



POLITECNICO
MILANO 1863

POLITECNICO DI MILANO
DIPARTIMENTO OF DESIGN

MASTER IN PRODUCT SERVICE SYSTEM DESIGN

Service System Design for Childhood Obesity in China

ACADEMIC TUTOR
FRANCESCO ZURLO

THESIS AUTHOR
JIA MIAO

ABSTRACT / English

Obesity, as one of the most common diseases in adulthood in Europe and the United States, has now become a 'standard' figure in life for both men and women, young and old. While China's economy is developing rapidly, the obesity population is also growing rapidly. At present, China's obesity population ranks first in the world, and the childhood obesity population ranks first in the world as well. Obesity is a disease that can increase the prevalence of chronic diseases such as type 2 diabetes and hypertension. Fortunately, the Chinese government has begun to attach importance to this issue, and referring to the relevant experience of other countries, issued relevant policies and measures trying to solve this problem. There must be some special reasons for the formation of such a large number of obese people in China, especially the childhood obesity. It is necessary to make a special analysis of the obese population in China while drawing on the experience of other countries.

The purpose of this thesis is to conduct an in-depth study on obese children and their families in China, interview obese families, understand their diet and exercise patterns, explore the underlying causes of obesity, dig out the pain points of users. Contrapose the diet-behavior model of obese children and the special Chinese national environment, to create a service system design which aims to improve childhood obesity, convey the correct perceptions on diet and healthy lifestyle. In the meantime, the target user also includes parents of obese children, parents need to correctly understand obesity and its hazards, then they could develop their own and children's dietary habits and lifestyle in a right way.

Keywords: childhood obesity; service design; diet; lifestyle

ABSTRACT / Italian

L'obesità, come una delle malattie più comuni nell'età adulta in Europa e negli Stati Uniti, è ora diventata una figura "standard" nella vita per uomini e donne, giovani e anziani. Mentre l'economia cinese si sta sviluppando rapidamente, anche la popolazione dell'obesità sta crescendo rapidamente. Al momento, la popolazione cinese di obesità è al primo posto nel mondo e anche la popolazione infantile di obesità è al primo posto nel mondo. L'obesità è una malattia che può aumentare la prevalenza di malattie croniche come il diabete di tipo 2 e l'ipertensione. Fortunatamente, il governo cinese ha iniziato ad attribuire importanza a questo problema e, riferendosi all'esperienza pertinente di altri paesi, ha emanato politiche e misure pertinenti che cercano di risolvere questo problema. Ci devono essere alcune ragioni speciali per la formazione di un numero così elevato di persone obese in Cina, specialmente l'obesità infantile. È necessario fare un'analisi speciale della popolazione obesa in Cina, sfruttando l'esperienza di altri paesi.

Lo scopo di questa tesi è di condurre uno studio approfondito sui bambini obesi e le loro famiglie in Cina, intervistare famiglie obese, capire la loro dieta e modelli di esercizio, esplorare le cause sottostanti dell'obesità, scavare i punti deboli degli utenti. Contrapporre il modello di comportamento alimentare dei bambini obesi e lo speciale ambiente nazionale cinese, per creare una progettazione di un sistema di servizi che miri a migliorare l'obesità infantile, a trasmettere le corrette percezioni sulla dieta e sullo stile di vita sano. Nel frattempo, l'utente target include anche genitori di bambini obesi, i genitori devono capire correttamente l'obesità e i suoi rischi, quindi potrebbero sviluppare le proprie abitudini alimentari e lo stile di vita dei bambini in modo corretto.

Keywords: obesità infantile; design di servizio; dieta; stile di vita

CONTENTS

Abstract/ English	1
Abstract/ Italian	2

01

Chapter 1 Introduction

1.1 project background	7
1.2 research object and content	9
1.3 research basis	10
1.3.1 relevant research abroad	10
1.3.2 relevant research in China	20
1.4 research tools	21
1.4.1 product service system design	21
1.4.2 service design on obesity issues	23
1.5 research purpose	24
1.6 research value	24
1.7 research plan	24
Summary	

02

Chapter 2 Obesity in China

2.1 childhood obesity	25
2.1.1 current situation and developing trends	26
2.1.2 forming reason	27
2.1.3 solutions	28
2.2 family environment	31
2.2.1 parents status	31
2.2.2 grandparents status	32
2.3 society environment	32
2.4 domestic policy and measure	36
Summary	

03

Chapter 3 Service system design process

3.1 application of design method	39
3.2 service design elements	39
3.2.1 define target user	39
3.2.2 user interview	41
3.2.3 create persona	49
3.2.4 insights and how might we	50
3.2.5 scenes segmentation	52
3.2.6 pain points	60
3.3 Identify Opportunity	60
3.3.1 design opportunity	60
3.3.2 stakeholders map	62
3.3.3 ecosystem	63
3.4 Case studies	63
3.5 Position map	74

04

Chapter 4 Design deliver

4.1 design brief	75
4.1.1 value	76
4.1.2 mission	76
4.1.3 vison	76
4.2 offering map	77
4.3 system map	78
4.4 touchpoint design	79
4.4.1 branding	80
4.4.2 app design	83
4.4.3 website design	89
4.4.4 environment design	91
4.5 scenarios	93
4.6 service blueprint	94

05

Chapter 5 Business plan

5.1 entity define	96
5.2 business canvas	99
5.3 pilot area	101
5.4 iteration and modify	104
Conclusion	105

Acknowledgements	106
-------------------------	-----

Bibliography	107
---------------------	-----

Report	108
---------------	-----

FIGURES

Figure 1.1-1 Overall searching trend for healthy diet	8
Figure 1.1-2 Overall searching trend for health	8
Figure 1.1-3 Searching trend on PC for health	8
Figure 1.1-4 Overall searching trend for obesity	8
Figure 1.1-5 Searching trend on mobile device for obesity	8
Figure 1.1-6 Overall searching trend for diabetes	9
Figure 1.1-7 Overall searching trend for chronic diseases	9
Figure 1.3.1-1 Body Mass Index Chart (WHO)	10
Figure 1.3.1-2 CDC BMI-for-age growth Chart	11
Figure 1.3.1-3 Weight-for-Height Girls Chart	12
Figure 1.3.1-4 Weight-for-Height Boys Chart	12
Figure 1.3.1-5 BMI-for-age Girls Chart	13
Figure 1.3.1-6 BMI-for-age Boys Chart	13
Figure 1.3.1-7 Obesity among adults, 2015 or nearest year	15
Figure 1.3.1-8 Rising overweight (including obesity) rates	15
Figure 1.3.1-9 Self-reported overweight (including obesity) in children	16
Figure 1.3.1-10 Obesity in children aged 3-17 years	16
Figure 1.3.1-11 Projected rates of obesity	17
Figure 1.3.1-12 Food policies to prevent obesity in selected countries	19
Figure 1.4.1-1 Double Diamond model	22
Figure 2.1.1-1 Related data on obesity group	26
Figure 2.1.1-2 The teenagers weight stays shown by BMI index	27
Figure 2.1.2-1 Proportion of teenagers eating breakfast and night snacks	27
Figure 2.1.3-1 Three minus points and three healthy points	28
Figure 2.1.3-2 Exercise frequency of children and their parents	29
Figure 2.1.3-3 Anxiety reasons for obese boys and girls	30
Figure 2.3-1 Map of Shanghai and the restaurants number chart	33
Figure 2.3-2 Typical diet during workdays	34
Figure 2.3-3 Different ages consumption preferences during the day	34
Figure 2.3-4 Catering order charts (1)	35
Figure 2.3-5 Catering order charts (2)	35
Figure 2.3-6 Chinese food/ fast food/ tea-based drink related consumption	35
Figure 3.2.1-1 Frame the design challenge	40
Figure 3.2.2-1 Interview questions for the doctor	41
Figure 3.2.2-2 Causes of obesity	42
Figure 3.2.2-3 Interview questions for the family	44
Figure 3.2.3-1 Persona	49
Figure 3.2.3-2 Characteristic of the persona	49
Figure 3.2.4-1 Insights statements	50
Figure 3.2.4-2 How might we questions	51
Figure 3.2.5-1 Diet journey of the whole family	52
Figure 3.2.5-2 Activities of the whole family	54
Figure 3.2.5-3 Drinking rate for Chinese men	55
Figure 3.2.5-4 Relations between educational level and drinking rate	56

Figure 3.2.5-5 Recommendations on drinking amount	57
Figure 3.2.5-6 User journey map	58
Figure 3.3.1-1 Needs and possible solutions	61
Figure 3.3.2-1 Stakeholders map	62
Figure 3.3.2-2 Stakeholders map 2	62
Figure 3.3.3-1 The ecosystem	63
Figure 3.4-1 Case studies (1)	64
Figure 3.4-2 Case studies (2)	65
Figure 3.4-3 Case studies (3)	66
Figure 3.4-4 Case studies (4)	67
Figure 3.4-5 Case studies (5)	68
Figure 3.4-6 Case studies (6)	69
Figure 3.4-7 Case studies (7)	70
Figure 3.4-8 Case studies (8)	71
Figure 3.4-9 Case studies (9)	72
Figure 3.4-10 Case studies (10)	73
Figure 3.5-1 Position map	74
Figure 4.1.1-1 Values, mission and vision	76
Figure 4.2-1 Offering map	77
Figure 4.3-1 System map	78
Figure 4.4.1-1 Logo and brand name	80
Figure 4.4.1-2 Icon and color	82
Figure 4.4.2-1 App wireframe	84
Figure 4.4.2-2 Poster of the app	85
Figure 4.4.2-3 Interface design (1)	86
Figure 4.4.2-4 Interface design (2)	86
Figure 4.4.2-5 Interface design (3)	87
Figure 4.4.2-6 Interface design (4)	87
Figure 4.4.2-7 Interface design (5)	88
Figure 4.4.3-1 Website design (1)	89
Figure 4.4.3-2 Website design (2)	90
Figure 4.4.4-1 Environment design (1)	91
Figure 4.4.4-2 Environment design (2)	92
Figure 4.4.4-3 Environment design (3)	92
Figure 4.5-1 Scenarios for children	93
Figure 4.5-2 Scenarios for parents	93
Figure 4.5-3 Scenarios for retired elderly	94
Figure 4.6 Service blueprint	94
Figure 5.1-1 Award lists	97
Figure 5.1-2 Entity cooperation	98
Figure 5.2 Business canvas	100
Figure 5.3-1 Pilot area (1)	101
Figure 5.3-2 Pilot area (2)	102

01 INTRODUCTION

1.1 PROJECT BACKGROUND

The project starts with two words “healthy diets” which is perused by modern generations in China, including the 1980s and 1990s, healthy diets has been a popular global topic as well. When I research deeper with those questions, like “What does ‘healthy’ mean in China?” or “What motivates people to go for healthy food and what are the barriers for eating healthy?”, I found the fact which together with huge and horrible numbers.

China has the world’s largest obese population, with 43.2 million obese men and 46.4 million obese women, accounting for 16.3% and 12.4% of the world’s total, respectively. The United States ranked second among 41 million 700 thousand obese men and 46 million 100 thousand obese women. Among the severely obese population, China rose from 60th and 41st in 1975 for men and women, second after the United States.

The obese issue will be an unprecedented threat to the health, the serious obesity crisis is approaching, diseases leading by high fat and high sugar diet are becoming much more frequent.

When I turned to the “Baidu Keyword Index”, searching ‘healthy diet’ as the keyword, the diagram showed as figure 1.1-1.



Figure 1.1-1 Overall searching trend for healthy diet

It's obvious that fewer and fewer people search the 'healthy diets' in 7 years. (data from 01/01/2011 to 29/05/2018). Then I change to the related word, like 'health', the trends were showed as follows (figure 1.1-2, 1.1-3).



Figure 1.1-2 Overall searching trend for health



Figure 1.1-3 Searching trend on PC for health

No matter which device, the trend is downward. When searching the obesity as the keyword, it totally changed (figure 1.1-4, 1.1-5).



Figure 1.1-4 Overall searching trend for obesity

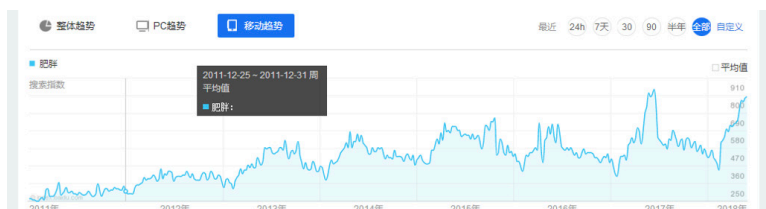


Figure 1.1-5 Searching trend on mobile device for obesity

Research object and content

It's an upward searching trend for obesity, especially on the mobile device, which we could understand the power of the mobile phone. After the surprising finding, I searched those two 'diabetes' and 'chronic diseases' as the last try (figure 1.1-6, 1.1-7).



