent-adolescent attachment and healthy development and 2.5.3 Parent–child conversation about shared emotional experiences)

What children expect from parents in a positive parent-child relationship?

The child hopes that the conversation with his parents can be free from the limitations of learning. They want to talk to their parents about topics they are interested in or make them look forward to. Carrying out simple creative activities with parents can make children feel the family's warm atmosphere and enhance their attachment to their parents.

2.9 Take-away

This chapter described the project-related literature research and field research, which is combined to answer the previous chapter's research question.

What are the main challenges of children in the transition to online education at home during the COVID-19 quarantine period?

The main challenge for children during the period is that the difficulties encountered in online classes and the prolonged time spent with their parents have brought the children more pressure and negative emotions, making them want to escape from this stressful and depressing family communication environment that is too concentrated on learning issues.

What are the challenges of parents in helping children with their studies during the COVID-19 quarantine period?

The main challenge for parents is that when children show negative feedback about their parents' involvement in their learning, parents are more likely to break down emotionally and get trapped in a vicious circle. In particular, they suffered from some job and financial stress during the quarantine period. They need to break the vicious circle and build a good parent-child relationship with their children through mutual understanding and positive communication.

How do parents solve these challenges now?

Although parents reflect on some of their behaviors and want to make changes to improve parent-child communication, most of them have not found a practical entry point. This is also the significance of this project, which helps parents find a breakthrough to improve parent-child communication under such circumstances.

What is the ideal situation of parents in helping their children with studies at home?

Compared with how to specifically help children learn, the more critical and essential problem is how to improve the communication between parents and children. When children and parents can better understand each other and achieve more effective communication, parents will reach consensus with their children on learning issues more efficiently and achieve the ideal situation.

CHAPTER 3   DEFINE

The previous section has shown the insights obtained from the literature and interviews. The Define chapter moves on to synthesis all the findings and clarifies a specific design goal of this project.

3.1   Design goal

image from https://news.cgtn.com/

3.1 Design goal

Challenge of children

pressure and negative emotions caused by the communication with parents focus too much on learning-related issues

Challenge of parents

emotion management failure

don't know how to make a positive conversation with children

Design goal

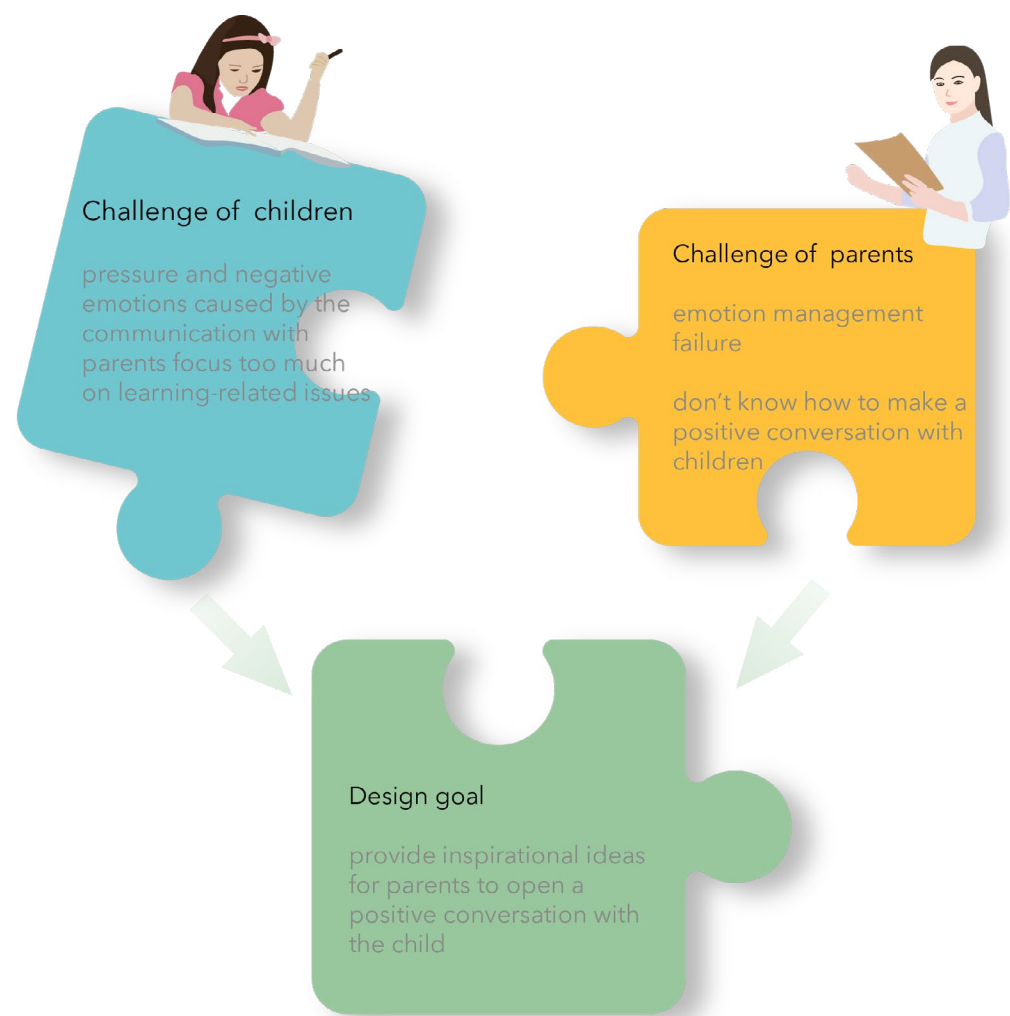provide inspirational ideas for parents to open a positive conversation with the child

Figure 3-1 The design goal

As was pointed out in the summary of the last chapter, children lack enough ability to study independently during the transition from traditional school to online education during the COVID-19 quarantine period. The difficulties in learning bring them pressure, and communication with parents about learning makes them feel unhappy and anxious.

However, for parents who are under pressure from all sides during this particular period, it is difficult for them to remain patient and encourage their children actively when their children are not performing well. When parents lose their temper with their children, the children also fall into negative emotions. This leads to more tension and conflict between children and parents due to study-related issues during the epidemic period.

Most parents regret and feel guilty about yelling or physically punishing their children. Parents need an opportunity to break this vicious circle, but they have little idea how to achieve this.

Most parents desire an equal relationship with children and build a more positive home learning environment. They want to be trusted and understood more by the children. Parents hope to make progress with children for a common goal. Similarly, children also desire a family environment where they can communicate easily and happily with their parents.

In summary, the redefined design goal is to design a tool that can

provide inspirational ideas for parents to open a positive conversation with the child

In this way, children can understand parents more and they are more likely to reach consensus with parents on learning issues.

Given this design goal, combined with the more specific insights in the previous chapter, some particular design requirements are shown in the figure below.

DESIGN CRITERIA CANVAS

MUST — Must-haves and non-negotiables

- Provide the opportunity for both children and parent to communicate in a more relaxed atmosphere and get out of the stress of learning-related issues

SHOULD — Should-haves and important features

- Attract the child to use and provide them enough fun elements to free explore
- Easy to perform at home and don't put an extra burden on both children and parents
- Think about the design for the long term and use design strategies to enable parents and children to use the product for improving their communication step by step

COULD — Could-haves and optional features

- Help mom and dad collaborate and benefit each other in the communication
- Provide personal guidance according to the characteristics of the users

WON'T — Won't haves - things that are definitely not on the table Also non-negotiables

- The product should not be used for more than half an hour each time, otherwise the child will lose interest and become bored

Figure 3-2 The design criteria canvas

CHAPTER 4 — DEVELOP

After defining the design goal and specific design requirements, the Develop chapter explains how the final design was created. The first step is the brainstorm session, in which several designers were invited to generate and ideate ideas about how to improve parent-child communication. And then, these ideas were clustered into several design directions. The final concept integrated some design directions to create a relaxed communication atmosphere at home during the quarantine period. The chapter ends with the main takeaways.

image from https://unsplash.com/

4.1 Brainstorm session with designers

Why I want to do the brainstorm session?

According to Delft Design Guide, (Van Boeijen, A., Daalhuizen, J., van der Schoor, R., & Zijlstra, J. 2014), the brainstorming is an effective tool especially in the idea generation phase after defining the design problem and design requirements to avoid premature criticism. As explained by researchers, brainstorming is suitable for using open-ended formulation to solve relatively simple problems without the need for professional knowledge. The Parent-child relationship is a problem that almost everyone has relevant experience in daily life. Therefore, brainstorm is the perfect match at this stage of the project.

The goal of the session is to ideate potential design directions to provide inspirational ideas for parents to open a positive conversation with the child based on the research insights in previous chapters.

4.1.1 Set up of the session

Participant selection

4 participants (3 designers from TU Delft and 1 non-designer) were selected to take part in the session through convenience sampling. Convenience sampling is a non-random sampling method in which participants who meet certain practical criteria are selected for the research. (Etikan, I., Musa, S. A., & Alkassim, R. S. 2016) These criteria include easy accessibility, availability at a given time, or the willingness to participate, etc. All the participants showed great interest in the project after a brief introduction and they are quite motivated for the session. The 3 designers are from different tracks (strategic product design, integrated product design, and design for interaction) so they can provide

different angles to the question with a wider knowledge base. At the same time, the participation of designers ensures the innovation and high quality of session outputs. And the participant without a design background can enrich the diversity of the session and avoid premature criticism.

Material preparation

The data collected from the previous research was selected and restructured in a way that the participants can get an understanding of the research topic in a short time. Specifically, the participants of the session will be presented with a brief introduction about the background of the project. The open purser and child persona will be shown to participants to understand the context better and use their creativity.

4.1.2 Procedure

The brainstorm session was conducted online via miro (a Free Online Collaborative Whiteboard Platform) and zoom (a Video Conferencing, Web Conferencing, Webinars Platform) due to the quarantine measures during the special period and it was proved work well. The entire session lasts approximately 50 minutes and is divided into four parts. The specific process is as follows:

Step 1 Step into the context (10 minutes)

The session started with outlining the structure of the brainstorming process, following by presenting the goal of the session and several ground rules during the session. Participants were encouraged to embrace wild and bold ideas without focusing too much on the feasibility. The rule of 'All ideas are good ideas" was emphasized at the beginning to encourage everyone to speak. (Rudy, L. 2016)
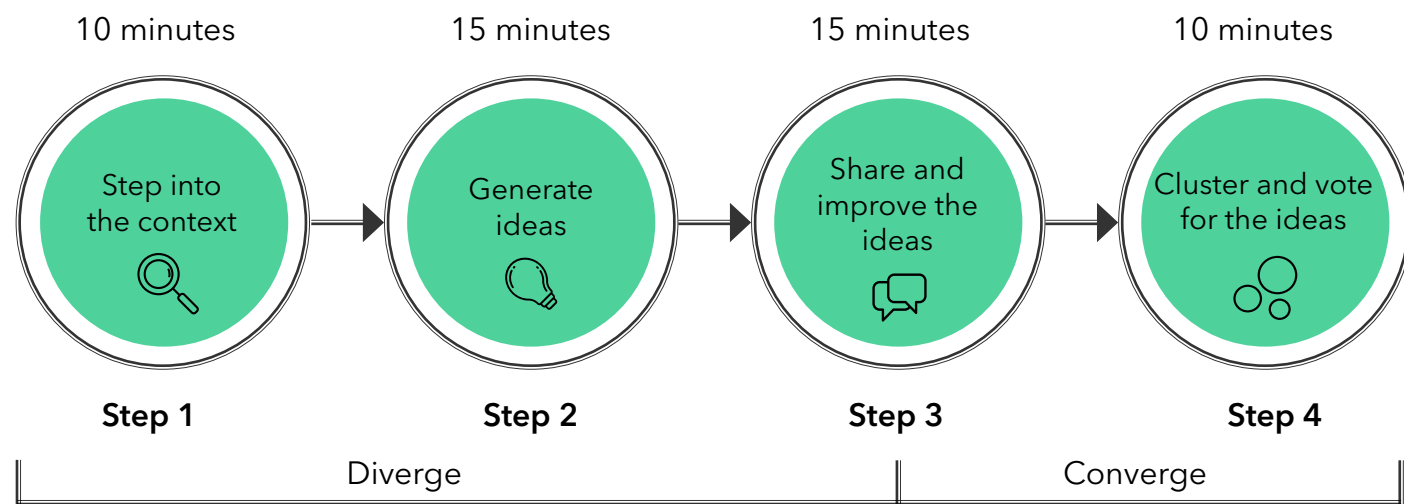
Figure 4-1 the procedure of brainstorm session

After a brief introduction of the previous research insights and the basic knowledge of how miro works, the participants were asked to choose from the two personas (the open purser and the kid) to read and imagine if they were the person they chose.

Step 2 Generate ideas (15 minutes)

After getting into the context, the participants were asked to write down their thoughts on how to design goal on the post-its. 2 participants chose the persona of mom, and 2 chose the persona of the kid in Step 1, so they can generate ideas from different perspectives and this can facilitate an improvement of the ideas by building upon the ideas of others in Step 3. When the participants seemed to have a hard time coming up with new ideas, they are provided by suggestions like 'imagining if you have a superpower, what kind of ideas would you propose' to help them make the best use of their creativity. The participants were asked to generate as many ideas as possible in the limited time because studies show that moderate performance pressures can enhance creative output.

Because the context of this project is based on the Chinese education system, all the participants are from China. This ensures that participants have a basic understanding of the project background which is the parent-child relationship under the Chinese culture but still has enough exploratory desire and curiosity for the parent-child relationship under the new context of the epidemic.

Step 3 Share and improve the ideas (15 minutes)

In this step, all the participants were asked to present their ideas one after another. And the audience was free to build on and improve others' ideas if they are inspired. The participants were asked to write down the thoughts on the post-its popped up in their minds at any time.