Figure 1.1-6 Overall searching trend for diabetes

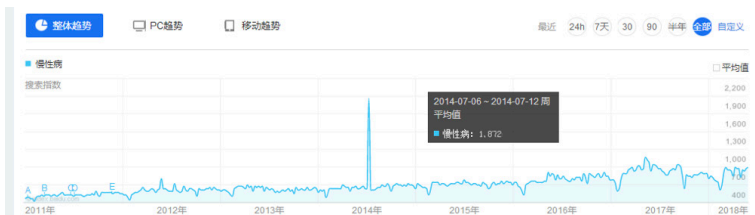


Figure 1.1-7 Overall searching trend for chronic diseases

When searching for the obesity-related words, the trends are opposite to the trends relating to health-related words. People search less for health, instead, the search for unhealthy symptoms increase dramatically. Suffering from obesity and diseases, Chinese people start to search for solutions.

The healthy diet is one of the solutions to improve obesity issue, even people concern a lot about healthy diets, the core problem is on the obesity issue behind its popularity.

1.2 RESEARCH OBJECT AND CONTENT

1. Research object

The research object of this thesis is the obesity group in China, mainly focusing on the obese children and their living families, big social environment included as well.

2. Research content

- Childhood obesity research in China (current situation, developing trends, forming reasons, solutions)
- family environment
- society environment
- domestic policy and measure

1.3 RESEARCH BASIS

1.3.1 Relevant research abroad

What is obesity?

According to WHO (World Health Organization), obesity and overweight are defined as abnormal or excessive fat accumulation that may impair health. How to tell the degree of fat accumulation? In which it is abnormal or in which it is normal? Body mass index (BMI) was created as a simple index of weight-for-height which is widely used to classify obesity and overweight among people.

What is the BMI index?

It was first been proposed that anthropometry is a way to predict growth performance, reflecting overall health condition (WHO, 1995). And the universal index was invented by Adolphe Quetelet (1796-1874) in 1832, which is the ratio of the weight in kilograms by the square of the height in meters (Kolimechkov, 2014). The index was officially named the Body Mass Index in 1972 by Ancel Keys (Eknoyan, 2007).

$$\text{BMI (kg/m}^2\text{)} = \text{Body weight (kg)} / \text{Height (m)}^2$$

WHO defines that:

-overweight is the BMI equal to or greater than 25

-obesity is the BMI equal to 30 or even greater than 30.

Which is normally be heard to tell the adult is obesity or not (see figure 1.3.1-1).

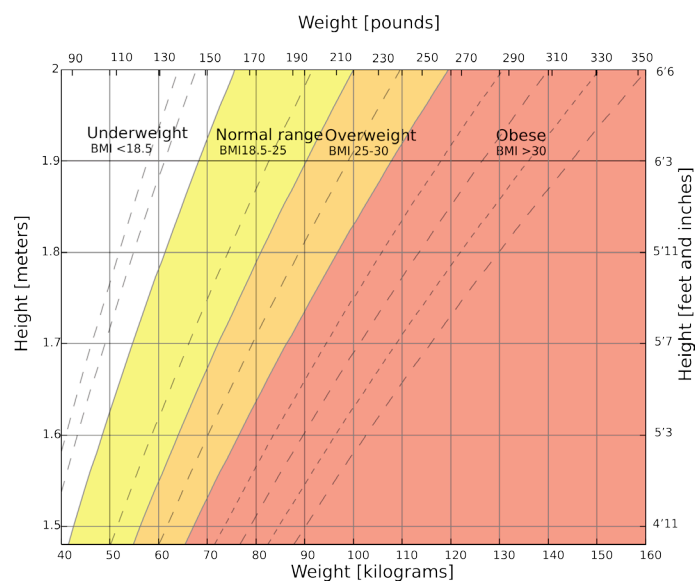


Figure 1.3.1-1 Body Mass Index Chart (WHO)

As the chart demonstrates, when the score is under 18.5, the individual is underweight. The score that is between 18.5 and 24.9 represents you are in a normal range. Ranging from 25 to 29.9, the person is overweight and when the score is over 30, sadly, he or she is obese.

Currently, BMI is considered as the most useful population-level measure of overweight and obesity which is adapted to all ages of adults, no matter male or female, WHO claims that it is still a rough guide because different individual varies, they may not correspond to the same level of body condition.

BMI for children

The calculating way is exactly the same for children, while to tell the children is obese or healthy, the criteria are totally different from it used for adults. For the reason that the amount of body fat change along with the age and it differs between boys and girls, BMI age- and sex-specific are adopted for a more scientific research (Kuczmarski, 2000). New methods are explored to assess the amount of fat based on two skin folds (Boye et al., 2002) which is widely used in Europe and America (Slaughter et al., 1988).

A new growth chart (see figure 1.3.1-2) was published by the Centre for Disease Control and Prevention USA (CDC) which considers the two elements and translation of a BMI number into a percentile for a child's sex and age (Kolimechkov, 2014).

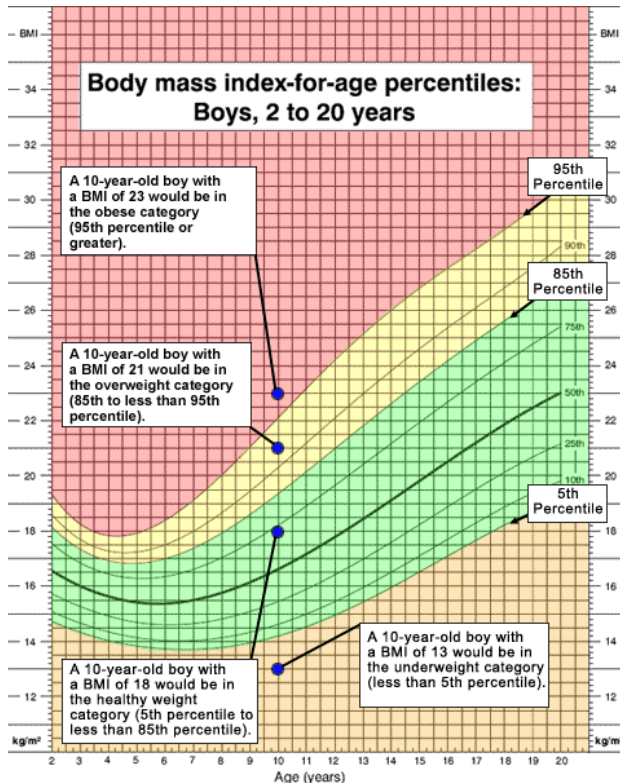


Figure 1.3.1-2 CDC BMI-for-age growth Chart

Apart from the chart above, WHO published some more detailed charts to interpret childhood obesity. As they described (figure 1.3.1-3, 1.3.1-4), overweight and obesity are defined for children whose ages are between 5 and 19 years:

- 1) overweight is BMI-for-age greater than 1 standard deviation above the WHO Growth Reference median

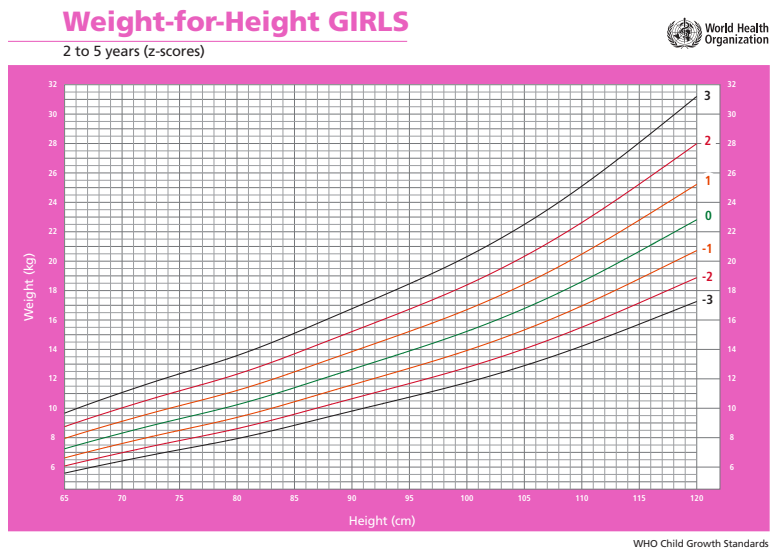


Figure 1.3.1-3 Weight-for-Height Girls Chart

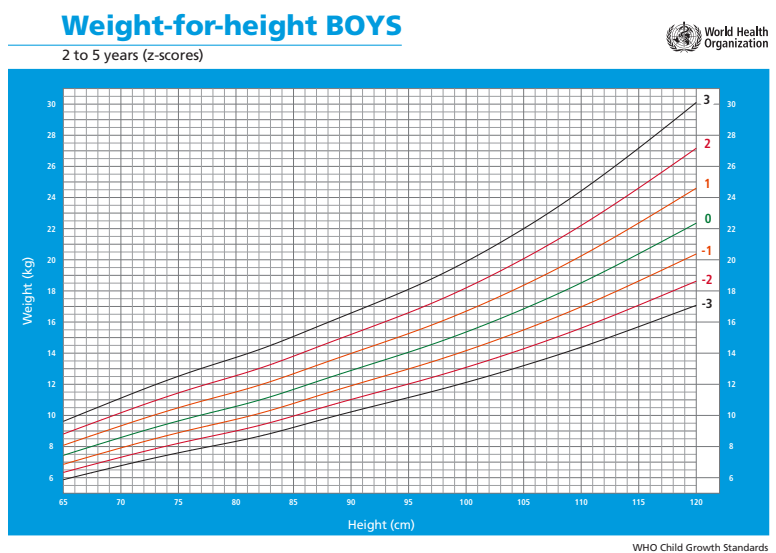


Figure 1.3.1-4 Weight-for-Height Boys Chart

For children who aged from 5 to 19 years old, parents should check their kids' scores from those two charts: [figure 1.3.1-5, 1.3.1-6]

- 1) overweight is BMI-for-age greater than 1 standard deviation above the WHO Growth Reference median
- 2) Obesity is greater than 2 standard deviations above the WHO Growth Reference median

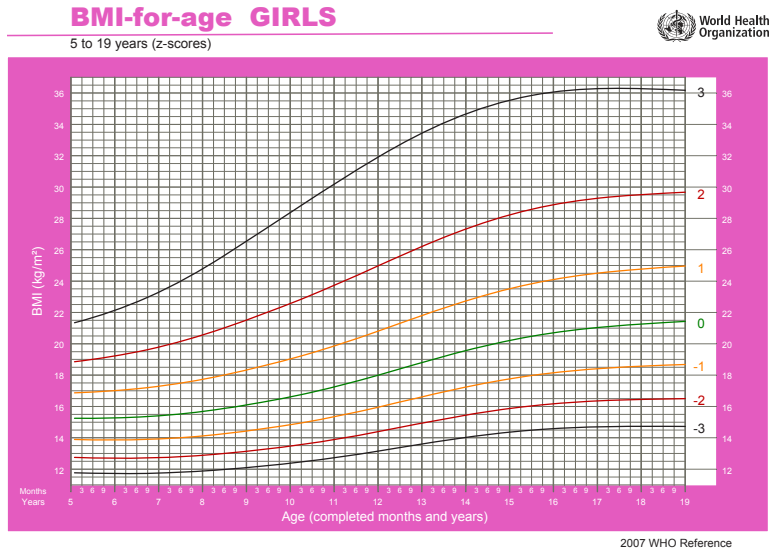


Figure 1.3.1-5 BMI-for-age Girls Chart

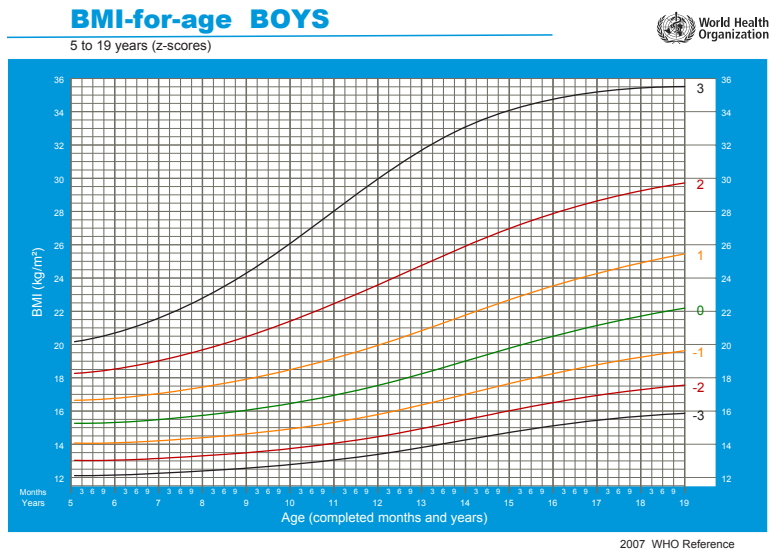


Figure 1.3.1-6 BMI-for-age Boys Chart

Causes and hazards

The fundamental element leading to obesity and overweight is the energy imbalance, between the calories intake and calories expended (WHO, 2015). There is a typical number of calories you should take into balance what you expend every day, if you take in calories over that and not expend them, that over part will transform to fat, eventually, the accumulation leads to overweight or obesity. To say it simply, obesity is mostly caused by eating too much and exercising too little, above all, we have a modern and enjoyable lifestyle. Besides, changing work, overusing technology, and the living environment, those all can be the invisible factors contributing to our weight (NHS Choices, 2018).

General speaking, obesity is a major risk factor to increase the likelihood of various diseases, for example, cardiovascular diseases, type 2 diabetes, certain types of cancer and so on (Haslam and James, 2005). Remarkably, cardiovascular diseases which are mainly heard as heart disease and stroke were the leading cause of death in 2012 (WHO, 2015).

Facts about overweight and obesity

It's because obesity is related to such diseases, people around the world have been paying attention to this topic and related data closely.

Data from WHO, since 1975, obesity in worldwide level, has been nearly tripled. There are more than 1.9 billion adults which are including the 18 years old and the older being named "overweight" in 2016. Of these, over 650 million were obese. Comparing to the total population, it means 39% of adults were overweight and 13% belonged to the obese group. Which we can not ignore among those data is the number of overweight or obese children and adolescents reached 340 million (WHO, 2015).

OECD which is an intergovernmental economic organization including 36 member countries releases a report on obesity in 2017. It elaborated the obesity issue from the perspective of nations by comparing to others and data from past years.

As is illustrated above (figure 1.3.1-7), 19.5% of the adult population was obese among the OECD, data ranges from 6% to 30%. Since the 1990s, the rates of overweight and obesity has increased rapidly in England, the United States and Mexico, while the trends for other nation have been grown slower. Unfortunately, the overall obese population is growing (figure 1.3.1-8).

Relevant Research Abroad

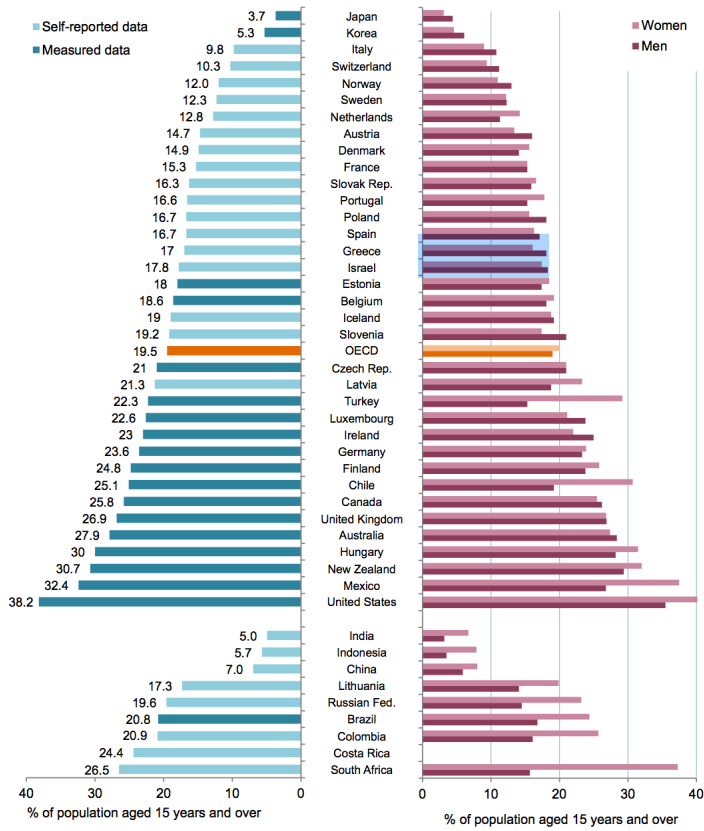


Figure 1.3.1-7 Obesity among adults, 2015 or nearest year

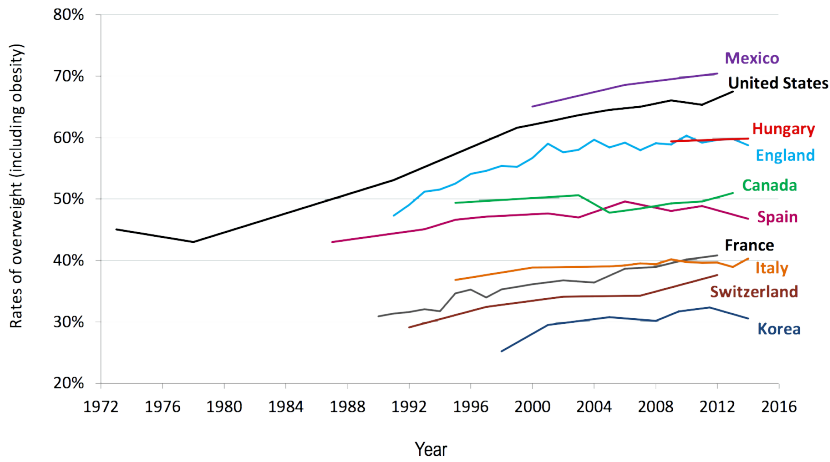


Figure 1.3.1-8 Rising overweight (including obesity) rates in adults aged 15-74 years

The rate of overweight or obese children ranges from 10% to 31% (figure 1.3.1-9). Although policies have been set in those countries for several years, from the diagram (figure 1.3.1-10), we can see their effects while the trends are still upward in 10 years.

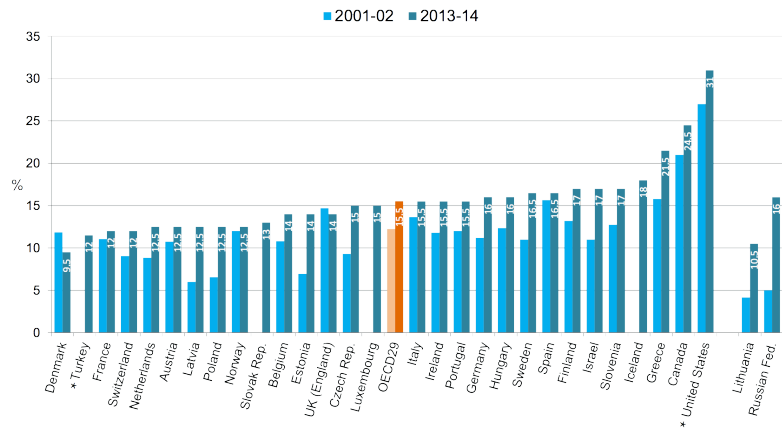


Figure 1.3.1-9 Self-reported overweight (including obesity) in children

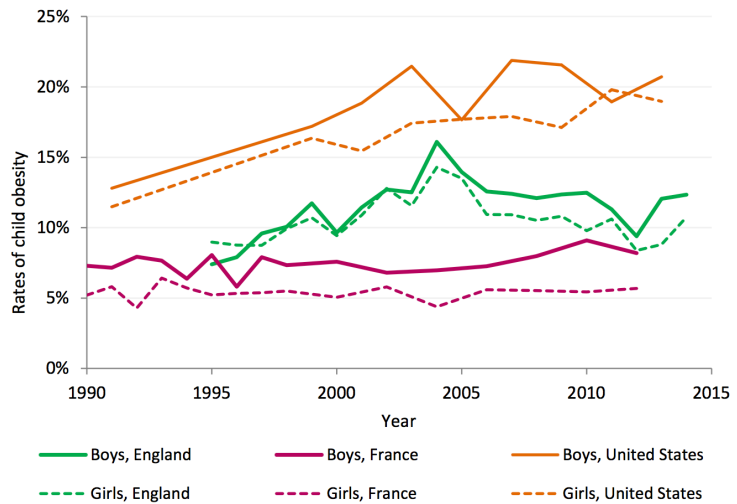


Figure 1.3.1-10 Obesity in children aged 3-17 years

As the diagram shows (figure 1.3.1-11), the projections from OECS is a steady growth for obesity rates. The rates in the United States, Mexico and England will increase rapidly according to the estimate. The obesity rates are projected to increase at a slower pace in Korea and Italy in which rates have been initially low (OECD, 2017).

Definitely, the rising rates of obesity have already received huge attention in countries all over the world, while the effect on the trends of obesity seems not that positive as imagined.

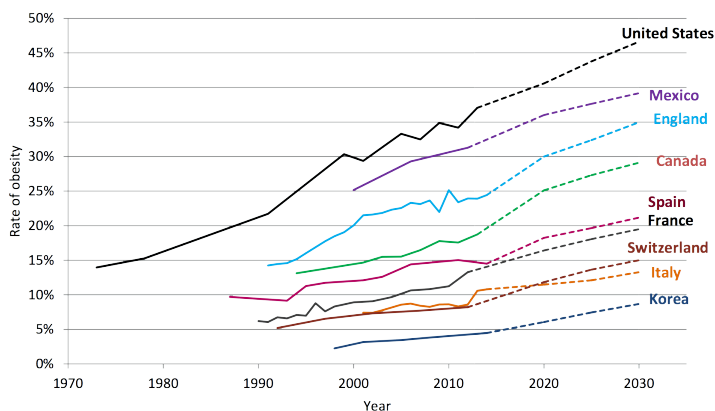


Figure 1.3.1-11 Projected rates of obesity

Scientific discovery

Based on the staggering increasing number on the amount of overweight and obese population, doctors and scientists have been researched on the topic for years and they evidenced some conjectures.

Early in 1988, researchers in the United States began their study on 16,884 adults who are 25 years and older, all belong to the overweight and obese group. They tried to find if there any linking between obesity and diseases like type 2 diabetes mellitus and high blood pressure or osteoarthritis. The results accorded with the conjecture. With the increasing severity of obesity, the prevalence ratio increased a lot and generally they were even greater in younger people than in older people (Must and Spadano, 1999). Conclusively, overweight and obesity were convinced to be related to the increased incidence of diseases like type 2 diabetes, hypertension, some certain cancers, stroke and cardiovascular disease (Burton and Foster, 1985). There were associations between the obesity and obesity-related mortality, and it may show some differences on different racial and ethnic groups (Wienpahl and Ragland, 1990; Stevens and Plankey, 1998; Savage and Harlan, 1991).

By analyzing data from 67.8 million individuals between 1980 and 2015, some researchers tried to assess the trends of obesity prevalence among children and adults. With the help of the Global Burden of Disease study data, quantifying the disease with BMI could be realized. In 2015, obesity gave 107.7 million children and 603.7 million adults troubles over the

world. The prevalence of obesity has doubled since 1980, more than 70 countries were influenced and the number is continuously growing. Despite the prevalence of obesity in children has been lower than the adults, the rate of growth in childhood obesity was higher than it in adults. Also, the data interprets, the high BMI reached for 4.0 million deaths globally, over two-thirds of deaths associated with high BMI were because of cardiovascular disease (N Engl J Med, 2017).

In addition, a result was mentioned that the childhood obesity may have detrimental consequences for childhood self-esteem, and the decreasing level of self-esteem, would be shown as the higher rates of sadness, loneliness, and nervousness. Those disturbing elements are likely to driven children involved with behaviours with high risks such as drinking or smoking (Strauss, 2000).

While researching the connections between obesity and diseases, scientists are trying to figure out what are the causes of obesity. Applied to both the childhood and adults obesity, the unbalance among energy requirements, nutrient partitioning, dietary intake, and physical activity, contributes to the growth of obesity (Roland and Weinsier, 1999). Reflecting those unbalance to real life, it could be insufficient energy intake, undernutrition or malnutrition, unhealthy diets and less exercise or even the combination of those symptoms. Also, the genetic influence behind each element cannot be forgotten. Behavioural geneticists have proved some expressions in the mathematical way which interprets that environment and behaviour are the two significant roles in determining the body weight (Roland and Weinsier, 1999; Ebbeling and Pawlak, 2002).

Policy and measure

Faced with the rise in obesity population, over the past years, a series of interventions related to the food environment and food system was proposed, wishing to improve the obesity issue. For instance, restrictions on the advertisements on unhealthy snacks for children, the improvement of school meals and adding taxes on that unhealthy food. If the government wants to advocate or operate those policies, their effectiveness, feasibility, and sustainability have to be tested in various environments (N Engl J Med, 2017). Researches from the United States already held a negative opinion to this. That series of policies that may potentially help Americans turn the corner on obesity is as long as the list of factors which affects people's diets and their lifestyle. The list of unintended consequences resulting from the policies maybe even longer, an apparent policy may give us a surprising answer. As an example, adding taxes on snacks may put consumers turn to other unhealthy food, instead of the taxed food. While setting restrictions on food advertising could generate the food price falls. The overflow on food policy has a great possibility to bring unintended consequences (Kuchler and Golan, 2005).

Here is the table (figure 1.3.1-12) summarising recent food policy changes in countries, including national nutrition education efforts, school-focused food policy, food labeling, food marketing, and pricing.