Step 4 Cluster and vote for the ideas (the criteria are used in this selection process) (10 minutes)

After the discussion of all the ideas generated, the participants worked together to cluster the ideas. Everyone was asked to pick their favorite idea and put it in the criteria matrix. The criteria matrix was developed from Innovation Evaluation Framework (Phillips, J. 2014), which contains seven components to evaluate innovation. (Choice/ control, Convenience, Community, Compatibility, Completeness, Coolness, Cost). Among the factors, convenience and coolness were selected as the criteria to evaluate the ideas.
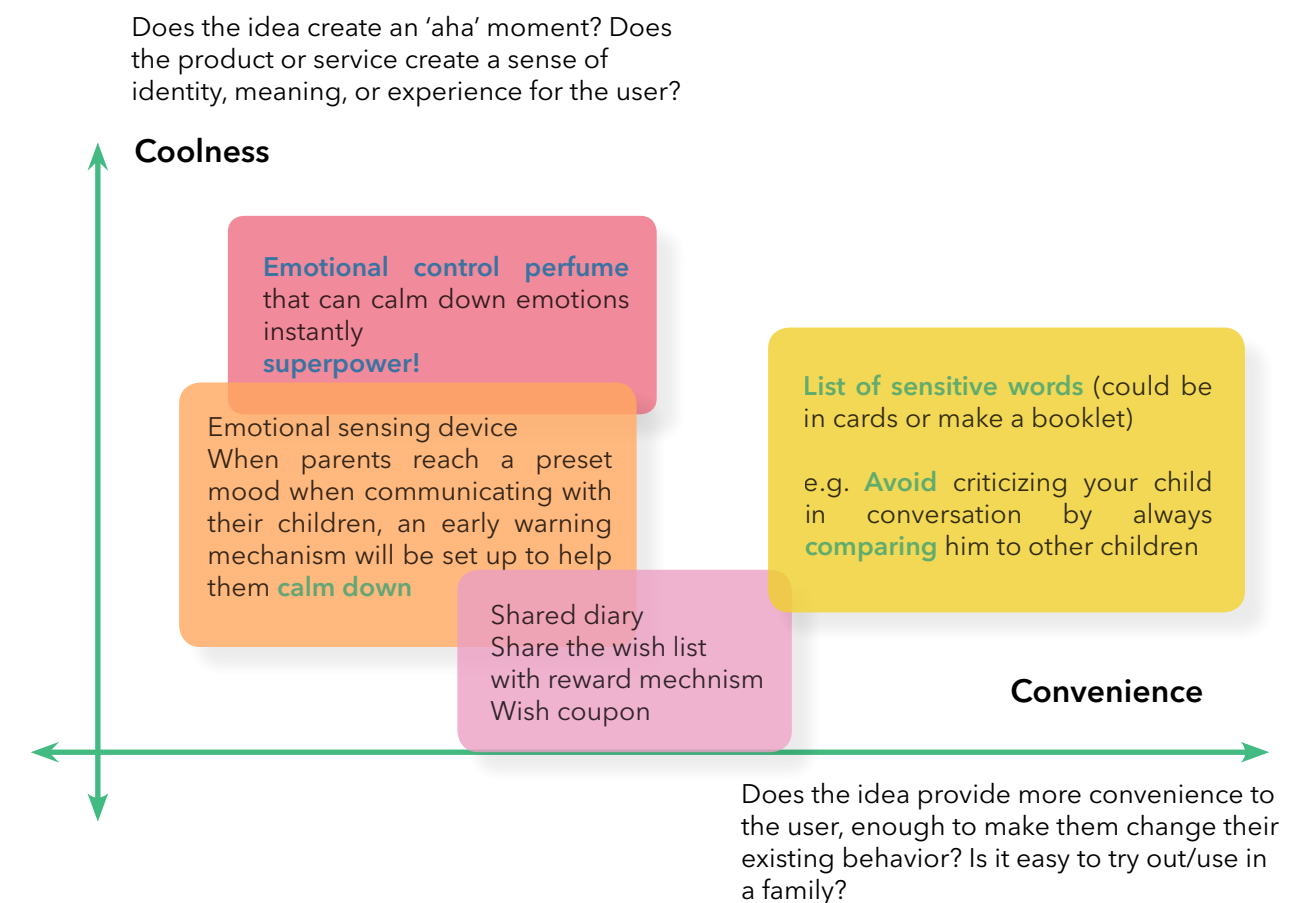

Figure 4-2 the criteria matrix used in the selection phase (adjusted from Innovation Evaluation Framework - Phillips, J. (2014)

Coolness is to measure how creative the idea is. The participants were asked to identify if the idea can create an 'aha' moment and if it can create a sense of identity, meaning, or experience for the user. The brainstorm session aims to collect and inspire creative ideas as much as possible, so coolness is a vital indicator of the value of the ideas.

Convenience measures how easy the idea to try out or use in the context. It is crucial for the project that the design is feasible in a family context during the quarantine period. It should be convenient enough for users to conduct at home.
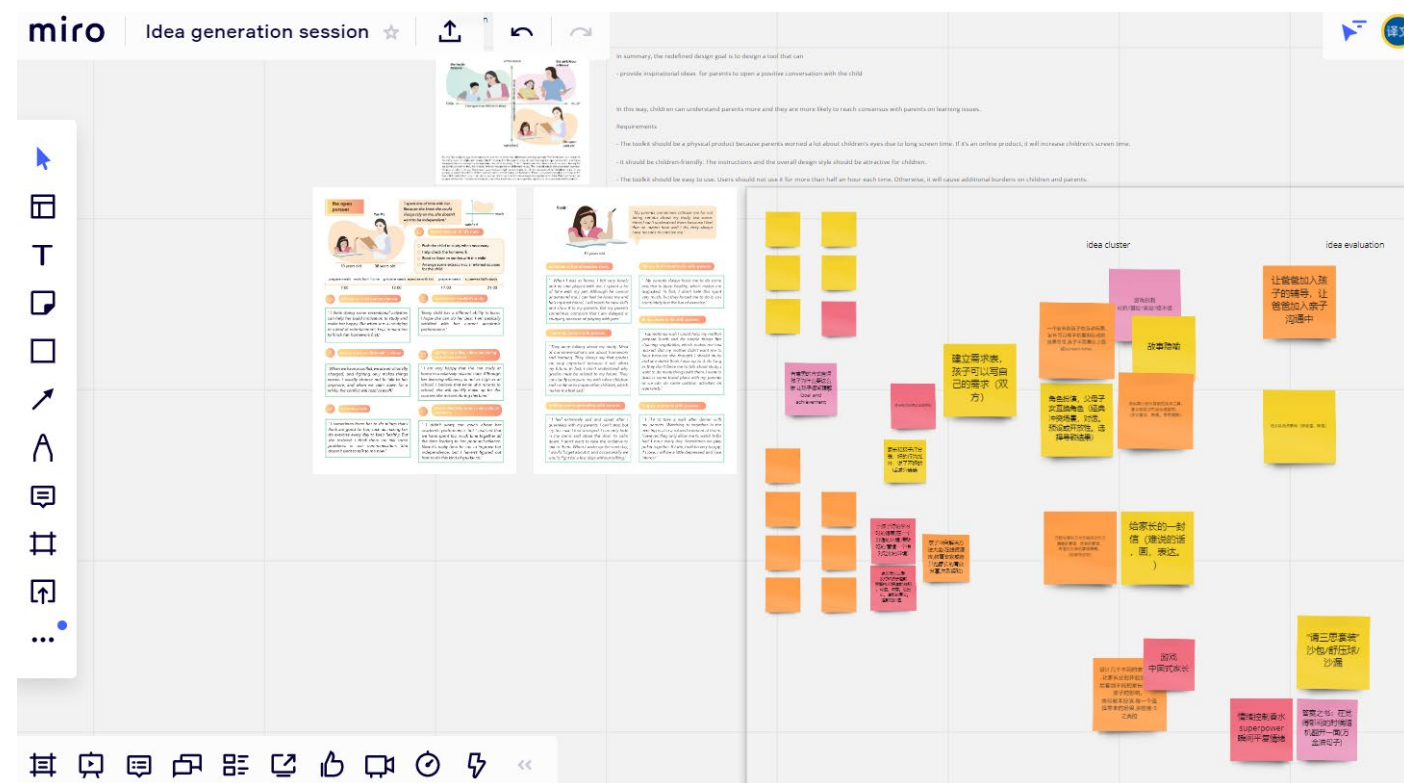
Figure 4-3 Screenshot of the online brainstorm session

4.1.3 Outcomes

In the brainstorm session, all the ideas generated by the participants were clustered into 5 themes. In the following section, each cluster will be explained in detail.
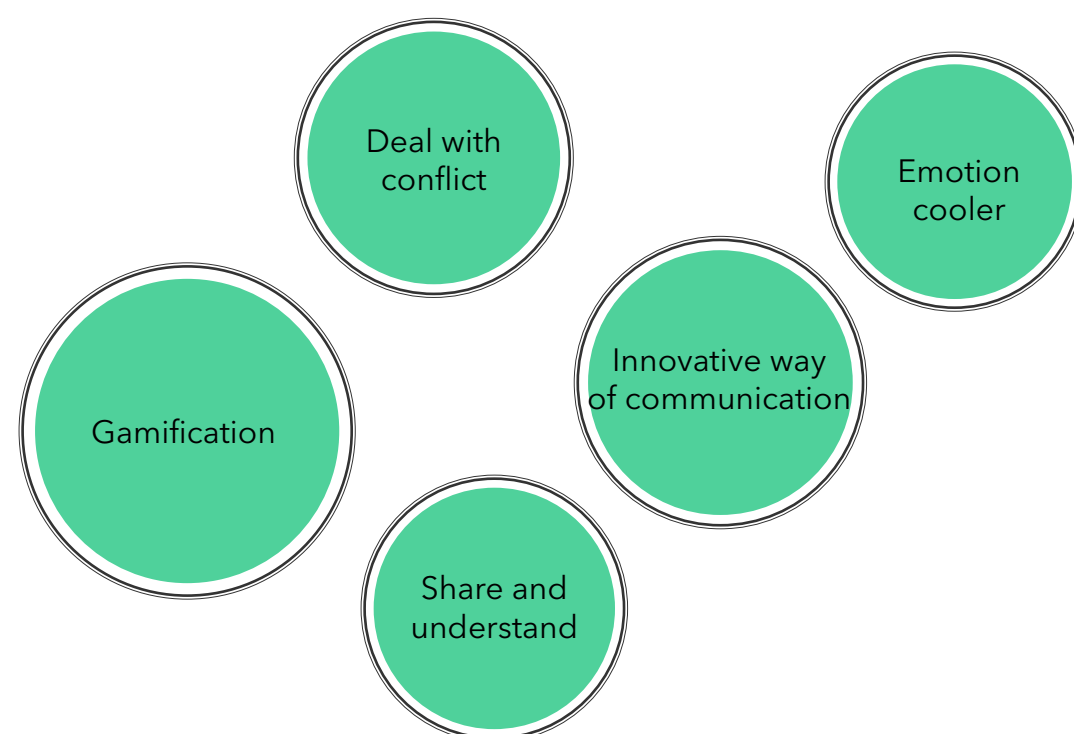

Figure 4-4 An overview of the clustered ideas

Create a portfolio of parent-child **conflict resolution solutions** (e.g., an **online repository** of effective experiences, successes and failures shared by educational experts or other parents)

Parents should **apologize** to their children **immediately** after losing their temper or engaging in excessive emotional outbursts. **Avoid too many negative emotions** to cause psychological harm to children.
You can **express your regret** in interesting ways, such as **writing a letter** or **taking regret medicine**

Create a **relaxed atmosphere** when discussing study with the child (**good food, comfortable** seats, etc.)
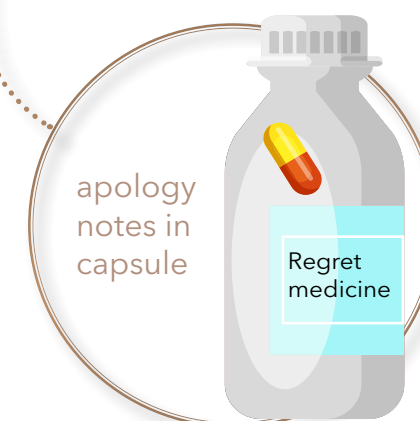
apology notes in capsule

Regret medicine

Figure 4-5 The idea cluster - deal with the conflict

Deal with conflict

The ideas in this cluster are about how to solve the conflict between parents and children.
One direction is to prevent conflict at its source. Conflict usually occurs when both parties are emotional and anxious. When parents are angry, children can also be drawn into this negative emotion. So the corresponding solution is to create a relaxed conversation environment to avoid a tense atmosphere between parents and children. And another direction is to provide solutions after the conflicts. An online repository developed by professionals and parents could help give suggestions and experiences in repairing a parent-child relationship after disputes or quarrels. This kind of problem must be dealt with on time to avoid the negative processing that may cause an irreparable psychological shadow to the child in the long run. This coincides with how conflicts should be dealt with in the literature (2.5.4 Memories on parent child conflict.) Therefore, this is a design direction that deserves further development.
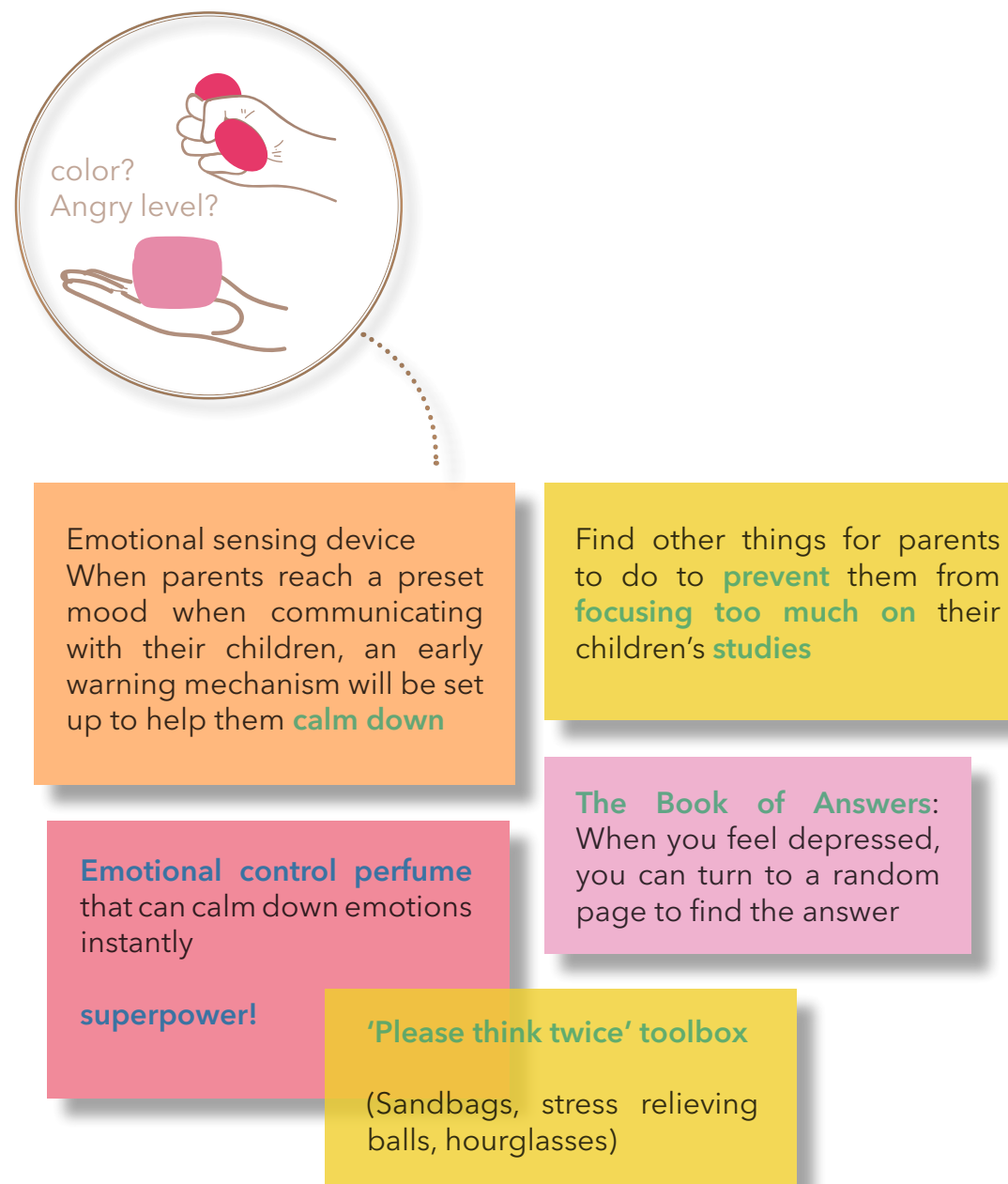
color?
Angry level?