Table 1

Food policies to prevent obesity in selected countries

Policy type					
Country	School-focused	Labeling: packaging and restaurants	Marketing	Pricing	Nutrition education/national dietary guidelines
Australia [13, 69]	2010 National Healthy School Canteens Guidelines	Health star rating system for front-of-pack labeling	Australian Food and Grocery Council-issued self-regulated codes for marketing unhealthy foods to children		Australia New Zealand Food Standards Code—Standard 1.2.7—Nutrition, Health and Related Claims: issued by Department of Health and Aging in 2013 Infant and young children feeding policies
Bangladesh [70]					
Brazil [71, 72]	As of 2001, regulations require 70% of food to be fresh or minimally processed As of 2009, the law requires 30% of food to be purchased from local family farms and their cooperatives	National Food and Nutrition Policy (NFNP) issued in 1999, updated in 2011; includes regulatory actions for nutritional labeling	Regulations for food marketing to infants and young children, since 2006		National Food and Nutrition Surveillance System; provides data on dietary and nutritional information at population level Food Guide for the Brazilian Population issued in 2006; guide for children under age 2 issued in 2002 Interministerial network to promote dietary and nutritional education since 2012 NFNP issued in 1999 and updated in 2011; health educators can promote healthy diets with media Canada's Food Guide, since 1942
Canada [73, 74]		Provincial requirement that all prepackaged foods have nutrition labeling			
Chile [75]		Food Labeling and Advertising law in effect since 2012: front-of-pack labeling	Food Labeling and Advertising law in effect since 2012: restricts unhealthy food marketing to children		
China [76]	Guidelines on snacks for children and adolescents, issued in 2008	General Rules for Nutrition Labeling of Prepackaged Foods (2013)			<i>Chinese Dietary Reference Intakes</i> (2000–2013 revision) 121 Health Action Strategy: 10,000 steps a day, the balance of eating and activity and a healthy life, issued by Minister of Health in 2007
Denmark [52, 77]				Tax on saturated fat (issued in 2011, removed in 2012)	
Finland [72]			Consumer Ombudsman's Guidelines on Marketing to Children		
France [52, 77]			Prohibition on food marketing in schools	Tax on SSBs (2012)	
Hungary [52, 77]				Tax imposed in 2011 on foods with high fat, sugar, or salt content	
India [78]	Complete ban on sale of junk foods and carbonated beverages near schools (2013)	Food Safety and Standards Authority of India (FSSAI)-issued guidelines recommending <10% trans since 2013	Advertising Standards Council of India regulation of junk food advertising FSSAI-issued self-regulation codes in food advertising		
United Kingdom [22, 72, 89]	Healthy Weight, Healthy Lives, a national strategy adopted in 2008 to promote a healthy diet Mandatory nutritional standards for school food Voluntary food guidance in preschools Government Buying Standards for Food	Voluntary "traffic light" front-of-pack labeling Voluntary calorie labeling on menus for standard government purchase	Restrictions on television advertising of unhealthy foods to children		Eatwell Plate Cooking in curriculum for students aged 11–14 y
United States [26, 27, 66, 90]	HHFKA (2010) Nutrition Standards in the National School Lunch and School Breakfast Programs (by USDA) "Smart Snacks in School" standards (first nutritional guidelines for school snacks)	Food labeling guidelines Voluntary "Facts Up Front" system by food industry	Self-regulatory standards for food and beverage marketing to children younger than 12, established by the Children's Advertising Review Unit and Children's Food and Beverage Advertising Initiative under the Council of Better Business Bureaus (BBB)	>40 states and some cities implemented SSB taxes	<i>Dietary Guidelines for Americans</i> , published jointly every 5 y since 1980 by HHS and USDA; most recent version published in 2010. The guidelines provide authoritative advice for people ≥2 y about how good dietary habits can promote health and reduce risk of major chronic diseases. They serve as the basis for federal food and nutrition education programs.

Figure 1.3.1-12 Food policies to prevent obesity in selected countries

Education on nutrition is significant for promoting healthy behaviors and healthy diets. In the past two decades, many countries have set the healthy diet guidelines to rich individuals' knowledge about nutrition and personal needs, advocating nutrition education under different circumstances, such as the Dietary Guidelines for Americans. It provides authoritative suggestions for people who is 2 years and older, presenting how a good dietary habit would protect the health and lower the risk for main chronic diseases. Also, it encourages people to take in adequate fruit and vegetables for reducing the risk of obesity and diet-related diseases (Zhang and Liu, 2014).

Researchers creatively proposed an Obesity Policy Action (OPA) framework, which is modified from the framework published by the WHO. It's a new framework which aimed at the global strategy on diet, physical activity and health, providing specific guidance for the government dealing with the obesity issue. Three different approaches are mentioned:

1) 'upstream' policy

By widely influencing the society and its economic conditions (such as tax, education and social welfare) or the environments of food and activities, make it easier for people to choose and healthy eating.

2) 'midstream' policy

It's aimed at directly disturb the population growth.

3) 'downstream' policy

It encourages health-related service and clinical interventions.

If measures are executed under this framework, no matter all sectors and levels of the government, or non-governmental organizations and private enterprises, all have the chances which they could operate freely to contribute to the decrease of obesity (Sacks and Swinburn, 2008).

1.3.2 Relevant research in China

In our previous concepts, obese people were mostly concentrated in developed countries in Europe and the United States, but the reality is that obesity rates are rising in low- and middle-income countries, and now childhood overweight and obesity growth rates in developing countries are 30% higher than in developed countries. According to the Global Burden of Disease report which is led by a team from the University of Washington, China had 57 million obese adults, only second to the United States which had 79 million obese adults. In addition, China had 15 million obese children, followed by India which had 14 million. Sadly to see the fact that China has the world's largest population of obese children. At present, China has been characterized by obesity group becoming younger and younger, and the obesity rate continues to grow.

The whole world is concerned about the childhood obesity issue, and the WHO has even set up the Commission on Ending Childhood Obesity. Obesity is much more serious than obesity in adults. As a Chinese researcher reported, who is working on a project focusing the influence of obesity on children, 45%-50% of the obese primary school students and 60%-70% of the obese middle school students are still obese in

adulthood. Moreover, compared to their peers with normal weight, obese adolescents are more likely to be depressed and form an inferiority complex and artistic personality. It's aimed to make the service more user-friendly, competitive and relevant to the customers, according to their needs.

The severity of obesity in China is not only been closely watched by China but also attracts researchers from all over the world. Those findings will be expounded in the next Chapter.

1.4 RESEARCH TOOLS

1.4.1 Product service system design

As the definition, service design is the activity of planning and organizing people, infrastructure, communication and material components of a service in order to improve its quality and the interaction between the service provider and its customers.

Five principles

Unlike UX design, when considering the concept of service design, there are five key principles that we designers have to keep in mind:

1. **User-centered:** people are at the center of the service design.
2. **Co-Creative:** Service design should involve other people, especially those who are part of a system or a service.
3. **Sequencing:** Services should be visualized by sequences or key moments in a customer's journey
4. **Evidencing:** Customers need to be aware of the elements of a service. Evidencing creates loyalty and helps customers understand the entire service experience
5. **Holistic:** A holistic design takes into account the entire experience of a service.

Service design process

In the design field, the widely accepted and disseminated design process has five steps: empathize -define-conceptual ideate-prototype-test, and the Double Diamond Design Process (figure 1.4.1-1) which is proposed by the Design Council, discover-define-develop-deliver. The common point is to start with discovery and definition, first to ensure that you are designing in the right direction, and then to go through iterative processes on concept production and testing.

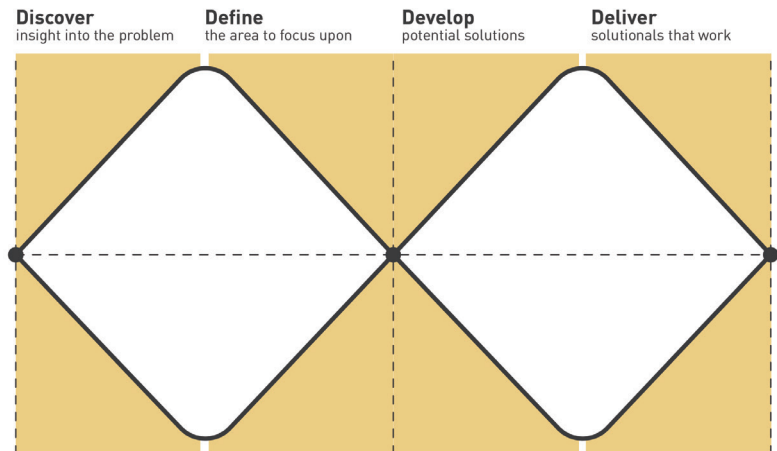


Figure 1.4.1-1 Double Diamond model

The Double Diamond model is a simple visual map to illustrate the design process. In all creative processes numerous possible ideas are created before refining and narrowing down to the best one, and this can be represented by a diamond shape. But with the Double Diamond model, it indicated that this happens twice, the first time is to confirm the problem definition and the second time is to create the solution. With the aim of creating the best idea, we designers have to iterate the process, which means the ideas will be developed, tested and refined many times, with the weak ones dropped in the process. Those iterations are inevitable and are the essential part of a good design.

There are some practical design methods, such as user personas, journey maps or service blueprint, moving a project through the four steps of the Double Diamond.

Discover

The first quarter of the Double Diamond model covers the start of the project. Designers need to observe the world from a fresh perspective, notice the common things with different insights.

Define

The second quarter is the definition stage, where the designers attempt to make the possibilities of the Discover step meaningful. Which one matters the most and should we try it first? The aim here is to develop a clear brief that frames the fundamental design challenge.

Develop

The third part represents a period of development where solutions or concepts are created, prototypes, tested and iterated. All the trials and errors happening in this process help us designers to improve and maybe need to refine the design ideas.

Delivery

The last part of the Double Diamond model is the stage of delivery, where the resulting project no matter it is a product, a service or the environment is finalized, produced and launched.

With those descriptions, seems to make the design process very complicated but it is real and a must, could offer designers a general direction to the right design (www.designcouncil.org.uk).

Value

“When you have two coffee shops right next to each other, and each sells the exact same coffee at the exact same price, service design is what makes you walk into one and not the other.”

-31 volts service design, 2008

1.4.2 Service design on obesity issues

The current approaches to the public service reform are reaching their limits. The service providers always focus on the targets that drive their performance, workers complain of their poor salary and heavy workloads, most users complain about the poor quality of service and lack of the personalization. Innovation is widespread but very difficult to operate in those public service areas because, for example, those prominent issues, including the environment, crime, public health service (smoking and obesity), cannot be adequately deal with the traditional services. The effective way is to address those social issues by professionals related to and co-work with the public individuals who are suffering from them (Cottam and Leadbeater, 2004).

More and more researchers are using the service design as the methodology for dealing with obesity and overweight issue (Rodriguez and Charvel, 2013). With the help of service design tools, we could understand the obesity from a user-centered perspective and speak out their voice in the collaboration process. Fro service design is based on a participatory mindset in the interaction of each stakeholder, it gives designer chances to get in touch with obesity group and get to know their living style and eating pattern, make the solutions more reliable and well-grounded (Dahlgren and Lycke, 2015).

Making current delivery system more efficient will not tackle the big issues on lifestyles and chronic diseases, more systematic and radical innovation methods are urgently needed, like service design, public goods and services can be created interactively, better relationship between the government and public individuals, public individuals and communities (Cottam and Leadbeater, 2004).

1.5 RESEARCH PURPOSE

The basic aim is to understand what are the reasons behind the fact that China has the largest population of childhood obesity, apart from the general aspects, diets, and moving. Get to understand how they deal with the childhood obesity and how they consider the “healthy diets” in China. Meanwhile, considering how to delivery the healthy diet and lifestyle into their daily routines.

1.6 RESEARCH VALUE

Utilising the expertise and skills of service design in areas related to public health areas, especially the childhood obesity and national health which is the becoming a worldwide epidemic. Creating solutions or improvements is extremely urgent when obesity is increasing the risk of many chronic diseases in children and adults, not only in China, the whole world is facing the obesity hazard.

1.7 RESEARCH CONTENTS

After the fundamental knowledge on obesity, especially on childhood obesity, the next research contents including, What is the current situation of childhood obesity in China? What are the forming reasons behind and possible solutions? Is the family environment a core factor for obesity childhood? How are the social environment, domestic policies, and measures?

Design process and tools from service design are going to be exercised to explore the design opportunity after those desk research and field research.

Summary

Obesity is epidemic which could result in great hazard not only to personal health level but also to nation society healthcare level. Since China is suffering the most from the obesity issue, researchers from each area are needed to show their intelligence and professional skills, helping to understand and trying to improve and solve the problems, apart from the effort from the government. As we are close enough and have the chance to get in touch with the obesity children, as we service designers have the associated skills to innovate the solution, it's our bounden duty to focus on this issue.

Numbers are overwhelming. 15 million obese children and 57 million obese adults (data until 2015), although we have a huge population base, we cannot deny it's an acid test. From the China Health Survey 2017, obesity index reached 17%. The growth rate is very speedy now, especially among adolescents.

02 OBESITY IN CHINA

2.1 CHILDHOOD OBESITY

Numbers are overwhelming. 15 million obese children and 57 million obese adults (data until 2015), although we have a huge population base, we cannot deny it's an acid test. From the China Health Survey 2017, obesity index reached 17%. The growth rate is very speedy now, especially among adolescents.

According to the report from GAIN (Global Alliance for Improved Nutrition), from 1980 to 2013, the amount of overweight and obese girls under 20 increased by 211% in China, while the amount of overweight and obese boys under 20 increased by 233%. The number of overweight and obese women aged 20 and older increased by 111%, and the number of overweight and obese men aged 20 and older increased by 195%. It was pointed out by the National Health Planning Commission in the "Report on nutrition and chronic diseases of the Chinese residents" in 2015, the overweight rate of adults aged 18 years and over was 30.1%, obesity rate was 11.9% in 2012, increased by 7.3% and 4.8% from 2002 to 2012. The overweight rate of children and adolescents aged 6-17 was 9.6% and the obesity rate was 6.4%, from 2002 to 2012. It increased by 5.1% and 4.3% by 2012. With its demographic advantage, China has contributed nearly 90 million obese people to the world, ranking first in number.

2.1.1 Current situation and developing trends

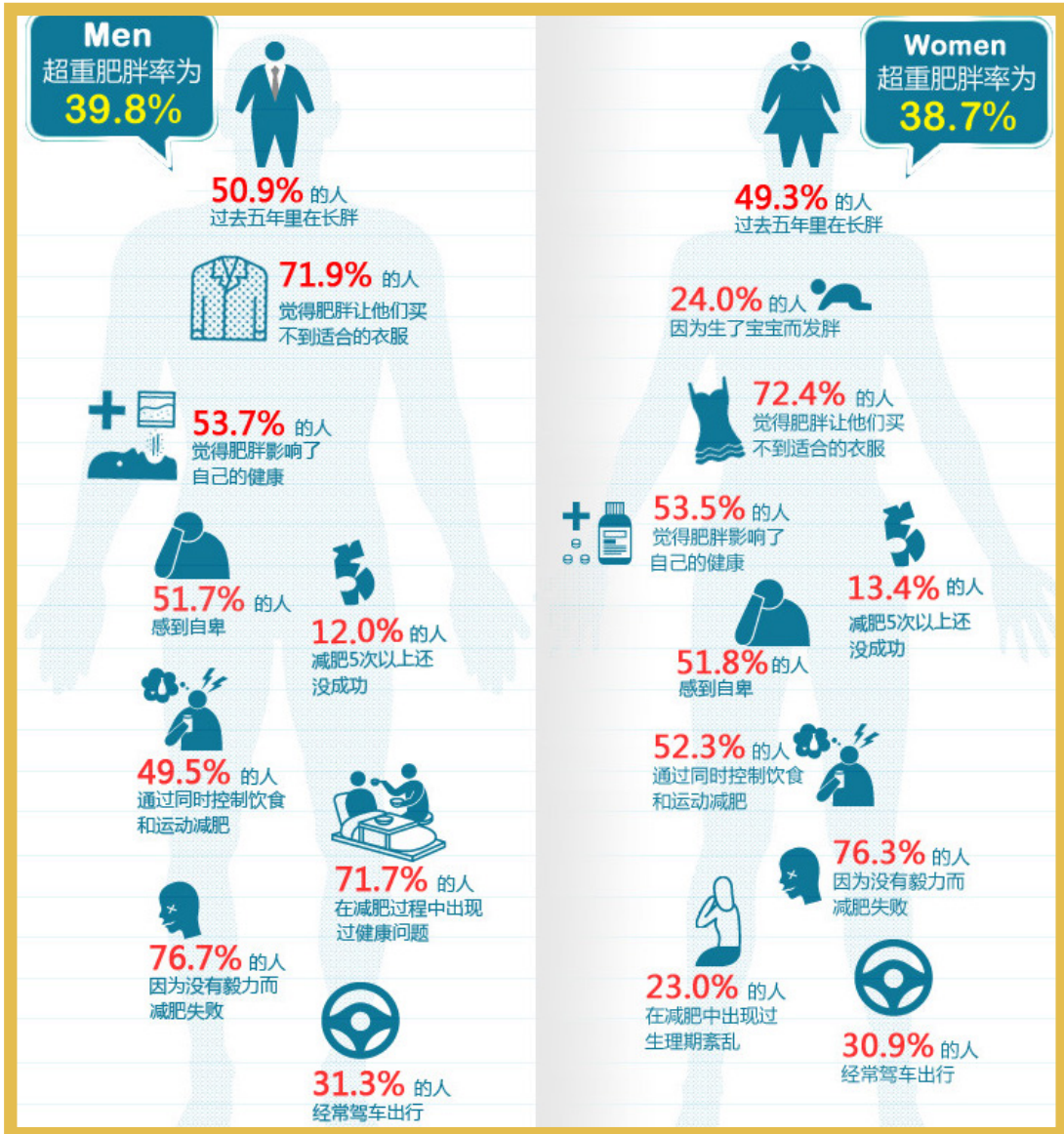


Figure 2.1.1-1 Related data on obesity group

As it illustrated (figure 2.1.1-1), the rate of overweight and obesity was 39.8% for men and 50.9% were gaining weight in the past five years. 71.9% felt that obesity made them unable to buy the suitable clothes; 53.7% felt that obesity affected their health; 51.7% felt low self-esteem; 12.0% tried to lose weight more than five times and not succeeded; 49.5% of the people attempted to lose weight through control of diet and exercise in the meantime; 71.7% of the people had health problems in the process of losing weight; 76.7% failed to lose weight for lack of perseverance, and 31.3% of them often drive out. Data was a little different for

women, the rate of overweight and obesity was 38.7% and 49.3% were gaining weight in the past five years; 24.0% were gaining weight after the birth of her child; 72.4% feel obesity worried when they cannot buy suitable clothes; 53.5% considered obesity influenced their health; 13.4% failed to lose weight more than 5 times; 51.8% felt low self-esteem; 52.3% attempted to lose weight through control of diet and exercise in the meantime; 76.3% failed to lose weight for lack of perseverance; 23.0% suffered the physiological disorder of their periods while they were on diet; 31.3% of them often drive out.

Forming reason

In addition, detailed research on children also is highlighted (figure 2.1.1-2). While paying attention to obesity, we should not ignore the present situation of underweight.

23.1% of the invested adolescents were underweight, 16.8% were overweight or obese and 45.5% were in the normal range of weight in their age, it means more than 50% were unhealthy. Attention should be paid to both on underweight and overweight. The development trend of adolescents' body shape can be seen as "fatter and fatter".

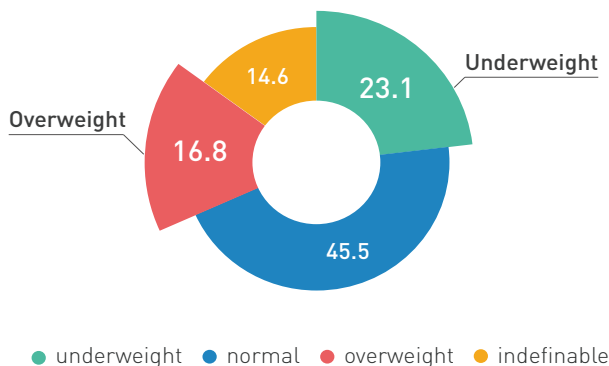


Figure 2.1.1-2 The teenagers weight stays shown by BMI index

2.1.2 Forming reason

Because they have not cultivated good eating habits and a balanced nutrition foundation since childhood, their body shape and weight reflected the problem "malnutrition when they are young, over nutrition when they are older".

For obese and overweight adolescents, eating habits are still one of the most important causes of weight change.

Skipping breakfast is a bad behavior. The survey shows that the proportion of teenagers eating breakfast is gradually decreasing with age: 95.7% of teenagers aged 7-12 eat breakfast, but 90.7% of teenagers aged 16-18 eat breakfast. The proportion of teenagers aged 7-12 who ate night snack increased with age: only 9.7% of them ate night snack, but 23.9% of teenagers aged 16-18 (figure 2.1.2-1).

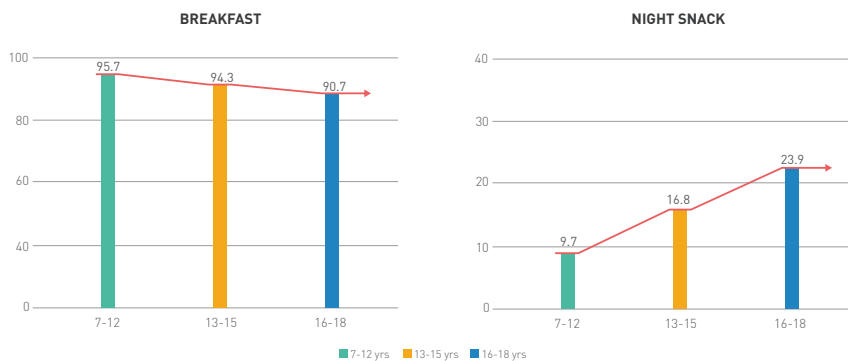


Figure 2.1.2-1 Proportion of teenagers eating breakfast and night snacks

Children who often eat night snacks easily have difficulty consuming calories, which may lead to fat accumulation and obesity after a long period of time. Parents did not have a perfect control over adolescent dessert intake: 34% of adolescents ate desserts at least four or more a week. The fundamental factor that influences the energy intake is the ratio of sugar and fat. Desserts have relatively high sugar and are more likely to cause fat accumulation and metabolic disorder or abnormal glucose metabolism.

Adolescents have less exercise time during daily life.

The most common sport for teenagers is walking or fast walking, followed by running and badminton. Nearly 68.6% of the adolescents exercise at school less than 2 hours one week. Among the most commonly used weight loss method, 'pure exercise' accounts for 74.3%, followed by 'diet control with exercise' (23.8%). Walking or brisk walking, running, and badminton are all aerobic sports, and badminton is a mixed energy-supply sport dominated by aerobic energy.

2.1.3 Solutions

Diets

No natural food is perfect, and no food can provide all the nutritional needs of the body, so the diet should be diversified. Parents should teach their kids from their perspective. They must make three meals a day, quantify them regularly, no picking food, do not smoke and drink, appropriately increase physical activity, guide children with actively eating and exercise. Increase the intake of energy and protein appropriately, requiring high-quality protein to account for 1/3-1/2 or more; ensure adequate carbohydrates, especially through fresh vegetables and fruits to increase the supply of vitamins and minerals, while according to the amount of perspiration to timely replenishment of water (a small number of times).

“Three minus points and three healthy points” is the healthy lifestyle advocated by the report. What is the three minus points? That is the salt reduction, oil reduction, and sugar reduction. What are the three healthy points? It is the healthy oral cavity, healthy weight, and healthy bones (figure 2.1.3-1).

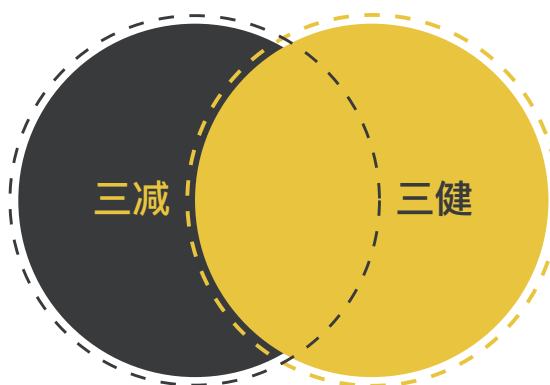


Figure 2.1.3-1 Three minus points and three healthy points

-Salt reduction

Salt is a must take-in food for the human body, but taking in over the suggested amount will be harmful to the human body, one hazard which has been evidenced by a large number of scientific research is the risk factor for high blood pressure. High blood pressure can cause stroke, coronary heart diseases and so on.

-Oil reduction

The recommended amount by the Dietary Guidelines for Chinese Residents is 20-30 grams. Now the real take-in amount is about 42 grams a day, and it has already exceeded a lot. The biggest problem it brings is the excessive fat intake. Salt has the character of high energy, hard to consume, it would result in hyperlipidemia, obesity, diabetes, and hypertension.

-Sugar reduction

Individuals are encouraged to drink boiled water instead of sugary drinks. Fizzy drinks are full of adding sugar which can also be converted into fat, directly causing diabetes, cardiovascular.

-Healthy oral cavity

In particular, elderly people and children who have the decayed tooth, are the two main group needing to focus on oral cavity condition.

-Healthy weight

A healthy weight is an important part to guarantee our health, overweight and obese group need to take it seriously.

-Healthy bones

Unhealthy bones condition may be resulted by children lacking sports, too much sugar, and carbonated drinks. Also, those factors can be the reasons for osteoporotic elderly falling.

Exercise

Summer vacation is a golden period for parents and children to cultivate a good diet and exercise habits. Parents should be a healthy leader. There is a positive correlation between the size of the parent and the size of the child. Among overweight and obese adolescents, mostly, one of their parents is overweight or obese. Besides, researchers find that parents' exercise frequency is also positively related to the child's exercise time (figure 2.1.3-2).