Emotional sensing device
When parents reach a preset mood when communicating with their children, an early warning mechanism will be set up to help them **calm down**

Find other things for parents to do to **prevent** them from **focusing too much on** their children's **studies**

The Book of Answers:
When you feel depressed, you can turn to a random page to find the answer

Emotional control perfume
that can calm down emotions instantly

superpower!

'Please think twice' toolbox

(Sandbags, stress relieving balls, hourglasses)

Figure 4-6 The idea cluster - emotion cooler

Emotion cooler

The emotion cooler aims to help the parents and children to calm down when they are controlled by the extreme emotions and have an negative impact on parent-child communication. It can relax the user by guiding them to follow the preset actions. Or it can give a reminder when it detects that the user's emotions reach a certain level and let them stop communicating to avoid serious quarrels.

Gamification

As mentioned in the literature review (2.6.2 Gamification), gamification is a widely used design strategy and proved useful for both parents and children. Roleplay is an idea mentioned by several participants. By playing the other party's role, following their daily routines or behaviors, parents and children can attain a new perspective to see things, which could be especially helpful in coping with conflicts or quarrels.

behaviour
keep blaming the children
The extent of the child's mental injury
possible outcome

behaviour
beat children
The extent of the child's mental injury
possible outcome
run out from home

A physical toy similar to **Truth or Dare**. Parents and children can play while they are relaxed. This toy can promote parents to **admit mistakes** to children or increase **personal intimacy** through behaviors such as hugging.

Set up several **different types of parents** in the game, let parents experience the play to understand the **impact of different education methods on children**.

Similar to script play, every choice brings corresponding consequences, and the intimacy value will change

Educate children through **metaphors in stories**

Role playing game
Parents and children can **exchange roles** (by presetting classic conflict scenes and dialogues to allow both parties to **understand each other's ideas and positions**). The game can also be open-ended, with players can make their choice to lead to different results.

Chinese Parents

a child-raising life simulation game

Introduce **game mechanics into communication**, adding elements of **confrontation, adventure, reward**, etc

Toys that parents and children can **interact with** each other. Parents can use mobile apps to monitor their interactions with their children. Children don't need to use cell phones to harm their eyes.
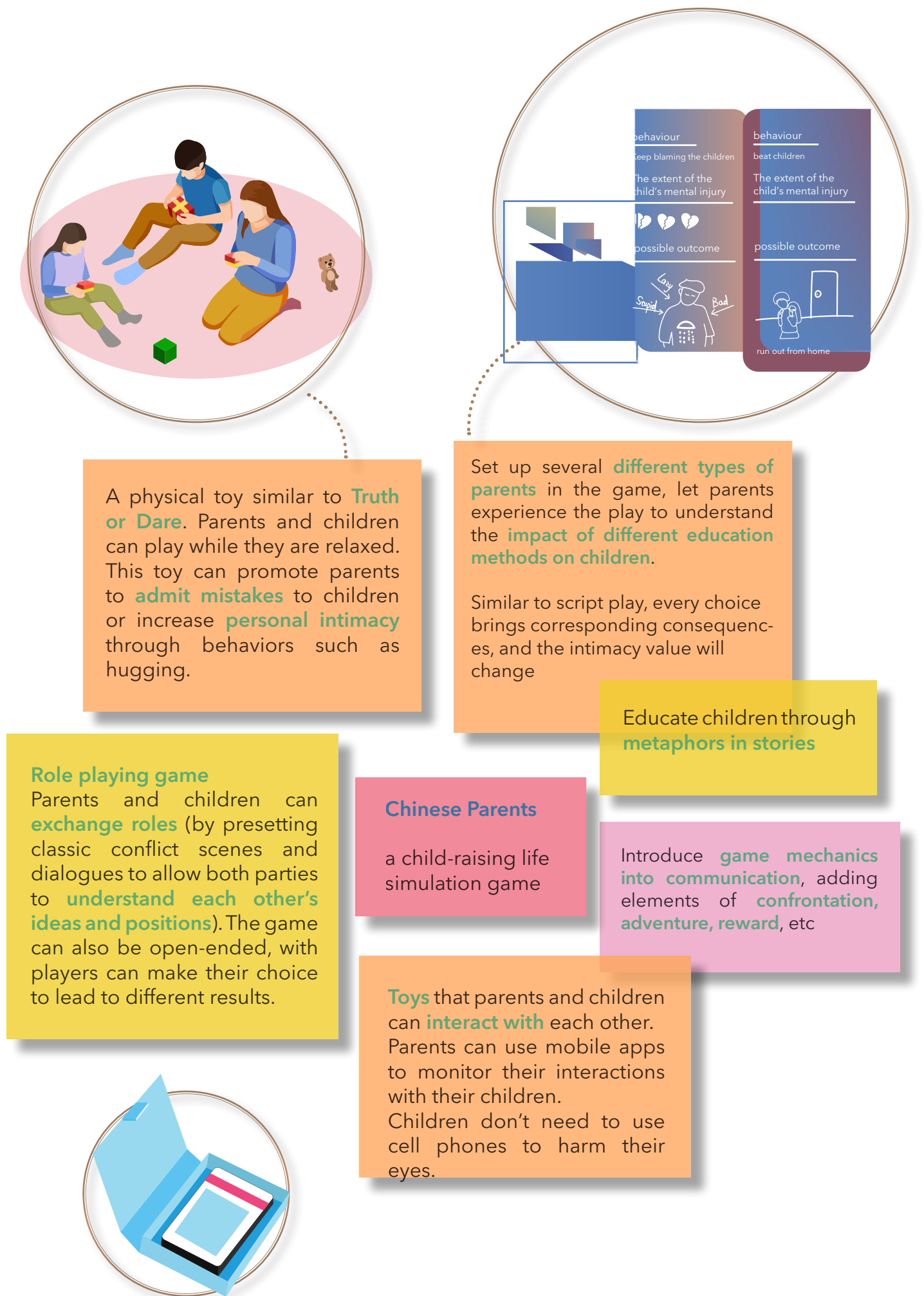
Figure 4-7 The idea cluster - gamification

In this way, they can experience each other's emotions and understand each other more, leading to different choices in a set scenario. Similarly, games like script play can also provide them with a new perspective, enabling parents and children to reflect on their behaviors and foresee the results of the choice they made. Such games aim to increase mutual understanding and reduce conflict in communication. Another direction is to create a positive communication atmosphere by providing rewards or introducing attractive incentives to make children actively talking with parents. The introduction of gamification can reduce children's refusal to communicate. They are more likely to open up to their parents when the conversation involves topics of their interests or contain elements that excite them.

Share and understand

When parents and children need to follow the same rules of behaviors or work together for the same goal, they may share experiences to increase their understanding. The idea in this cluster is through this mechanism to promote more effective parent-child communication. A shared behavior evaluation form can help parents and children to reflect on their own behaviors and also provide them the opportunity to express their expectations of each other's performance. The same goes for writing a diary together. In this way, parents and children can strengthen the connection between them through the diary and create good memories.
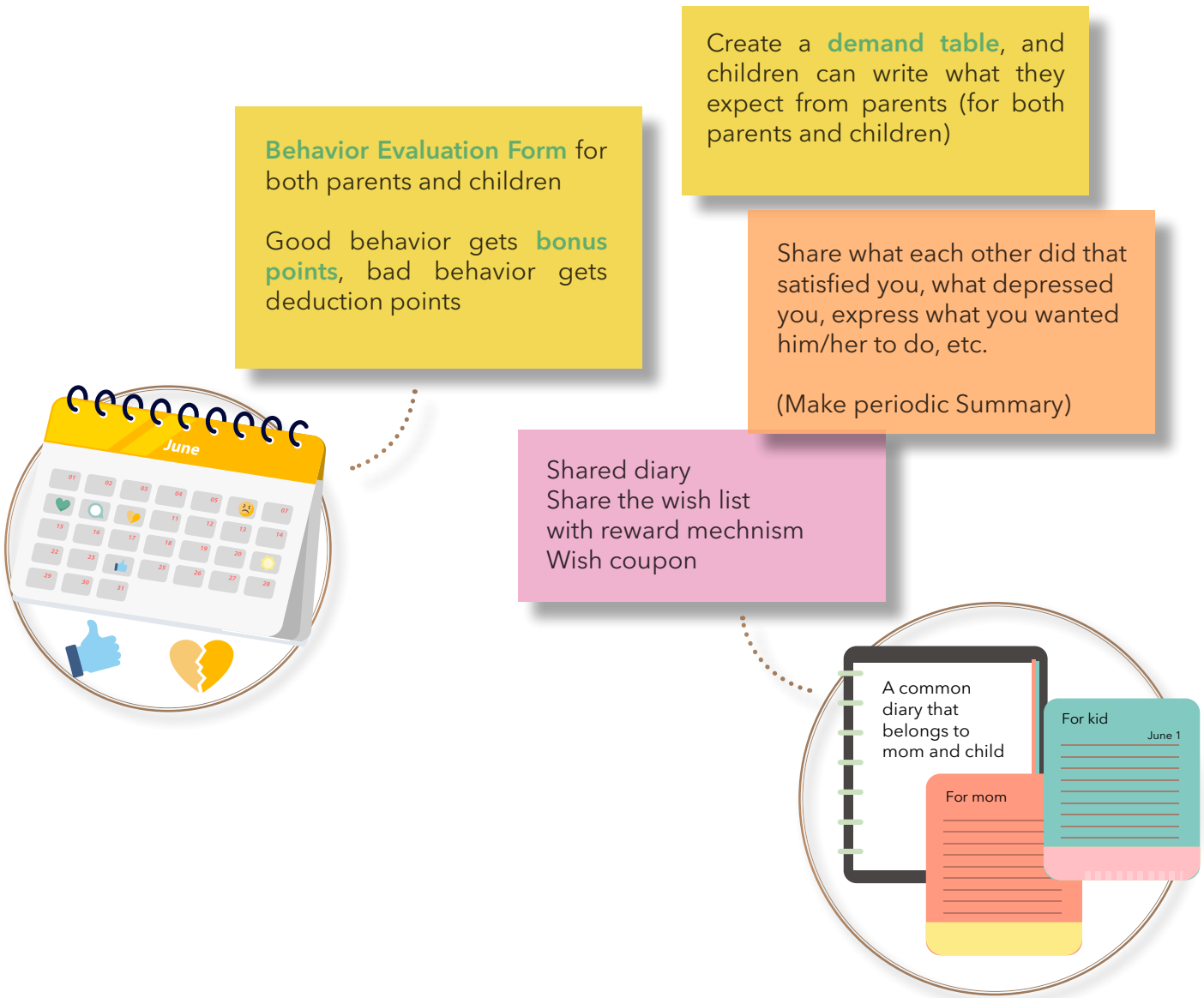
Behavior Evaluation Form for both parents and children

Good behavior gets **bonus points**, bad behavior gets deduction points

Create a **demand table**, and children can write what they expect from parents (for both parents and children)

Share what each other did that satisfied you, what depressed you, express what you wanted him/her to do, etc.

(Make periodic Summary)

Shared diary
Share the wish list
with reward mechnism
Wish coupon

A common diary that belongs to mom and child

For kid
June 1

For mom

Figure 4-8 The idea cluster - share and understand

Write a letter or draw a painting to the parent (it can be used to express something that is difficult to say in daily life)

Present **logical consequences** in an interesting way and explain things step by step to make the child understand

Make a list of the things that children find **most dislike** about what their parents say

Set **specifc goals** for the children and encourage them to achieve it

List of sensitive words (could be in cards or make a booklet)

e.g. **Avoid** criticizing your child in conversation by always **comparing** him to other children

Taboo words

I appreciate when you...   I don't like...

Why don't you even do such a simple question?

Why can't you learn from Xiaoming in your class?

I don't care about you any more.
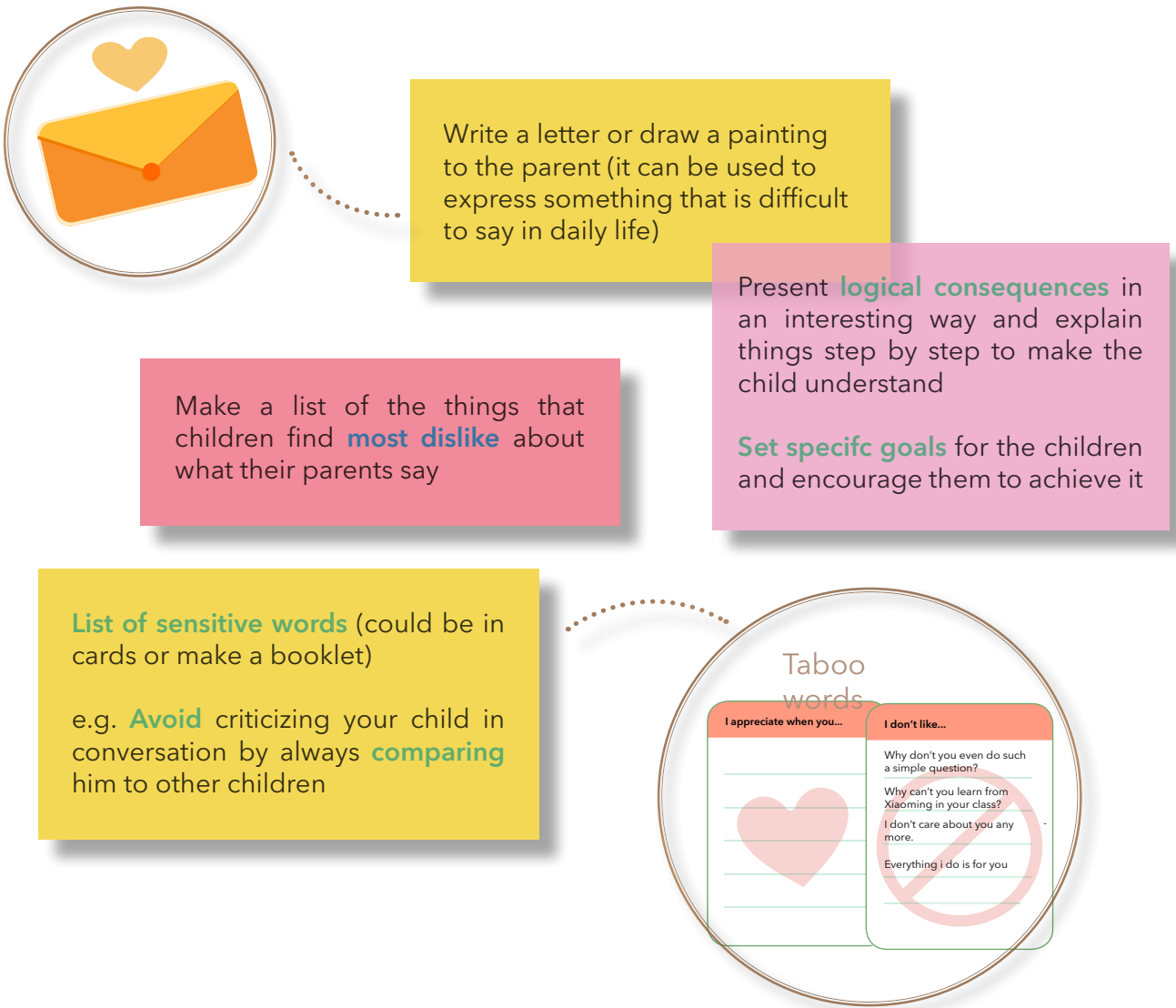
Everything i do is for you

Figure 4-9 The idea cluster - innovative way of communication

Innovative way of communication

As indicated in (2.3.2 Parenting style and child outcomes in Chinese families), most Chinese families attach high value to academic success, and parents believe firm control and governance of the child can help them to be successful. This kind of thinking affects how parents communicate with their children, leading them to comment on children's feelings and aim to 'teach the child a lesson instead of paying attention to children's emotional experience. (2.5.3 Parent-child conversation about shared emotional experiences) The innovative way of communication helps parents learn more about children's feelings and emotions in parent-child conversations. Writing a letter or drawing a painting is an alternative way for children who do not want to talk to parents during a particular stage to express their feelings. Also, making some taboo words to remind both parents and children to care more about each other's feelings during a conversation can create a more relaxed and harmonious family atmosphere.

All the ideas generated in this session, together with the design principles and strategies collected and examined in Chapter 2, provide the directions to achieve the design goal defined in Chapter 3. Some of the ideas clusters were selected and combined to form a final concept.

4.2 Concept

This figure presented an overview of the selected elements from all the previous chapters to generate the final concept. Both the literature and the idea clusters indicated that applying meaningful gamification in

parent-child communication can help create a relaxed family atmosphere and improve parent-child attachment. Meanwhile, the design should integrate factors that can interest children and provide them enough space to imagine and explore.
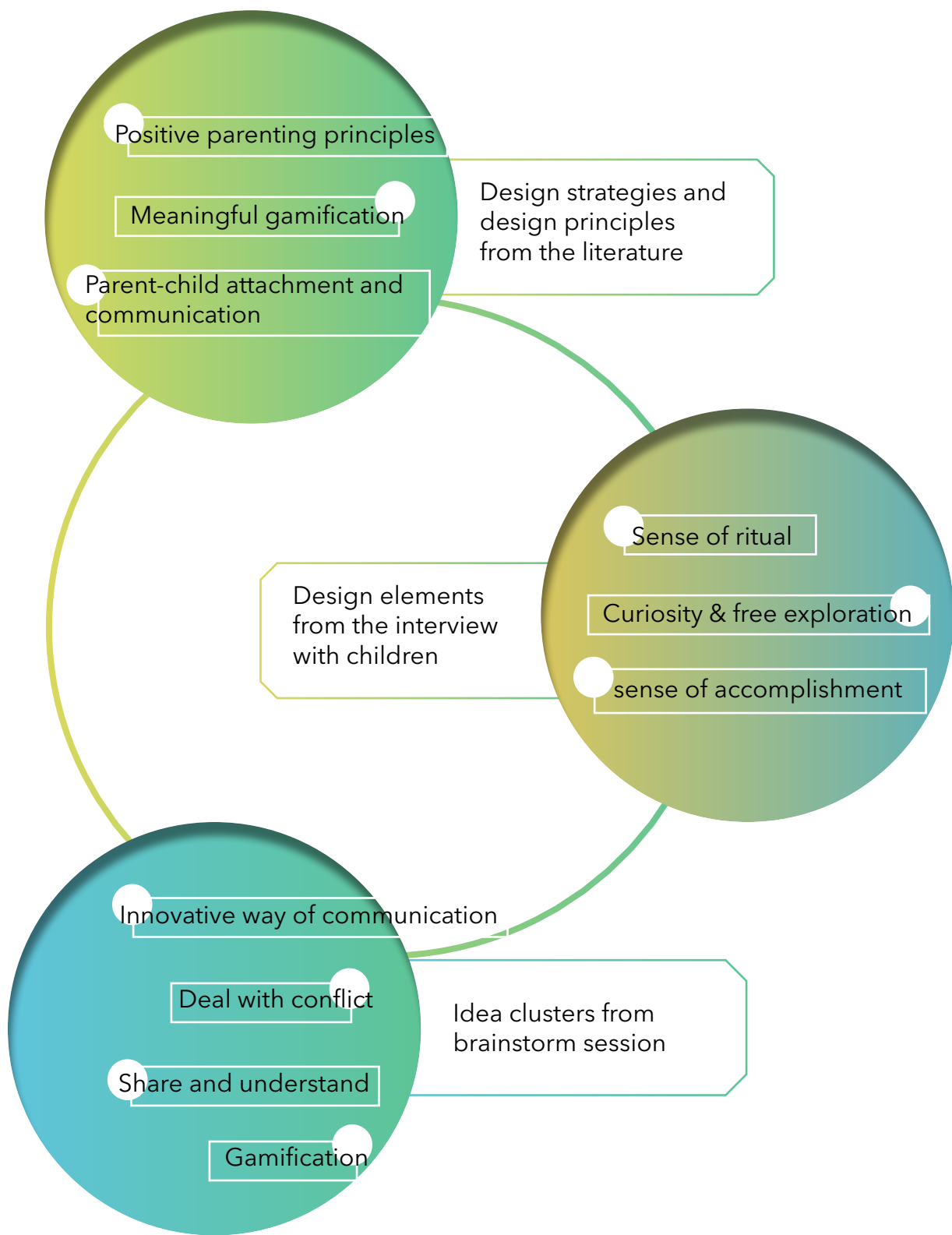
Figure 4-10 Combining elements from literature, interview and brainstorm session

4.2.1 The idea of time travel

The idea is not to focus too much on the current situation and study-related issues and provide more inspiration to expand communication between children and parents. One way to achieve this is the concept- time traveler, which can eliminate the constraints of time and space by providing opportunities to travel around. By talking about the past, both parents and children will remember to

discover the other person's perspective on things while reflecting on his own behavior. By imagining the future, parents and children can understand each other's expectations, increasing their understanding and forming a common goal. Especially when people are at home during the quarantine period, the time traveler's concept is expected to help people get out of the tedious and anxious atmosphere at home.
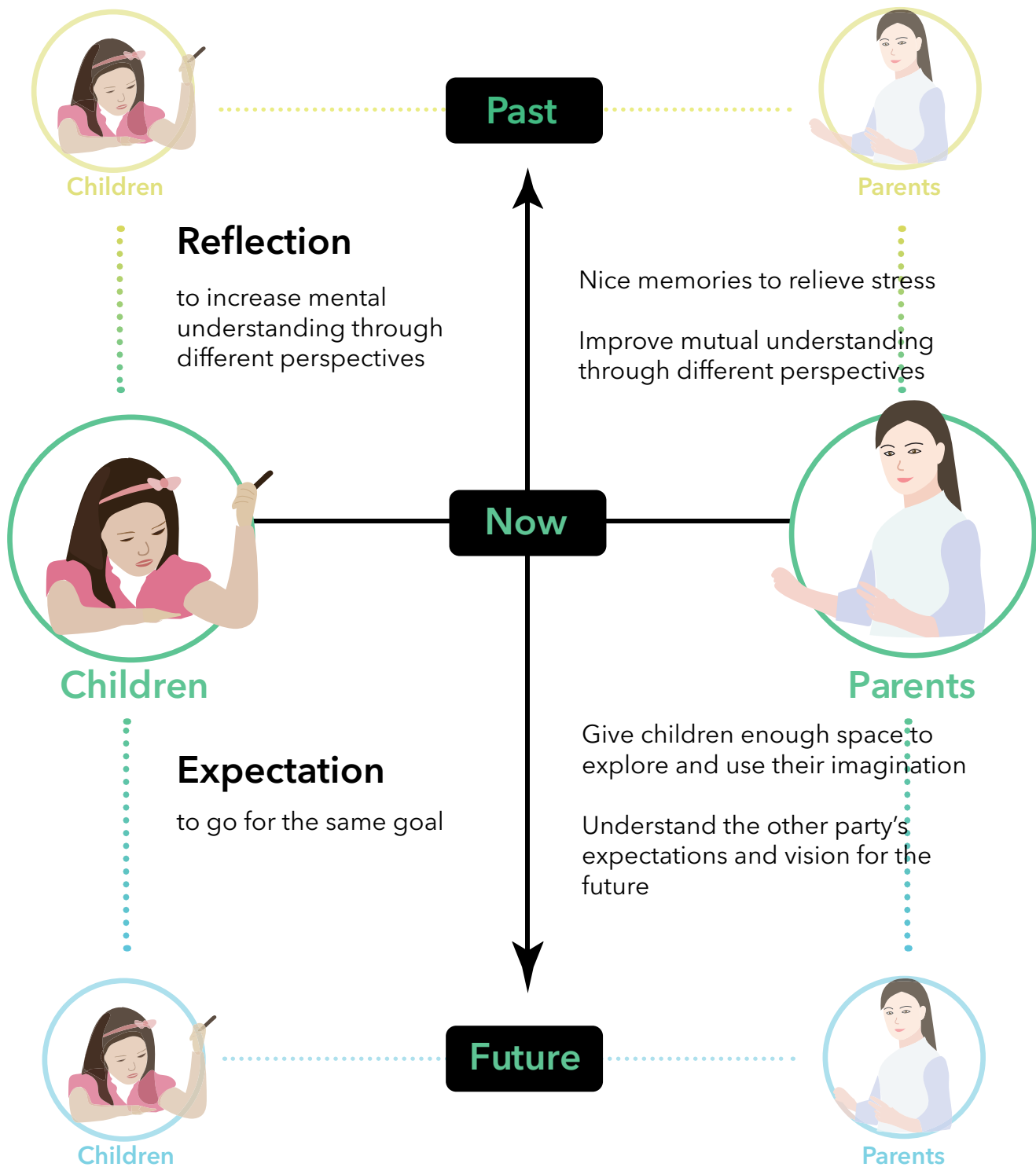
Figure 4-11 The concept- time traveller

The idea is inspired by the Japanese character Doraemon (Fujiko Fujio,1970), a well-known cartoon character who can travel through time to help a boy improve his life. The Doraemon manga was first introduced to China in the late 1980s, and the anime series was imported in about 1990. So the Chinese people born in the 1980s became the first audience of the anime and grew up with the influence of the character. (Yuqing, X.,2015)

It has become the shared childhood memories of the first Chinese audience, and there are still new theme movies coming out even recently. (like STAND BY ME Doraemon 2 XR Ride, 2020) Therefore, the concept of time travel could be iconic for parents and remind them about happy childhood memories. Simultaneously, it is also attractive to the children due to the science fiction elements so they can explore and imagine whatever they want.

Figure 4-12 The cartoon character Doraemon

Figure 4-13 "STAND BY ME Doraemon 2"

4.2.2 Three time zones

There are three time zones in the concept, *the past, recent and the future.*

Return to the past

Recall the same day's memory can provide a starter for children and family to open a relaxed conversation. Chinese parents tend to emphasize the correctness of their behaviors in sharing memories and communicating with their children to conduct critical education on their children's behaviors. (2.5.1 parent-child conversations about shared emotional experiences) It can be seen from interviews with children that this dialogue style is not accepted and liked by children. Through some guiding elements, this design aims to lead the dialogue based on memories to more positive aspects and emphasize the importance of emotional experience, strengthening the parent-child attachment and enhancing children's desire for parent-child communication.

In the process of drawing the day, they can find their different focus on this day and what they appreciate most in this day/ what do they want to change if they can back to this day. In this way, they can understand more about each other and know the reason behind their behaviors or know each other's desires at the bottom of their heart. (2.4 positive parenting) Recall happy moments can relieve a tense atmosphere at home. Drawing together can be an exciting experience for both children and parents.