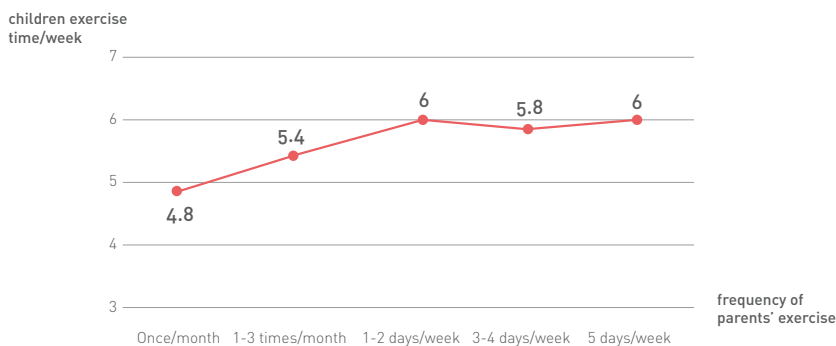


Figure 2.1.3-2 Exercise frequency of children and their parents

The report emphasizes that the core of losing weight is to keep energy in and out to achieve a "negative balance". Simply speaking, it is necessary to eat less and exercise more. It is suggested that we should cooperate with exercise on the basis of reasonable diet control to achieve the goal. No matter which kind of exercise, only the time, intensity and frequency are guaranteed, energy can be consumed to achieve the goal of losing weight after long-term trying. If trying the jogging method, generally the recommended time is 30 minutes, it's better to last for more than one hour if you are fast walking. It's suggested that adolescents take appropriate exercise to promote the weight loss. Through exercise, you can gain lean weight, which is the weight without fat. Being lean not only improves your basal metabolism, but also makes you look stronger, more beautiful, and more energetic.

Psychological care

20% of teenagers have body anxiety. Many young girls are always considering losing weight, and sometimes when they eat too much, they have to do more exercise or eat less next time to make up for it. In fact, physical anxiety is also common among adolescents who are physically and psychologically sensitive in their ages.

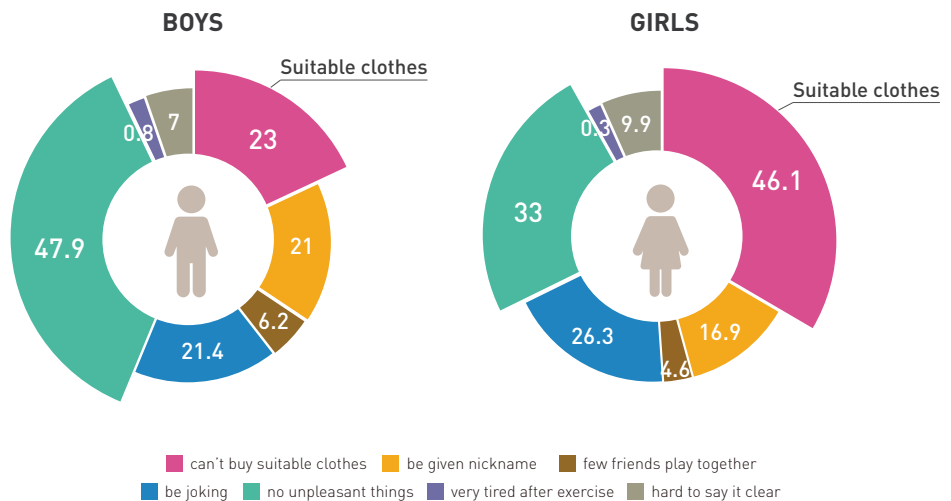


Figure 2.1.3-3 Anxiety reasons for obese boys and girls

Boys were more positive to the overweight body shape, 47.9% thought their body shape didn't bring worries. Comparatively, only 33% of the girls thought their overweight body shape didn't bring worries, and the rate of can't get suitable clothes for girls was twice as it for boys (figure 2.1.3-3). In the perspective of overweight children, the biggest worry of body shape was that they can not buy the right clothes, be joked, nickname and other psychological problems. From the results of the investigation, the top reason for girls to lose weight is "wish to look better" (55%); for boys is "improve physical flexibility and strength" (35.7%). Worthy to mention is that, in more than half of the families, the children themselves present their willing to lose weight. It's clear that adolescents have a strong understanding of their need to lose weight. Parents are suggested to closely care adolescents' psychological condition and offer them the right attitude to body shape, also the scientific guidelines to lose weight.

2.2 FAMILY ENVIRONMENT

2.2.1 Parents status

Most obese adolescents, they were born and grown during the implementation of One-child policy, which is the typical population planning policy of China. The One-child policy was introduced from the 1950s "recommendation" and evolved to the policy introduced between 1978 and 1980, the policy began to be formally phased out in 2015. On 29 October 2015, it was reported that the policy would be changed to a two-child policy. In reality, the new policy became effective from 1 January 2016, allowing and recommend Chinese parents to give birth to two children. From the timeline of the population policy, those 15 million obese children are growing under the one-child family environment.

A British study has found that the only child in a family is up to 30 percent more likely to be overweight than children with siblings. Studies have shown that lack of playmates of similar age at home, decreased the amount of activity, also, overindulgence and excessive diet are all contributing factors to the weight gain of the only child in a family. Parents who are smoking or being overweight also increases the risk of childhood obesity. A study from the University of London followed the weight changes of more than 11,000 children as they grew up. The study showed that children as the only child in families up to seven years of age were 25 to 30 percent more likely to be overweight than those with one or more siblings. Girls have higher possibilities to be overweight or obese, there will be one obese child in every four children, while there will be one obese boy in every six boys. The study also found that parents' lifestyle and weight were associated with childhood obesity, especially maternal obesity. Experts in charge of the study estimate that only-child girls are more likely to be spoiled and overprotected by their parents, eat more and exercise less, and have a higher risk of obesity than boys. In addition, researchers in China found that being the single-child in a family is about four times more likely to be overweight or obese than those who have siblings, and the association and influence became stronger in China. China's one-child policy might have resulted in its increasing childhood obesity rates (Min and VHC, 2017).

2.2.2 Grandparents status

There is a research revealed that affection from grandparents towards their grandkids may take a major role in contributing to the childhood obesity pandemic in China (Li and Adab, 2015). From the finding, nearly half (47.9%) of the 500 children surveyed were mainly cared for by their grandparents. Chinese children who are mainly cared for by their grandparents are more than twice as likely to be overweight or obese, compared with those who are mainly looked after by their parents or other adults. Children who are mainly cared for by a grandparent also consume unhealthy snacks and drinks more frequently.

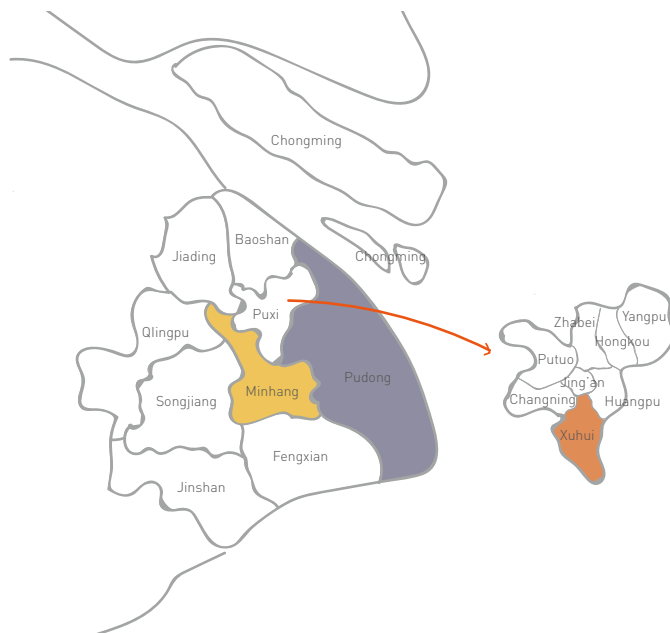
In interviews with teachers, the researchers also get to know the phenomenon that in schools, teachers always teach children to eat fewer snacks, but many parents at home like to use snacks as a reward. Moreover, this does not seem to be a problem only for grandparents. Moreover, in China, grandparents are contributing to childhood obesity through their inappropriate perception, with many sharing the belief that fat children are healthy and inaccurate knowledge, believing that obesity-related diseases only happen in adults. Grandparents will often assess weight status by comparing their grandchildren with their peers, rather than seeking the professional opinion. The inappropriate behavior of grandparents, including overfeeding and keep all the children away from household chores, is another contributing factor. Conflicts on child care beliefs and practice between grandparents and parents, and between grandparents and school teachers, are considered to undermine efforts to promote healthy behaviors in children.

Grandparents responsible for childcare is a growing social trend across the world and, especially in China, about 50% of urban families have grandparents involved in the care of children. Researchers highlight the need to include grandparents in future interventions to promote healthy behaviors among children.

2.3 SOCIETY ENVIRONMENT

Modern adolescents are living in a big society environment that numerous fast food restaurant, food trails are located around schools and companies. They are easily attracted by the advertisements of snacks or desserts through the billboards of underground, display screen on squares and even the posters on their doors. Researches put forward that the frequency of people eating in fast food restaurants is related to their weight gain and unhealthy eating habits (Jeffery and Baxter, 2006). Fast food restaurants everywhere in China are greatly adding the possibility of childhood obesity, adult obesity as well.

According to the “Report on catering industry of Shanghai in 2017”, here are the numbers for how many restaurants in each district and its proportion (figure 2.3-1).



Districts	Number	Proportion
Pudong District	9683	21.58%
Minxing District	4229	9.43%
Xuhui District	3765	8.39%
Changning District	2820	6.28%
Songjiang District	2557	5.70%
Baoshan District	2395	5.34%
Huangpu District	2055	4.58%
Jiading District	2015	4.49%
Jing'an District	1937	4.32%
Yangpu District	1866	4.16%

Figure 2.3-1 Map of Shanghai and the restaurants number chart

Pudong New District has the most restaurant which up to 9683, and the proportion reached 21.58%. The next is Minxing District, the number of restaurants is 4229, promotion reached 9.43%. Huangpu District has the highest per capita consumption of ¥129. The next is Changning District, it's ¥125 per person on average.

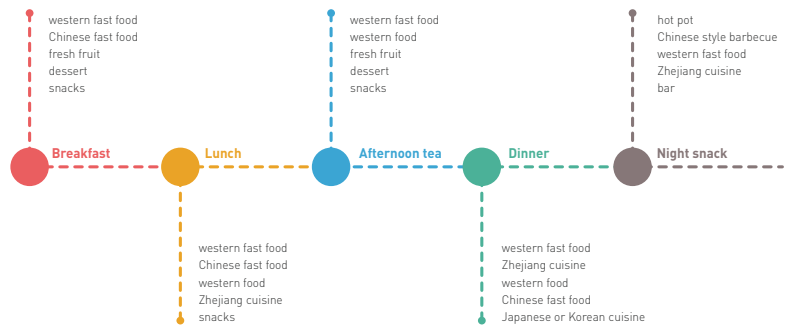


Figure 2.3-2 Typical diets during workdays

Living in this environment, people’s living style and eating habits are more likely to change together with the popular tendency. It’s the typical diets during workdays (figure 2.3-2).

It illustrates that most Chinese people are taking five meals in one day, and for each meal, they have options, such as western fast food, Chinese fast food, Zhejiang Cuisine, and Japanese Cuisine. More and more people get used to having night snack after the formal dinner which could accumulate the fat. As it shows (figure 2.3-3), the daily diet structure differs in different age group: The older you are, the healthier your diet is; The male orders more than female during the night, while the female loves afternoon tea more. With the growth of age, the share of breakfast and lunch increases among the personal catering consumption, and the share of night snack and dinner will decrease a lot. The change is mainly related to people’s pursuing a healthy lifestyle.

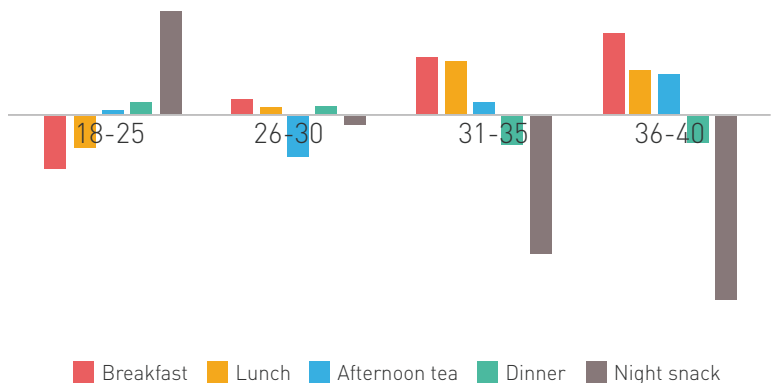


Figure 2.3-3 Different ages consumption preferences during the day

Comparatively, Family with a child is the main part of weekend catering consumption, cares about the environment and eat healthier (figure 2.3-4, 2.3-5). During weekends, a family with a child has a higher possibility

Catering order number of family with a child during workdays and weekend



Figure 2.3-4 Catering order charts (1)

Catering order number of family with/without the child during weekend

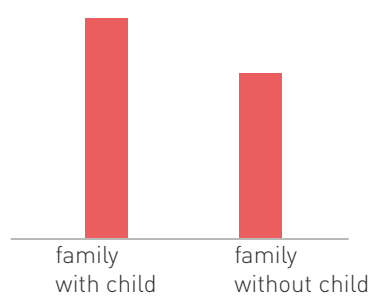


Figure 2.3-5 Catering order charts (2)

Another representative phenomenon is that Tea-based drink stores are the core connection for the consumption of a family with a child on weekend (figure 2.3-6), and that is a potential occasion for children taking in too much sugar or carbonated drinks.