Recent

The time zone recent mainly revolves around what happened in recent days. This can provide families with opportunities to create a positive family atmosphere. For example, they use the time machine to go back to the day before the quarrel and imagine the behavior

or communication style they want to change if they have the opportunity to start again.

It is mentioned in the literature that conflict is not the cause of lousy parent-child relationships. On the contrary, if the conflict is resolved correctly, parent-child relationships can be turned in a good direction. But from interviews and literature, it is difficult for children and parents to take the initiative to apologize or solve problems. Most of the time, they choose to stay silent and stuck in their emotions or run away from the situation. The design aims to provide children and parents an opportunity to reflect on recent conflicts or alleviate the extreme negative emotions caused by disputes. The concept of a time machine can help ease their feelings when they have strong feelings of regret after a conflict. Or they can draw a picture of how they want to spend a happy weekend.

Go to the future

When children give full play to their imagination, not only can they enjoy happiness in the process, but parents are also likely to be surprised by their children's rich imagination. This provides an opportunity for parents to see the advantages and possibilities of their children. Because from the interview, it has been found that some of the parents tend to see the shortcomings of the children and don't know how to encourage children. Children want their parents to see their advantages more. Simultaneously, when children and parents communicate their ideas based on the same point in time, they can understand each other's expectations for the future, which will also help them communicate more effectively in daily life.

4.2.3 Other features of the idea

The character

A cartoon character, Duoduo, was created to guide the parents and children through the start of the journey. According to literature, introducing a character or mascot in the design can appeal to the children, making the design relatable, approachable, and impressive. And the character can help build the connection between the product and the users. Duoduo functions as an assistant to guide the parents and children through the use process. Children nowadays are already familiar with different intelligent assistants, so it should be easy for them to accept and connect to the character.

The communication topics

In the interview with children, children can easily remember a happy time with their parents on special days like birthdays or festivals. The celebrating activities make children feel a sense of ritual and attachment with their parents. So such topics are believed to be helpful to create a relaxed communication atmosphere in the family. Also, children desire to travel with their parents, during which they can get away from the monotonous daily life and enjoy a nice view and food together. Planning travel also can make children excited and motivated. So the topics of birthdays, festivals, and travels are provided as an inspiration to start a positive parent-child communication. Considering that each family may be interested in different topics, these three topics are just for inspiration. Users can customize communication topics.

Product form

Because students were required to take online lessons at home during the initial period of the epidemic quarantine, it was learned from interviews that most families have tablets or computers to enable their children to better online education. Considering the convenience for children and parents to use this design at home, the design is presented as an APP prototype that can be used on a tablet computer. Tablets have larger screens than phones, which might make them more comfortable for kids to use. Also, since many kids already have tablet-sized intelligent learning machines, the design could also be built into the learning machine.

All the interface of the application was done in Adobe Illustrator and Adobe XD with a standard tablet screen size. The prototype can present the fundamental interactions with parts sound effects in the interaction actions.

4.2.3 Use journey

The use journey includes five steps. The first step, choose the topic and time zone, is intended to bring the users into the context to feel the ritual of traveling through time. They are then guided to recall the memory or imagine their ideal situation and express it via drawing in the panel. During the process, the parents and children would be provided with preset drawing elements and shapes to help them finish their creations. And the fourth step is to communicate the drawing they have done. Last, the fifth step explains how this design makes sense in the long run for improving parent- child communication at home.

Step 1 Choose the topic and time zone
Step 2 Recall the memory
Step 3 Express it via drawing/writing
Step 4 Communicate what you created
Step 5 How it works in the long run

Hello, I am Duo Duo!
Next, I will lead you on a journey of time. Please follow me and explore!
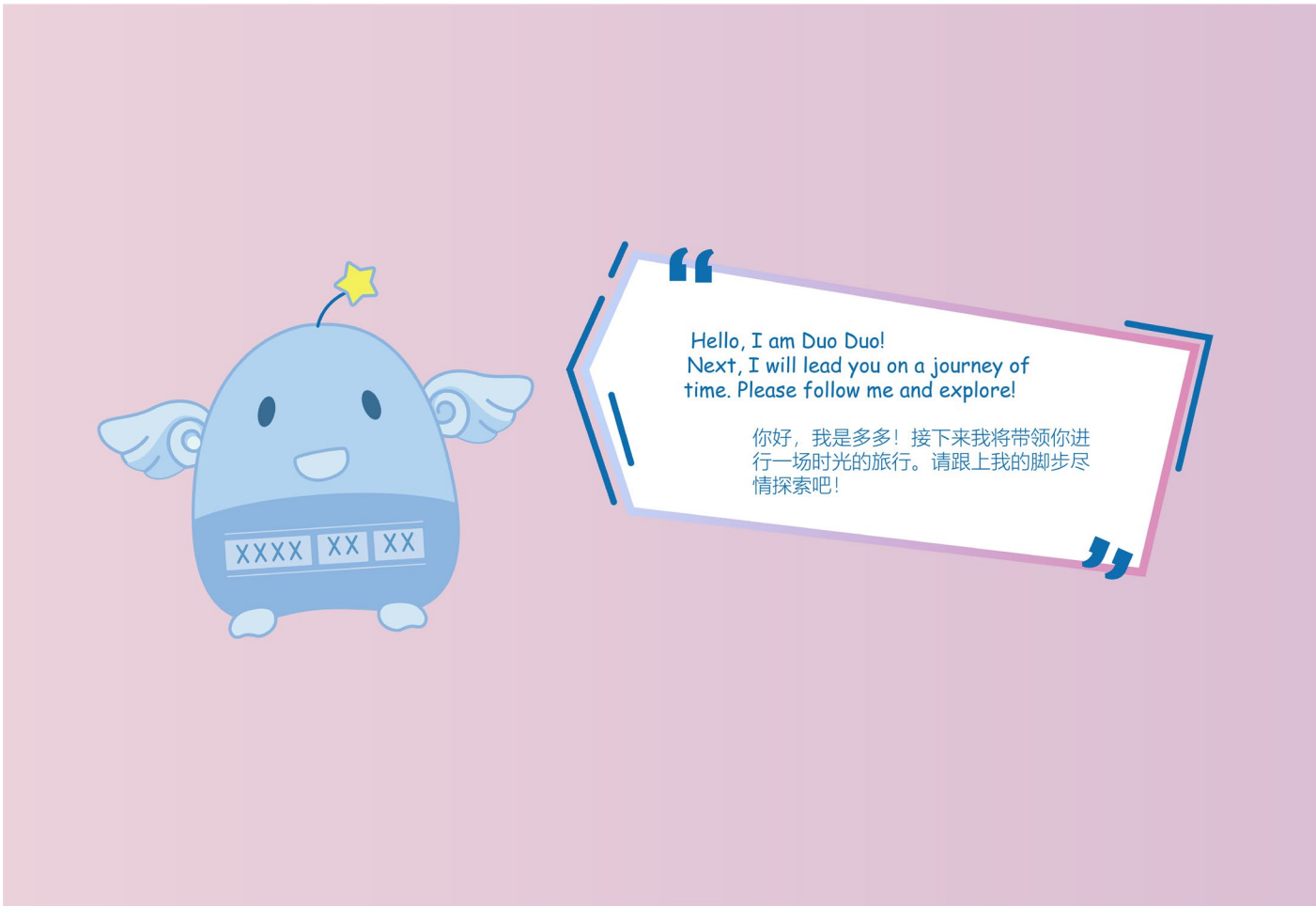
你好，我是多多！接下来我将带领你进行一场时光的旅行。请跟上我的脚步尽情探索吧！
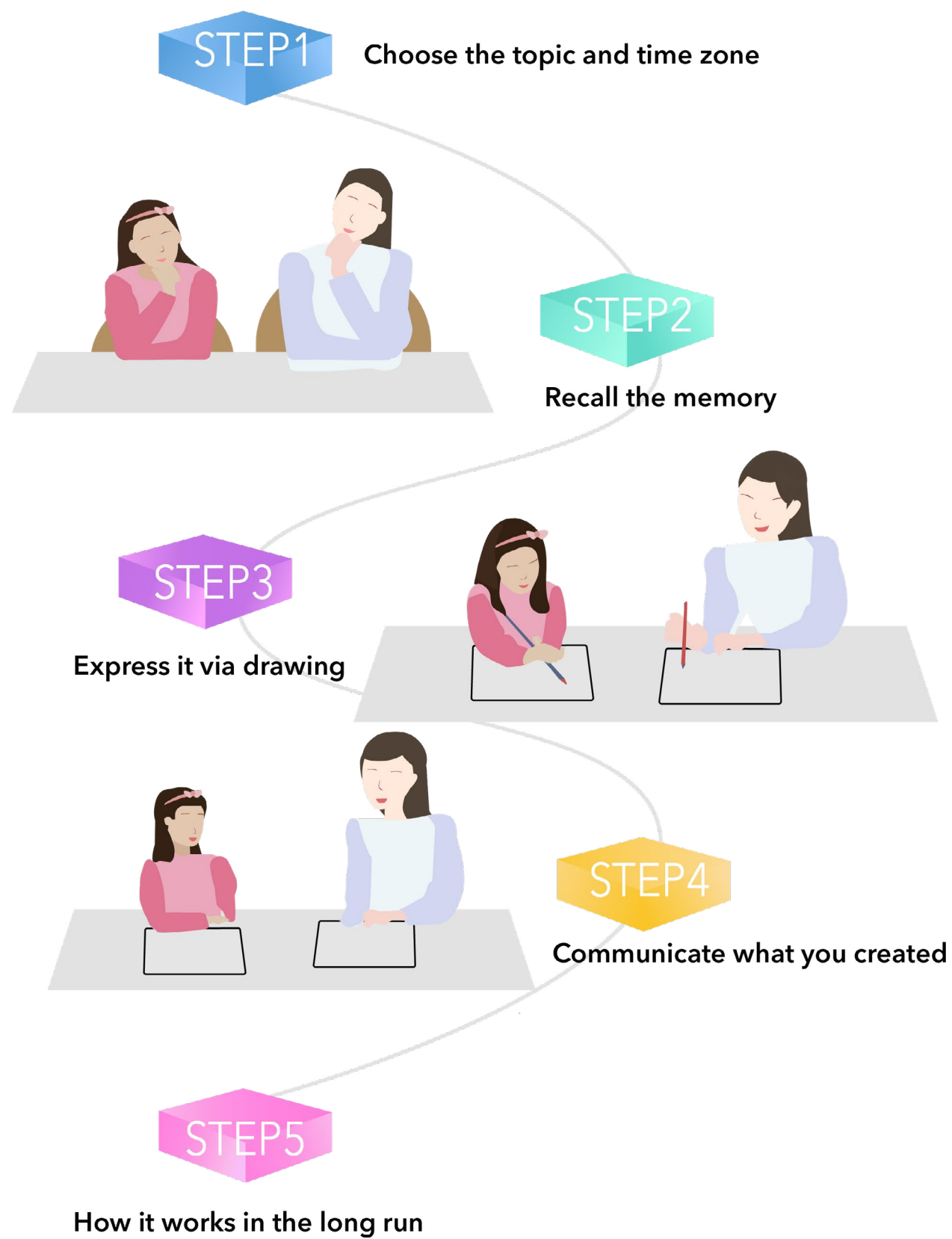
Figure 4-14 The character - Duoduo

Figure 4-15 Use journey

Step 1 Choose the topic and time zone

First, users can choose a communication topic from the three topics provided. They can also customize their preferred topic if they like.
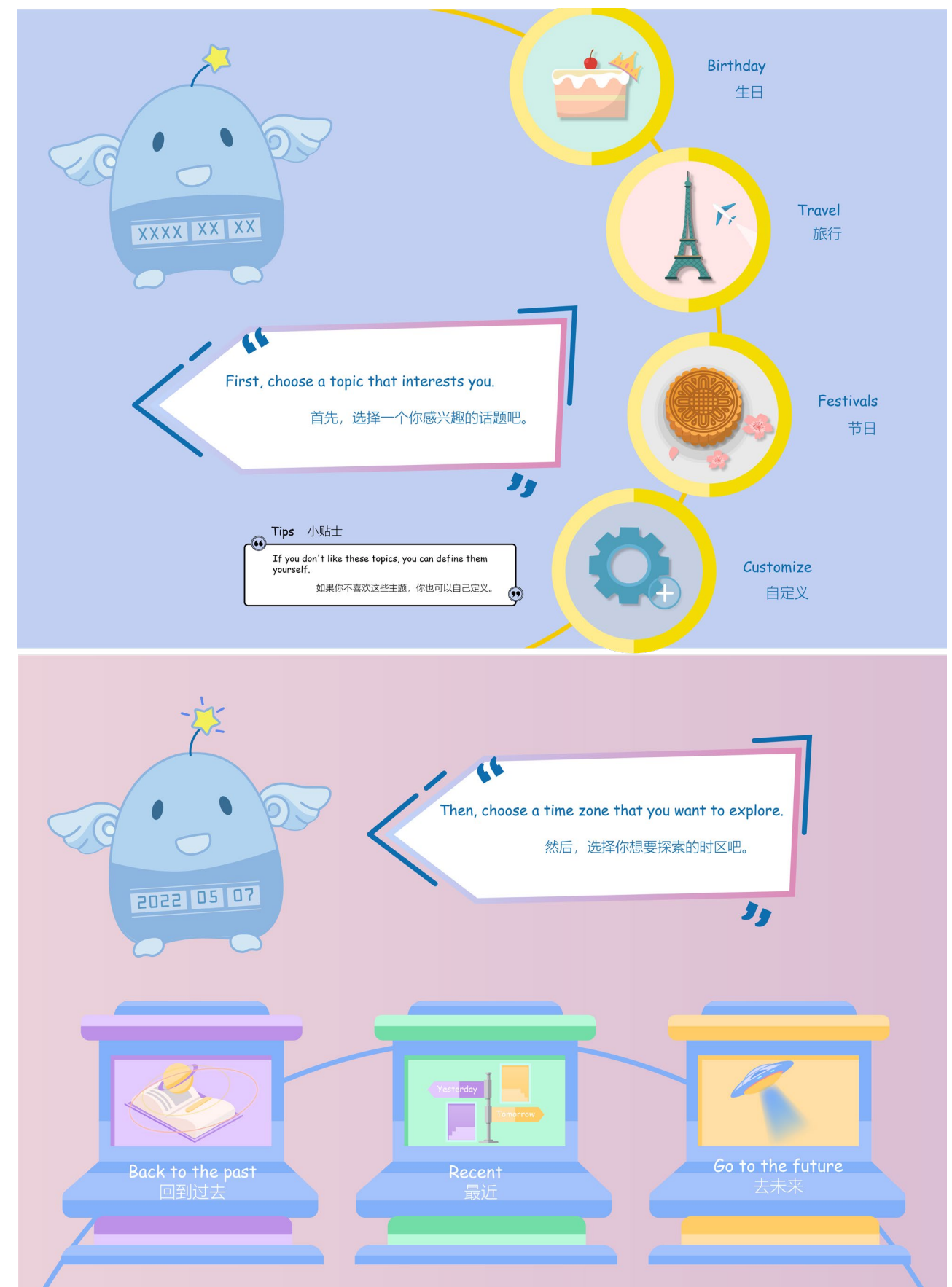

Figure 4-16 Choose the communication topic and time zone

Step 2 Recall the memory
(how to start the journey)

As shown in the figure, when children and parents set the specific day they want to go to and put their fingers in the designated area at the same time, the time travel journey started.

Meanwhile, the users can hear a two-second sound effect, which is to establish a stronger sense of ritual, allowing children and parents to better understand and feel the concept of time travel.

Figure 4-17   travel to the selected time zone

Step 3 Express it via drawing
(drawing elements were provided)

For some people, it is not easy to express their ideas through drawing. To make it easier, some simple shapes and elements relevant to the communication topics are provided to help users build what they want. Users can drag the element to the drawing panel and adjust the size and color according to their needs. Drawing is a creative process. Users can feel their creativity and get fun out of the process. The empowerment of creativity can keep the users engaged in the activity especially for the children.

Next to the drawing board, the children and parents were asked to write down their mood on that day. This can help users pay more attention to the emotional experience in the following conversations instead of overly focusing on facts and behaviors. Similarly, some simple emoji in the bottom can help

users who are not good at drawing express their feelings. When users have multiple complex emotions, they can also define them in words.

Depending on the selected time zone, users can also describe what they most look forward to /most impressed/most want to change/most want to achieve that day. This helps children and parents see the problem from each other's perspective and understand their different concerns. By comparing this answer, users can think about and understand the reasons behind each other's behavior or understand their different expectations for the same thing. By discussing these differences, children and parents will deepen their understanding of each other, improving the quality of communication.
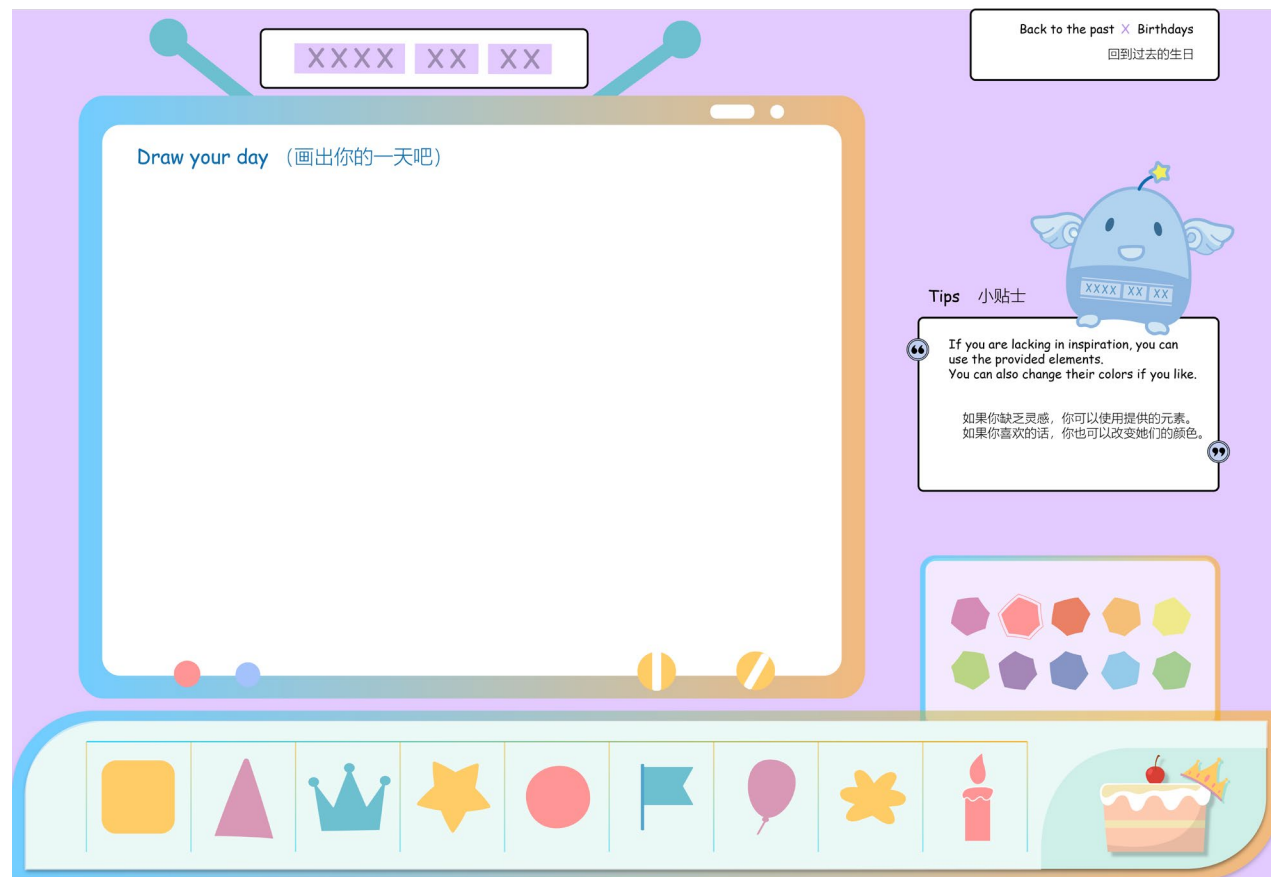
XXXX XX XX

Draw your day （画出你的一天吧）

Tips 小贴士

If you are lacking in inspiration, you can use the provided elements.
You can also change their colors if you like.

如果你缺乏灵感，你可以使用提供的元素。
如果你喜欢的话，你也可以改变她们的颜色。

Figure 4-18   Drawing panel of Back to the past - Birthday

XXXX XX XX

Draw your day （画出你的一天吧）

what do you want to change/achieve on this day
你想在这一天改变/实现什么

today's mood
今日心情

Figure 4-19   Drawing panel of Recent - Customize (Conflict)

XXXX XX XX

what do you expect most in this day/what do you want to do in this day
你在这一天最期待什么/最想做什么

Imagine and Draw your day （尽情想象并画出你的一天吧）

today's mood
今日心情

Figure 4-20   Drawing panel of go to the future- Birthday

what do you appreciate most / what do you want to change in this day
你最怀念这天的什么/你想在这天改变什么

Draw your day （画出你的一天吧）

today's mood
今日心情

Figure 4-21   Drawing panel of Back to the past - Travel

Figure 4-22 Drawing panel of Recent- Festival

Figure 4-23 Communication tips

**Step 4 Communicate what you created
(Tips on communication were provided)**

When parents and children finish the drawing, they can discuss what they have created. In this step, some tips are provided on how they can communicate better. (show their desire to the children)(response actively to each others' story) (focus more on emotional experience rather than to teach the child a lesson) These three tips in this figure are extracted from the literature in chapter 2. Based on the topics selected by the users, different communication tips would be provided to help promote better communication in that context.

Step 5 How it works in the long run

The improvement of communication quality is a long-term process. Therefore, it is vital to make the concept continually work for the users. At the end of each conversation, the user will evaluate the conversation experience by answering two questions. When their feedback is lower than expected, the topics provided in the first step will be adjusted to meet users' needs better.
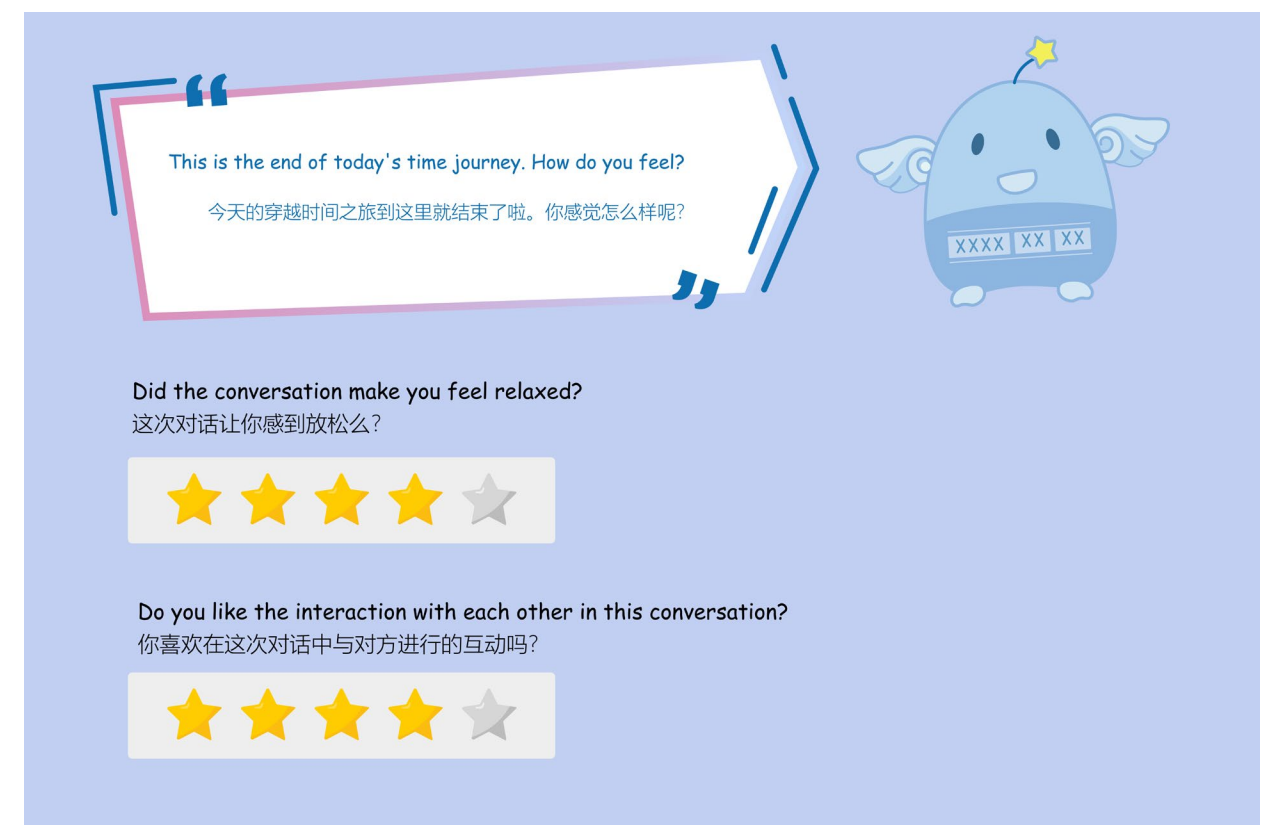
Figure 4-24 Evaluate the conversation

After the users finished a painting, they can choose to save it in the album if they are satisfied with their works. This makes them feel ownership of the creations and wants to build them better in the long term. And after a month, the system can automatically generate commemorative videos for the users to review. Such videos can provide a sense of accomplishment for users and be a good memory of happy parent-child time. And if the communication topic selected is about the future, the users will receive a reminder on that day to see what they have drawn in the activity. They can check whether the scenes and wishes in their paintings have been realized.

When the users use the time machine more than the specified number of times, they will receive a commemorative prize/reward to keep them motivated to use the product. In this way, they can visualize the changes in their communication and parent-child relationship, facilitating them to continue the behavior to get more rewards in the system. For parents, the improved parent-child relationship can become the inner motivation for them to keep doing this. For the children, the sense of accomplishment of getting the badges and the curiosity for the presents would keep them going for more conversations.

Figure 4-25   Save the memories
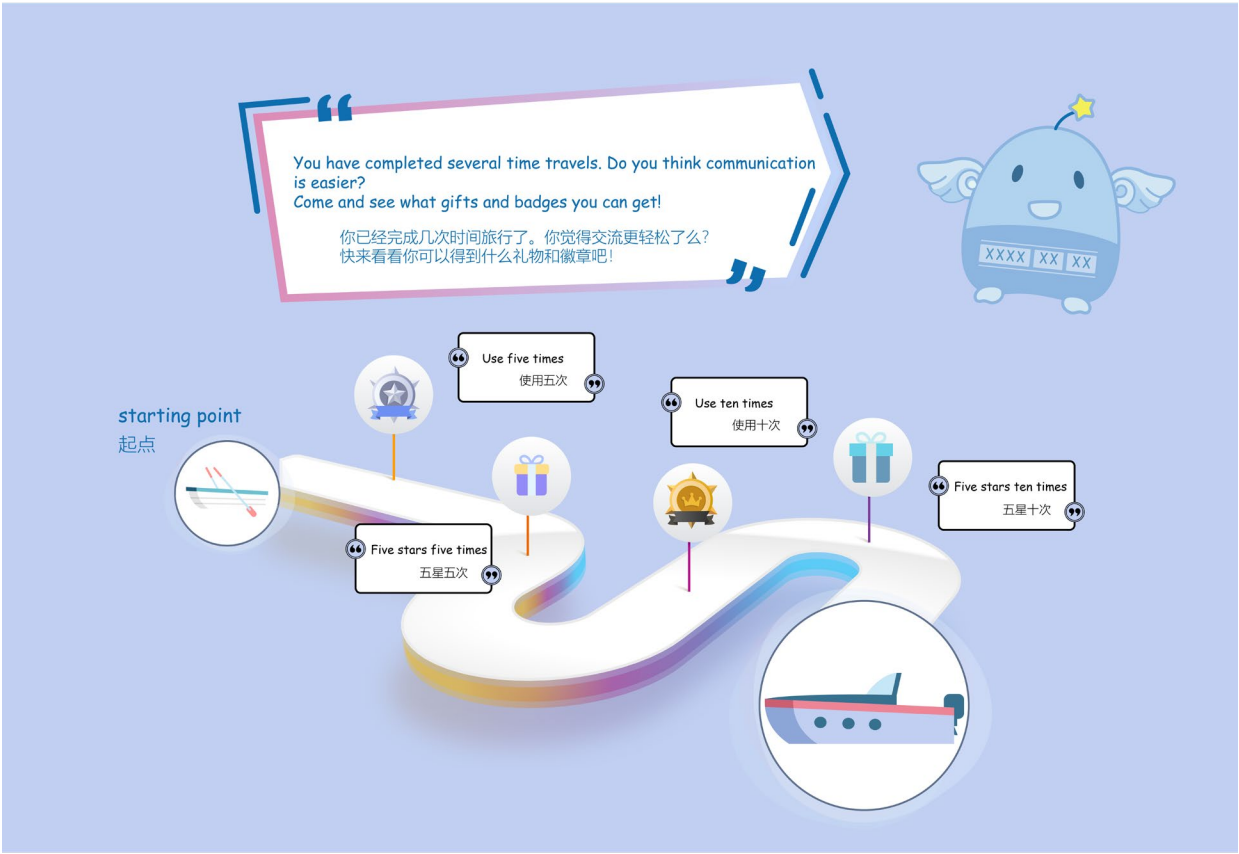
Figure 4-26   The reward system

4.3 Take-away

This chapter described the process that how the concept was created and developed based on the design goal set in the chapter 3.