‘Fast food+convenience stores’ and ‘snacks+tea-based drink’ are the most related consumption group for a family with one child on weekends. Chinese cuisine is easier to be related to tea-based drink than fast food, while individuals who consume fast food are more likely to consume in convenience stores. Those eating routines and enjoyable lifestyle are potential factors for nourishing obesity.



Figure 2.3-6 Chinese food/ fast food/ tea-based drink related consumption

2.4 DOMESTIC POLICY AND MEASURE

About fifteen years ago, the Chinese government started to realize the fundamentality of controlling the rate of overweight and obesity, as the leader of the nation, it had to play the guiding role in preventing obesity. Programs for preventing obesity and the policy decisions should be set while the childhood. The most powerful strategies have to be supported by the government, associations and the involvement of the entire society.

In 2009, the government released regulations on residents fitness to guide people better exercise. In 2010, the Ministry of Health published the "Management Approach of Nutrition Improvement Work ", aimed to increase national nutrition level and improve the health condition of Chinese residents, including nutrition surveillance, health, and nutrition education, guidance and intervention. As part of the public health policies, policies related to overweight and obesity will be adding to the plans for disease prevention and control. The emphasis of the Twelfth Five-Year plan is to prevent chronic diseases, widespread health education and operate national healthcare programs.

In response to the unhealthy lifestyle among children, the Chinese government has framed the outline of China's food and nutrition development for 2014-2020, aiming to make children and adolescents back to healthy conditions. It mentioned:

1. Popularize the knowledge of diet, nutrition, and health
 - Set up the public "Nutrition Day".
 - Developing activities on food and nutrition knowledge into the village (community) to strengthen nutrition and health education.
 - Publish dietary guides suitable for different groups of people and distribute them regularly in shopping malls, supermarkets, stations, airports, etc.
 - Encourage main social media to play the role of disseminating food and nutrition knowledge for public welfare, to enhance the scientific level of nutritional knowledge.
 - Increase investment in the development of food and nutrition, and strengthen infrastructures such as circulation and catering services.
2. Strengthen food production and supply
 - Strengthen food safety responsibilities of local governments
 - Increase support for the production of edible agricultural products and protect farmers' enthusiasm on development and production.
3. Nutrition surveillance and intervention
 - Carry out national nutrition and basic health surveillance
 - Conduct food consumption surveys, and regularly publish reports on food consumption and the nutritional health of Chinese residents, so as to guide residents to improve food and nutritional status.
 - Increasing financial input to improve the eating environment of primary and secondary schools and kindergartens in the poor areas

4. Promote the legal management of food and nutrition

-Pay attention to the research work on food and nutrition-related laws and regulations, and carry out timely legislation on nutrition improvement regulations

-Food production and management activities should be standardized according to law, special management and rectification should be carried out to create a safe, honest and fair market environment.

5. Accelerate technological innovation in food and nutrition

-Aimed at the major needs in the fields of food, nutrition, and health, enterprises should be guided to increase scientific and technological input in food and nutrition and to strengthen research on key areas and key links of food and nutrition.

-Strengthen the research on the development of new food resources and food safety risk analysis techniques, and improve the level of food safety in scientific and technological innovation.

-Deeper study the relationship among food, nutrition and health, and to revise the reference intake standard of dietary nutrients in time.

6. Strengthen organizational leadership and guidance

Provincial people's governments shall, in accordance with the objectives, tasks, and priorities, set forth in this outline and in light of local conditions, formulate an implementation plan for the development of local food and nutrition.

China has its historical reason for having the largest population of childhood obesity. But luckily, the government of China already shown a strong emphasis on the obesity issue, both on childhood and adult. Policies and measures are set from the perspective of the government, maybe from the perspective of the obesity group, there will be a surprising outcome for improving obesity, which is also encouraged by the government.

SUMMARY

03

SERVICE SYSTEM DESIGN PROCESS

3.1 APPLICATION OF DESIGN METHOD

In order to get to know the real condition of the target user, tools like customer journey map, character profile, personas, stakeholder map are needed to record users' experiences for the data analysis in the next stage. Using the product service system design methodology to create a new service for obese children.

3.2 SERVICE DESIGN ELEMENTS

3.2.1 Define target user

Target user is defined as the overweight or obese child in a family, who is aged between 7 to 18 years old (during the primary and secondary school). The childhood obesity is close connected to their living environment, as the researches mentioned above, children are easily influenced by their parents' living style and eating habits, the main user is the child in a family, but also their parents are included as the users. It means we treat the family as a whole user, considering the solutions not only for the child, but also the parents.

Then frame the design challenge roughly (figure 3.2.1-1).

Frame Your Design Challenge

What is the problem you're trying to solve?

Improve children's obesity, together with their parents.

1) Take a stab at framing it as a design question.

How might we improve children's obesity, their parents as well?

2) Now, state the ultimate impact you're trying to have.

We want children and their parents have a healthy diet cognition, start to avoid obesity.

3) What are some possible solutions to your problem?

Better education around parenting, "all about obesity" campaign, Apps played by children and parents, speeches on obesity and its danger

4) Finally, write down some context and constraints that you're facing.

The influences on their minds, inflecting to their habits and diets are in long-term. It works or not needs time-based observation.

5) Does your original question need a tweak? Try it again.

How might education works to improve obesity both on children and parents? In which form?


Figure 3.2.1-1 Frame the design challenge

3.2.2 User interview

QUESTIONS LISTS	TOPIC
<p>As a doctor, what is your major field and how long have you been in this area? Can you give me a short description of what you are doing on this position?</p>	<p>Basic understanding of background</p>
<p>What is the medical explanation of obesity and overweight? What is the definition of childhood obesity? Do those definitions differ from childhood and the adults/ What are symptoms of obesity and overweight? Just looking fat? Does it have any influence on human beings? And does it differ for children and adults? And those relations already being evidenced by scientists?</p>	<p>Obesity definiton; Causes; Symptoms</p>
<p>What is the solution or improvement of obesity, especially the childhood obesity? Do the solutions apply both to adults and children? Is there any medical measures can be done to cure obesity? How long it would work on the obesity group?</p>	<p>Treatment</p>
<p>What is the current environment of childhood obesity in China, for example, in this city? How many patients you will receive one day and in one month? Can you just give the estimated number received in this hospital? And those who come here belong to the overweight group or obesity group or the underweight group? How about the rate of the three main group?</p>	<p>Patients' general information</p>
<p>Can you describe the scene of the obese children coming? Which kind of treatment you will give, such as blood testing? Normally what suggestions you will give to them and will you suggest the children take medicine? What is the parents' attitude toward the treatment? Will parents mention children's diet and exercise habits? Does that information help to understand the cause of obesity?</p> <p>Normally how long will they come back for the second treatment? Does the childhood obesity improve the second time? What is the parents' feedback on your treatment?</p>	<p>Scenes when treating obese children</p>

Figure 3.2.2-1 Interview questions for the doctor

As the childhood obesity is a medical disease, firstly interview with a doctor will help to understand what is obesity and childhood obesity, what is the reason causing obesity, what is the correct and scientific approach to deal with the obesity issue. Together with those questions (figure 3.2.2-1), I interviewed a doctor who works in childhood nutrition and health field.



Interviews with the doctor
 Who: Doctor Li
 Gender: Male
 Where: Taizhou Renmin Hospital
 Profession: Children Nutrition

Cause of obesity

For the better understanding of obesity and its forming reason, I did the interview with the doctor who is currently working about the nutrition for children and healthcare, asking him what are the factors resulting in obesity and possible solutions. As the doctor described, no matter the children or the adults, there are three main reasons for obesity (figure 3.2.2-2): excessive food intake, lack of exercise, and genetic factors. Excessive food intake includes the carbohydrate, fizzy drinks, desserts, sweets, fast food like KFC, fried food, meat and so on. For the exercise, he explained that, once childhood obesity is formed, due to inconvenient movements, they are unwilling to exercise then even gain weight, forming a vicious circle. And about the genetic factors, scientifically to say, obesity has a certain family genetic predisposition. Parents are fat, 70%-80% of the offspring are obese; One parent is obese, 40%-50% of the offspring are obese; Both parents aren't obese, nearly 1% of the offspring are obese.

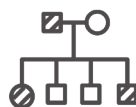


EXCESSIVE FOOD INTAKE

- Carbohydrate/ fizzy drinks, desserts, sweets
- Fat/ fast food like KFC, fried food, meat



LACK OF EXERCISE



GENETIC FACTORS

Figure 3.2.2-2 Causes of obesity

Treatment of obesity

Corresponding to the forming reasons, the treatments that doctors often suggest to the obese patients are diet control, increase exercise, and behavior therapy.



The first is to control the diet, by limiting the diet to achieve the purpose of weight loss, but also to ensure the normal growth and development of children. Therefore, at the beginning, you can't be too hasty. You only need to control the kid's weight gain, so that his weight can be reduced to more than 10% of the average standard weight calculated by the length.

The general principle of calorie control is:

- for children, 60kcal/(kg-d);
- for children in primary and middle school, 80kcal/(kg-d)
- for 100% overweight, 50kcal/(kg-d)

- Nutritional ingredients: 20% protein, 55% carbohydrate, and 25% fat.
- Eat more grains, fish, vegetables and soy products, followed by poultry and lean meat.
- Potatoes, hawthorns, high sugar ingredients and sweets should not be eaten as much as possible. -In order to meet the appetite of children, eliminate hunger, they can eat vegetables and fruit which is low in calories.
- Limit the snacks and sweets and high calories food like chocolate.



Obese children should increase their daily exercise and form the habit. They should start with a slow and easy workout and increase in amount and lasting time gradually. In the early stage, they should avoid vigorous exercise, so as not to increase their appetite. The usual exercise can be: jogging for 30 mins one hour after meals; climbing stairs, rope skipping, playing ball games, treadmill running, swimming; not advocating anaerobic exercises.



The behavior therapy means to teach children and parents' behaviour management methods. The older children should learn to monitor themselves and record: daily weight, activity amount, food intake, the influencing factors of the environment. Then regularly summarise, parents help the children to evaluate the implementation of treatment and establish good diet and behaviour habits.

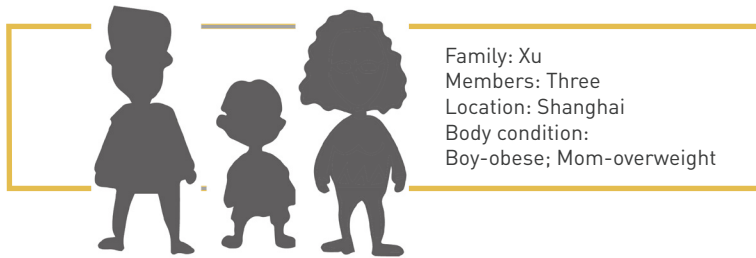
Interviews with the obese children and their family

As it listed on the right side (figure 3.2.2-3), before interviewing the obese children and their families, those questions are prepared according to what I got from the doctor. The main questions are related to the diet and exercise, involving family members' perceptions on obesity and how their deal with the obese body conditions. Through the deep interview with the obese families, I hope to understand how Chinese individuals consider obesity and what are the relations between obesity and family environment.

QUESTIONS LISTS	TOPIC
<p>How is your family background? You have only three family members or you live together with the grandparents? Can you give me a short introduction of each family members, including their age and occupations? Which members in your family have the overweight or obesity problem?</p>	Family background
<p>As we all know, diseases come from eating, do you know the obesity mainly result from the unbalance in diet and exercise? Can you describe a normal day in your family, starting from getting up, each meal and exercise included? Who is responsible for the management of the family diet? When you plan the family diet, what will you consider? When you are cooking, will you choose a healthier cooking method or changing for healthier food material for certain reasons?</p> <p>How often you exercise and what about the child? Do you think you already get enough exercise during a day? Where you often do exercise and which kind of exercise?</p>	Diet and exercise pattern
<p>Which level do you think your children are in? the healthy one or the overweight or obesity? Have you taken your child go to the hospital for overweight or obesity? Have you taken your child to do the physical examination each year? Or how often you do this?</p> <p>If you have seen the doctor, What does the doctor say about your child? Does the doctor give you some suggestions on diet and exercise? Did you improve what you are doing according to the doctor? Does any effect after changing diet and exercise pattern?</p>	Doctor's treatment and effects
<p>What are the family members' attitudes towards obesity? Do they consider the child is obese or very healthy? Does any family member think the obese child need to improve the problem? Like eating less? If you want the child to eat less, what are their response or attitudes?</p> <p>Ask each family members about their opinions about their current diet and exercise pattern.</p>	Family members' attitudes
<p>As you said, actually you have done something trying to improve the obesity or make everyone healthier? Where did you get the information that could help you? Will you talk those with your colleagues? Do you think it 's correct and scientific? Have you seen the effect of those actions?</p>	Information resources

Figure 3.2.2-3 Interview questions for the family

Interviews with the obese children and their family



"You can see my body shape, I am fat and my son is fat, looks like me. I think maybe some genetic factors from me, but he has a very good appetite! I know he is fatter than the teenagers in his age, so sometimes I try to manage his diet with low calories and low amount of fat."