From the bainstorm session, several idea clusters pointed out that to make positive conversations between parents and children needs innovative way of communication. To attract the children and arise their interests in communicating and interacting with their parents, gamification could be a feasible strategy. The way to improve communication quality and increase parent-child attachment could be spend time together sharing and creating things together. In this way, parents and children can increase mutual understanding and decrease conflict.

Inspired by the cartoon charater Doraemon, the time machine concept was chose to be further developed to enrich the topics that children and parents to communicate together. Combining and integrating all the insights from the previous chapters and the idea clusters in the brainstorm session, the time machine concept was made.

In addition to guiding children and parents to choose a topic that can give them a lot of inspiration and communication space, this concept also offers users enough room to reflect and imagine, thereby increasing their mutual understanding. The communication tips can better help create a positive family communication environment, emphasizing emotional experience in communication rather than judgments based on facts and behavior. Simultaneously, this concept applies to part of the meaningful gamification theory to promote users' long-term motivation for using his design.

CHAPTER 5   DELIVER

The first two sections of this chapter explain how the concept was tested and what insights and recommendations gained from the parents and children. The test provides information about how real users perceive the design, indicating how the concept can be improved and further developed. The third section is about the reflection on how the design theories were applied in the concept and what I have learned from this. The chapter ends with the main takeaways.

5.1 Test with users

5.2 Insights and recommendation

5.3 Reflection on the theories applied in the design

5.4 Take away

image from https://zanlifestyle.wordpress.com/

5.1 Test with users

The design prototype was tested with Chinese families. The test aims to understand if the design has attained the expected design goal, improving parent-child communication at home. When the test took place, most Chinese had gone back to regular schooling; that is to say, the context was slightly different from the original research setting. Therefore, the participants were asked to recall their memories during the epidemic quarantine period and talk about their user experience in that context.

5.1.1 Method

Participants selection

As mentioned in the last chapter, the open pursuer was selected as the target group for the project. To make sure the effectiveness of the test results, the participants should conform to the educational philosophy and behavior characteristics of this persona. Based on the analysis and sorting of the answers of the 9 participants in the research phase, four of the interviewees were considered to be in line with the open purser persona. Therefore, the three parents and their children were invited to participate in the test.

Interview preparation

To get a better evaluation result, the users should experience the product. So, all the participants were asked to use the product one day before the interview. They were provided with a online prototype link, a demo video with operation guidelines, and a short description of the concept.

The application of PLU model

According to the evaluation framework (Read, 2004, in Markopouloset al., 2008), the evaluation of the product with children are divided into five steps:

Step one
Specify the purpose/focus of the product.

The product's purpose is an application for children and parents on a tablet to help them improve communication and create a relaxed atmosphere at home during the COVID-19 quarantine period.

Step two
Core users and specialist users

The core users of this product are Chinese families with children aged 9-12 years old. (from the third grade to the sixth grade at primary school). Specialist users could be psychology experts or education experts to provide professional advice and help further develop the product.

Step three
PLU weighting of the product

According to the practice examples of the evaluation framework (Read, 2004, in Markopouloset al., 2008), the PLU weighting of the product should be discussed and decided by the design teams to what extent the design aims to support Playing, Learning or Using.

Based on the design goal and design requirements of the project, the PLU weighting of the product is [P(player):70%; L(learner):10%; U(user):20%] The most crucial goal of the product is to make children would like to communicate with parents, so it would be good if children can view this product as a game rather than a communication tool. It is
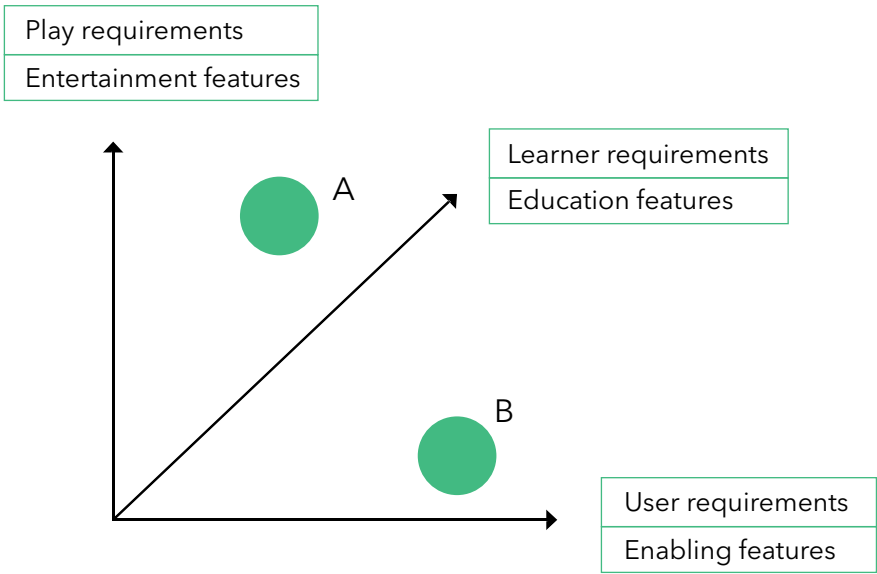

Figure 5 - 1 The PLU model (Read, 2004, in Markpouloset al., 2008)

vital that children can feel the entertainment aspect of the product. In addition to being a player, children can also use it for attaining some communication skills.

Step four and five
Proposed and plan of tests and evaluations

The test is about the fun level of the application. Children aged from 9-12 would be asked to use the application and evaluate how much they like about it and how much fun they can get from the application. And the children will be asked about their perceptions of their roles in using the product. (the weighing as player, learner, and user)

Process

All the participants were provided with an online prototype link, a demo video with operation guidelines, and a short description of the concept. These materials can make them fully understand the design and prepare them with the knowledge of using the design correctly.

Due to the COVID-19 situation, it is challenging to observe participants' use process in their homes. For one of the participant families, I can explain the design to them face to face and follow their user experience. The other participants were asked to take photos of them using the product and describe their use process briefly. In this way, I can better understand how the users experience and feel about the product and what problems they have encountered during the operations.

Each interview is about 40 minutes (30 minutes for the parent and 10 minutes for the child). The interview questions are mainly about two aspects, the function of the prototype and the emotional experience in the drawing process and following communication.

Figure 5 - 2 An demo video with operation guidelines

Figure 5 - 3 the application prototype that users can try

这是一个帮助亲子更轻松地进行对话的一个小工具。

设计背景是，在疫情居家隔离期间，孩子们要上网课，期间遇到的不适应以及学习自立性还不够等问题会让孩子们压力增加。同时，家长们也因为对疫情本身的担心以及由居家隔离产生了工作及经济上可能存在的压力而背负了一些压力。同时，由于家长和孩子的相处时间比以前要更多，在双方压力都很大的时候，更容易围绕学习上的问题以及其他生活琐事产生冲突矛盾，或者在矛盾激化的时候互相发泄负面情绪。

所以，这个设计希望能够帮助孩子和父母跳脱出这样一个高压紧张的交流环境，进行一些轻松的对话。同时通过积极开心的对话，增加互相的了解，也有助于减少冲突的产生，从对方的角度思考问题。

This is a small tool that helps parents and children to conduct conversations more easily at home under significant stress.

The design background is that children have to take online lessons during the home isolation period of the epidemic. The problems encountered during the period, such as unsuitability and insufficient learning independence, will increase the children's pressure. At the same time, parents are also under pressure of work-related issues and financial matters caused by home isolation. It is easier for parents and children to have conflict around learning problems and different life trivial matters in such a situation. Therefore, they could probably vent negative emotions to each other and hardly have a positive and relaxed conversation.

Therefore, this design aims to help children and parents escape from such a high-pressure and tense communication environment and have relaxed conversations. Through active and happy dialogue, increasing mutual understanding will help reduce conflicts and see problems from the other side's perspective.

设计概念是通过一个时间穿越机器，用户可以选择穿越到很久之前过去的某一天，很远之后未来的某一天，或者最近（向过去到昨天，上周，向未来到下个周末）。同时，在每个时间区域，使用者可以选择一些准备好的比较积极有趣的话题来进行穿越之旅。（如果有比较想要聊的话题，也可以自定义）在选择好时区和主题之后，家长和孩子可以按照要求，画出理想中的那一天，或者回忆中的那一天。在画好之后，家长和孩子可以针对画好的图画来进行交流。通过这种方式，双方可能会了解到，针对同一件事，对方看事情的角度以及对事情的

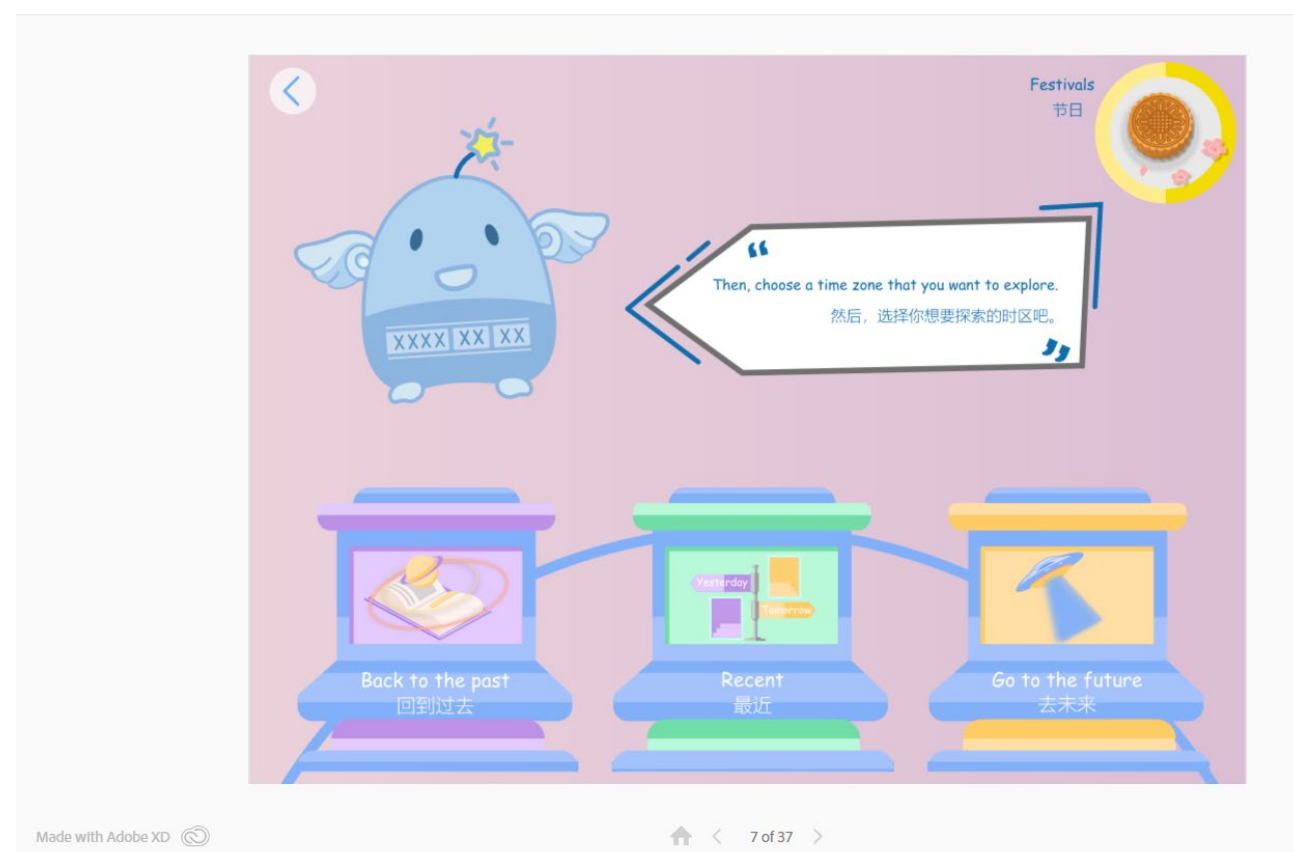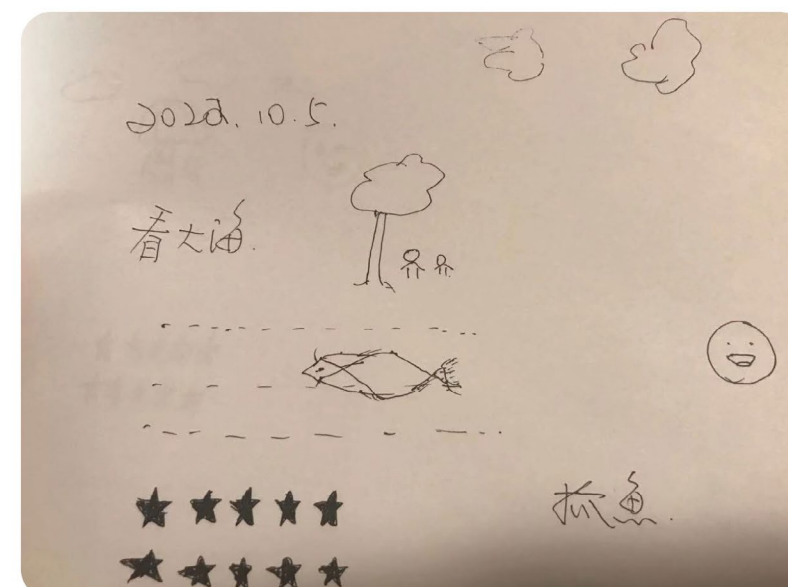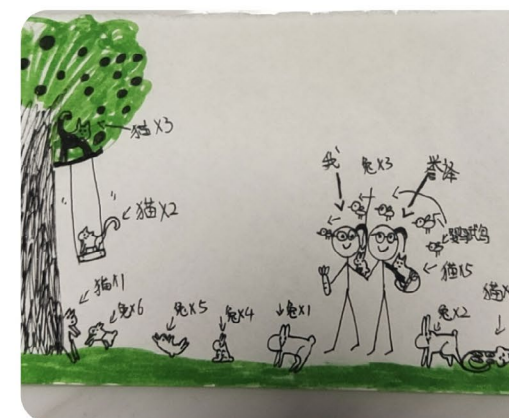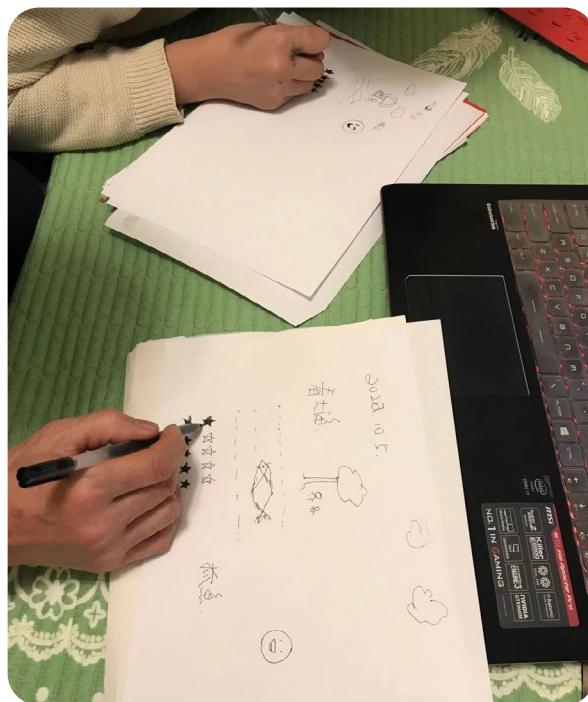Figure 5 - 4 a short description of the concept

Figure 5 - 5 the use process (Some facial features are obscured for privacy reasons)

Figure 5 - 6 a selection of the creations of the interviewee

5.2 Insights and recommendation

5.2.1 General insights

The use time

The use time of the product is about 30 minutes. This is in line with the design criteria in Chapter 3. 30 minutes would not put too much pressure on users and children won't get bored in the time period.

The interactions during the drawing process

When they choose the time zone of 'return back to the past', they can complement each other's memories in the process of painting, which is a positive interaction in the communication process. During the drawing process, the children discuss with their parents whether an object is vivid enough. Usually, parents find that their drawing ability is not as good as their children, making the children feel happy that they outperform their parents in this skill. Both parties can have fun by commenting on each other's paintings.

5.2.2 Insights from the children

The fun level

Most children perceive it as a game application rather than a tool application or learning application, which is within the expectation of the design intention. However, it is not fun enough for children to keep using it. As mentioned by one child, 'It can only be considered interesting, but not particularly interesting. It depends on what you compare. If compared with studying, this is an interesting and relaxing activity, but compared with playing video games, it is not interesting enough.'

The drawing process

Children enjoy the process of drawing. They view it as a relaxing moment and they can feel a sense of accomplishment when finishing their work. Compared to parents, children encounter less difficulties in expressing ideas with pens.

The sound effect

When clicking some buttons to trigger the sound effect, some children can understand the connection between this sound effect and time travel. However, some children are confused about it, and they cannot connect this voice to the time travel journey . Therefore, children who understand this sound effect think it is funny while those who do not understand it believe it is strange.

The memorial album

Some children expressed their liking for the memorial album feature. 'It will make me feel that this thing belongs to me, and I will have more and more pictures drawn by my parents and me, which will make me feel very fulfilled. 'A child said.

The reward system

The thing with rewards connected to games is that only a very small group of very dedicated users buys and want these rewards, maybe here this will apply also.

Most children showed interest in the reward system. They are curious about what they can get when using the product several times, and they have the desire to share this with their friends. This would make them motivated to earn badges and rewards.

5.2.3 Insights from the parents

The drawing process

For some parents, it isn't easy to draw ideas and scenarios. 'I have lots of thoughts in my head, but I do not know how to present it on paper. I seldom express myself in this way. I even do not know how to draw a fish. But it is an interesting experience to try. Tiantian (my daughter) taught me to draw a fish, and it is quite vivid.' Said a parent.

The memorial album

Parents love the feature. As said by a parent, 'This reminds me that I would often take pictures of my daughter with an old camera in the era without smartphones and put the photos in the album. I still keep the growth diary wrote for her until her first birthday, and she would occasionally take it out to look at it, which makes her feel fresh and interested. I believe this function is the same. We will leave a shared memory, which will be valuable to look back in the future. '

The reward system

The reward system would not be the reason that parents continue to use the product. But they would like to earn the badges for their children because this would satisfy the children and make them happy.

The 'aha' moment

Some parents experienced 'aha' moment in the use process. They were kind of surprised by the clear memory of their children or the children's talent in drawing a scenario. 'I can easily see that he drew a scene where I took him to Tiananmen Square when he was a child. It was a long time ago, and I was surprised that he remembered it so clearly and was able to draw it.'

The communication tips

The communication tips are helpful in reminding parents to care more about children's emotional experience during the conversation.

5.2.4 Recommendation from the parents

The form of the product

Some parents worry much about their children's eyes, so they believe that an application on a tablet is not the best way for the design. They suggest making it a set of cards or similar tools that would not increase the screen time. And it is also more comfortable and convenient to draw on paper than on a screen. And if so, the design can be used not only in the family context but also before a school class to create a relaxed atmosphere.

The elements in the drawing panel

In addition to drawing the mood of the day, some parents also hope to write a comment about the communication experience on this picture, so that they can keep the memory deeper and longer.

For many parents who are not good at drawing, the most difficult part is drawing characters and their poses. In addition to some basic shapes, it will be very valuable if such adjustable drawing materials were provided.

5.2.5 Recommendation from the children

To share it with others

Some kids said that if they can share their paintings or the rewards they got in the application with their friends or peers, they would be more willing to do this again. They will strive to get badges in order to outdo their peers and enjoy the joy of victory.

5.3 Reflection on the theories applied in the design

5.3.1 Positive parenting

One of the core principles of positive parenting is to create a safe and engaging environment, which is necessary for promoting a healthy development at home. And as suggested in Triple P-positive Parenting Program, there are several skills to enhabce parent-child relationship - spending brief quality time together, talking with children and showing affection. (Sanders, M.R.2012) Drawing and discussing their creation work together is an opportunity for parents and childen to spend quality time together, getting them positively involved in the activity and making them to focuing on each other during the process. This could help children build sense of security and confidence with the perception of being cared and aprreciated by their parents.

Another skill of managing anticipating and planning is to provide consequences. When the users choose the 'go to the future' time zone, they can learn about each other's expectations on future activities. The content they have drawn could facilitate a conversation about their reasoning behind imaging such a scenario, therefore to know more about each other's thinking and planning.

5.3.2 Parent child attachment

In order to achieve a healthy development in parent-child attachment, it is necessary to keep 'relatedness' even when parents disagree with their children based on critical issues. As indicated in the interface examples of 'Recent - Customize (Conflict),' both parents and children are provided an opportunity to discuss their disagreement or dispute rather than escape from the problems/conflicts. This kind of conversation can help children perceive attachment security, express their opinions confidently, and be empathetic to others' views. (Allen, J. P., McElhaney, K. B., Land, D. J., Kuperminc, G. P., Moore, C. W., O'Beirne–Kelly, H., & Kilmer, S. L. 2003) And according to Dykas, M. J., Woodhouse, S. S., Ehrlich, K. B., and Cassidy, J. (2010), when children rebuild their memories of the conflicts with parents, they could perceive it in a more positive way in the case that the adolescents' internal working models of attachment are secure. In the drawing and recalling memory process, it could be possible that children have positive interactions and discussions with parents about the conflict. This conversation in such a context could make children feel secure and change their negative perceptions on memory of the conflict.

5.3.3 The meaningful gamification

To achieve long-term behavior change, it is needed to internalize the behavioral changes caused by gamification benefits, making it a new habit. (Kazhamiakin, R., Marconi, A., Martinelli, A., Pistore, M., & Valetto, G. 2016) And one of the methods to achieve this goal is to facilitate users building meaningful connections between their interests and wanted behavior in the gamification activities. As mentioned in Nicholson, S(2015)'s RECIPE for Meaningful Gamification, Exposition and Reflection can help build such connection. For the exposition, the character Duoduo was introduced to guide the users through the use process. On the one hand, Duoduo could make the users recall their memories about the Doraemon character. On the other hand, Duoduo helps the users to make transitions smoothly between different stages and activities. For reflection, the memory album can help users to reflect on what they have gained in the process and stay with the behavior when the rewards are gone and connect it to daily life.

5.4 Take away

This chapter describes how the test was done with target users, and the recommendations got from the participants.

From the test, it has been found that most children like drawing their ideas and interacting with their parents. And for parents, some of the participants found it kind of difficult to express via drawing a picture, but they can get fun out of this and enjoy the thinking process. This is an opportunity for both parents and children to have a relaxed topic and atmosphere to communicate at home.

One of the concerns about the design is that children might lose interest in using this for a long time. The possible solution to the problem is that the system can provide intelligent recommendations for improving the using experience. For example, through the evaluation at the end of each use, the system can learn about the topics and content that interest the children and parents. Therefore, it can suggest relevant or popular topics that could facilitate positive conversation.

The memory album function and the reward system could effectively keep children involved in the communication activities. Still, it could not be tested with the time limitation of the project for the time being. As mentioned by the children, sharing the application with peers and seeing each other's rankings could encourage them to use it because they want to win their friends. Also, enabling the customization of the achievements and badges they have gained from the application could improve their sense of belonging to the design and keep them interested.

Indeed, improving parent-child communication and strenthen parent-child attachment is a long process. The design function as a tool to facilitate the process. When the users feel their positive change in communicating with each other, they have the motivation to keep this positive transition.

CHAPTER 6   CONCLUSION

This chapter is the reflection and discussion of the whole process. The first section describes the practical and academic contribution of the thesis, following by the limitations of the design process and outcomes. The chapter ends with the recommendations for further development and take away.

image from https://kknews.cc/

6.1 Contributions

6.1.1 Practical contribution

The thesis inspires parents and children to open a positive conversation during the COVID-19 quarantine period at home. They can recall beautiful memories, discuss plans, and form mutual aims by using the product. They can also solve a conflict and improve parent-child attachment through the design. The drawing process can fulfill their needs of finding something interesting in the quarantine time and bring them a sense of accomplishment. The design serves as a cornerstone, aiming to inspire people to explore more topics to increase parent-child understanding.

And also, the thesis could inspire people on how to design in a difficult situation. For example, due to social distancing limitations, many design activities could be done online, such as interviewing and brainstorming sessions. Compared to face-to-face activities, some details or feelings could be different from the expectation, but it could still be a supplement and substitute with the sources on the hand.

6.2 Limitations

6.2.1 Reflection on the process

Participants involvement

Affected by epidemic prevention regulations worldwide, face-to-face interviews are impossible in the research phase and the evaluation phase, which means that I have lost the opportunity to truly enter the user's home to feel and observe the parent-child relationship and parent-child communication. This led me to sometimes take detours in the whole design process because of being out of context. This also made me deeply aware of the importance of getting into and experience the context.

Validation

Since the cognitive and understanding abilities of 9-12-year-old children cannot fully reach adults' level, they cannot fully understand the product functions when the prototype is not highly developed. As in the final design prototype, not every part is available, which results in the children not having a good experience. Of course, this has a certain impact on the accuracy of the test results.
Also, the context has changed when the test was conducted, so all the participant were asked to imagine they were in the quarantine period and give their feedback, which could have impact on the test result.

Time management

This project took longer than expected, including the impact of forced changes in work styles and living habits during the epidemic. Part of the reason was repeated field research and literature reviews during the design research period. Design is never a linear process. In the initial stage of design, it is customary to encounter a fuzzy front end.

The important thing is to have overall time and rhythm control and more autonomy over the project.

6.3 Recommendations for further development

6.3.1 The changing context

The original intention of this design is for Chinese families affected by the epidemic. When the evaluation test was conducted, most schools in China had resumed regular classes. In other words, the context has changed. However, looking at the whole world, schools in many countries and regions are still severely affected by the epidemic, and online courses are the main form of education. Therefore, this thesis has the opportunity to provide some inspiration for family education and parent-child communication in these countries and regions. But it is worth emphasizing that different countries and cultural backgrounds may lead to different educational methods and educational concepts. But there are still problems and struggles that have something in common. Therefore, when applying this paper's insights into other contexts, it is necessary to keep the differences that cultural factors may bring in mind.

The design goal of the thesis is to improve parent-child communication by creating a relaxed family atmosphere. This is not only valuable in the COVID-19 quarantine period. It can also be applied in daily life or a particular period during which parents and children make a transition in their lives or under extreme pressure. And for the time being, children and parents are not limited at home. So more physical activities can be embedded in the use process.

6.3.2 The other two personas

In chapter 2, three personas were created based on all the insights I got from the interview, and the final concept is mainly for the open pursuer persona. It could be challenging for the other two personas to have much time to do fun activities with their children. The expected time of using the product is about half an hour, which could be possible even for busy parents. For the parents who are trapped with traditional education concept and tend to raise their children in the way they are treated when they were children, the time zone 'return to the past' (return to the time they were children) could help them reflect on the differences of all the conditions between their generations and the children's generation. This could be helpful and inspirational for them to change their opinions and behaviors on the parenting style. Also, the communication tips could help them eliminate some difficulties, such as the children's refusal to communicate.

6.3.3 In the long run

From the research interview and the evaluation interview, it is not difficult to find that most parents desire a more comfortable and relaxed communication with children but lack professional practice guidelines to achieve the goal. And if they have access to overcome communication problems, they would like to use the product or service. Therefore, there are possibilities that the design can be promoted in educational organizations or online educational platforms to inspire and benefit more families.

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