Mom's
Descriptions

"You know what, I want to let my son eat less but his grandparents always blame me for that. They want him to eat as more as possible."

"For me, actually I want to become slimmer and I tried some ways, finally failed. So we bought the GYM card for the whole family, we will go there two or three times one week. I wish the family members to be healthier."

Dad's *"I am very healthy, you can see, I am not fat at all! And sometimes I will go take a walk after meal, it's a very healthy lifestyle, right?"*

"I don't think my son need to lose weight, he is still very young and on the period of growing. If he looks a little bit of obese, it's ok. We don't need to stop that or even worry. He needs those energy to study!"

"I love food and I can finish the lunch at school, sometime I still feel hungry then I will go to buy some snacks and cola."

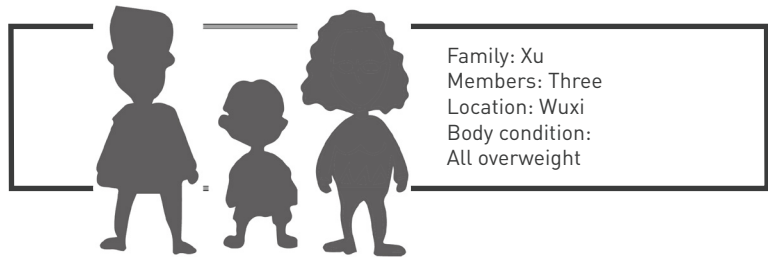
Son's
Descriptions

"When at home, mom doesn't allow me to eat too much snacks or meat. So I prefer to go to my grandparents, they will buy me everything I want and prepare delicious meal for me, full of meat or chicken or beef. That's all I love!"

Also, I interviewed the family about the grandparents, their opinions and behaviors to the obese child. The mom told me, she could understand their thoughts for the historical background. From the perspective of grandparents: most generations of them have experienced underweight, under-nutrition, food shortage, physical hardship and deprivation in their early lives before China's economic reform. At that time, slenderness represented poverty and poor health, while oil and meat were precious foods. So they consider the fat or obese equals to "healthy"; eat as much as possible equals to "healthy".

Summary

The mom already noticed that his son is overweight or obese, but she didn't take actions to the phenomena, just try to do something from her perspective like letting the boy eat less meat. Also, opinions differ in the whole family, including the grandparents. Grandparents and the father consider the boy is not fat at all and encourage the boy to eat more meat, also the boy prefers that attitude.



Mom's
Descriptions

"If we go out, other people will definitely know we are a family ahhh cuz we are all fat!"

"You know, when we married, we were slim, but after married, I and my husband become fatter and fatter. And now my boy is fat too. I think that's because we always have the rich meal, we love food and love tasting food. That's an enjoyable thing."

"About my boy's size, I think it's okay for him currently and when he goes to the secondary and high school when the course becomes harder, he will lose weight gradually."

"Sometimes when I am in school, someone will call me fatty boy, I know they are not saying that on purpose but if I keep focusing on that, that's a little bit hurting so I ever consider to lose weight. But when I am eating food, everything will pass over. I feel very happy when eating food!"

Son's

Dad's
Descriptions

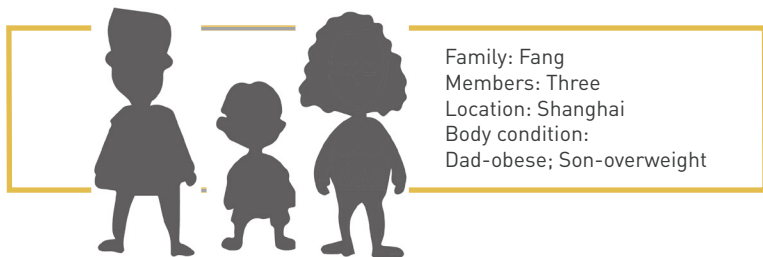
"He is on primary school and just looks a little bit overweight, but he is very healthy! Because he eats many kinds of food and they cover the nutrition all he wants, he didn't have health problems like sick or fever. And he exercises a lot at school, also the PE lessons, he will consume the calories and need to take energy from food."

"Even he wants to lose weight, it's not the time. He can lose weight when he is at the university and then I cannot manage his life. He will do whatever he wants."

Summary

The whole family doesn't have a right attitude and cognition towards obesity and its hazards. They thought the child seems overweight and obese is okay for his age and he will lose his weight gradually when he is older or entering the university. They consider he is healthy or not according to with or without sickness, instead of the physical body condition. The whole family is increasing the child's obesity level.

Interviews with the obese children and their family



“Because of my weight and body size, actually, I have the desire to lose weight through on-diet, exercise and taking in low-fat food. The on-diet is very easy, just to eat less during the dinner such as eat the rice no more than 30g. When I use the spoon to fill the bowl with rice, I know how much equal to 30g.”

Perceptions on his obesity (Dad)

“I was going to a special agency to lose weight but lacking time. They required to record whatever you eat and weigh your weight and waist day by day. And they will give you one kind of milkshake to mix with water, instead of meals. In the beginning, I didn’t believe this kind of losing weight method. I was attracted by the comparing photos of some users then I wanted to try it.”

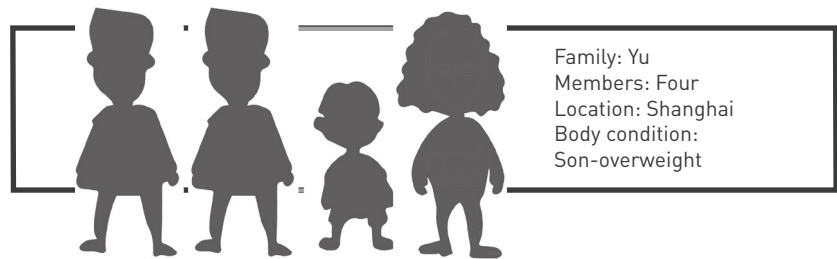
Experiences | *“For exercise, the whole family goes to the gym and I play badminton twice a week. However, I didn’t feel any changes in my body size even everytime I was sweated. The key point is to eat less.”*

“For my son, I think he is good, he is not that fat or not that thin and it’s already a good health condition for him. Even he is becoming overweight, I won’t stop him or set limitations on what he eats because it may influence his growth. Even exist few possibilities of being influenced, I won’t do it. If he wants or needs to lose weight, he can do it after the graduation from high school, then he will have plenty of time to exercise.”

Perceptions on childhood obesity

Summary

The father, as an overweight person, he knows his body condition and took some methods to lose weight but they were not that effective as he imagined. As to the attitude to the childhood obesity, he has the cognition of childhood obesity but won’t change the current diet and exercise mode of his son for avoiding harmful influences on the son’s growth.



Information
resources
(grandpa)

"Normally I am the one who cooks for the family and when I cook, I seldom use the monosodium glutamate because I heard that is not good for health."

"I heard that information from TV programmes when I hang out with friends, sometimes we will talk about it. I know nothing about the Internet so I seldom touch the computer. But I have the smartphone and my own WeChat account! In addition, sometimes friends send me the link between food and health."

"For me, I prefer the taste is not that strong but my young people, they like the strong taste, for example, my grandson loves fried food or with the sweet-and-sour sauce. He loves stewed pork with a brown sauce that made by me! For myself, I won't eat some certain dishes because they are not helpful for my health. The doctor told me all the information about what I should avoid doing or eating in daily life and I follow his advice."

Diet and health

Perceptions on
childhood obesity
and health

"When mentioning my grandson, he is a little fat but it's very good because it means he is very healthy. Only when he eats well, he can have the body size, and it equals to I did a very good job. I will be very happy when he can eat a lot dished or finish what I prepared for him."

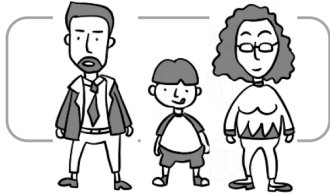
"About the physical examination, every year the primary school will be responsible for that. I don't remember if his mom takes him to the hospital. And there is no need to take him to the hospital, he is very healthy and seldom have the sickness."

Summary

The grandpa, as the manager of the family diet, he knows what he can't eat and what he should avoid doing while considering his obese grandson, he has the opinion that the child needs to eat more to be healthier. The obese body size means his healthy physical condition and his well-done cooking job.

3.2.3 Create persona

Sum up from all the interview descriptions from the obese children and their family, personal thoughts and behaviors, form this persona (figure 3.2.3-1).



“ I am afraid my kid is undernourished, also worried he is eating too much. ”

Family background

Gang Fan
38 Y/O.
Engineer
(busy)

Li Fan
10 Y/O.
Primary school
(study pressure)

Qi Cai
36 Y/O.
Manager
(busy)

Physical condition and focus

healthy but much drinking;
prevent chronic diseases

Obese and less exercise;
body growth

Obese;
prevent chronic diseases and lose weight

Daily meals

Breakfast

Eat at home, prepare it the day before and warm it in the morning. Make sure one egg for everyone, provide protein and energy.

Lunch

Parents eat at company's canteen or nearby restaurants, the child eats at school canteen, have no idea what everyone ate during lunch.

Dinner

Provide rich meal to make up the missing nutrition for the day.

Diet consumption

Cost: ¥3000/month,
Family income: ¥2.5w/month

Personal condition

Child

Have a very good appetite and eat a lot;
Be given few snacks but always ask for them;
Eat health care products;
Take in nuts everyday;
Ask for more fruits;
Drink milk as water, fresh and packed milk;
Drink yogurt;
Not willing to eat less;
Love eating meat but mom controls the amount, while grandparents encourage him to eat more;
Almost sit all day, less exercise chance at school;
Not worried about body shape.

Mom

Know herself is obese and try to control weight;
Not take in rice each meal to reduce carbohydrate;
Wish to become slimmer but not keep diet on purpose;
Ever consider the medicine methods to lose weight;
Clear obesity will bring a lot diseases;
Take in grains or soup for health;
Avoid (bring child) eating out for the much oil and salts;
Sit in office whole day and less exercise;
Consider herself obese but healthy.

Dad

Busy working and not eating too much;
Can't avoid drinking occasions;
Few time to care child's diet;
Wish child to eat more for body growth and study;
Not sitting in office whole day, have chance to walk;
Less exercise during workdays.

Exercise

Feel it's bad not doing sporting, soon bought fitness cards, involving the whole family to exercise.
The whole family comes together, child do swimming and parents exercise with equipment or running.

Normally go there on weekends, very few times on weekday because the child is too busy with study to go out.

Persona

Figure 3.2.3-1 Persona

Together with this kind of persona, those characteristics followed (figure 3.2.3-2): obese members, awareness and barrier. Obese members mean existing at least one family member is obese, normally one of the parents is obese; awareness presents one of the parents is aware that the child is obese and try to slightly control the diet, but with scruples. Last but not least, the barrier means pressure and incomprehension from other family member and grandparents. And they lack the scientific weight loss guidelines.



Obese member(s)



Awareness



Barrier

Figure 3.2.3-2 Characteristic of the persona

3.2.4 Insights and how might we questions

Based on the persona information and the design challenges above, fulfill the insight statements and how might we questions (figure 3.2.4-1, 3.2.4-2).

Create Insight Statements

Write Your Design Challenge

Our design challenge is to guide and rectify their diet ideas and lifestyle to improve the obesity issue in China.

Theme : Children's Needs

Insights:

1. Parents may want to obese children lose weight, but not influencing body growth and intelligence.
2. It's very hard for parents to say no to children's appetite.
3. Parents can't find the balance between feeling full and malnutrition for children.

Theme : Reliability

Insights:

1. Parents need the scientific way to guide healthy diet and exercise.
2. Parents doubt whether it adapts both to children and parents.
3. They care whether it works and how soon after using it.

Theme : Approach

Insights:

1. Children are hard to resist high calories food and western fast food.
2. We all know relative knowledge but hard to operate healthy diets and lifestyle.
3. Sometimes we want to exercise but children don't have time, too busy with studying.

Figure 3.2.4-1 Insights statements

Create How Might We Questions

Turn Your Insights Into How Might We Questions

Insights:

1. Parents doubt whether it adapts both to children and parents.

How might we offer the solution adapts both to children and parents?

Insights:

1. Children are hard to resist high calories food and western fast food.

How might we teach children to resist high calories food and western fast food?

Insights:

1. We all know relative knowledge but hard to operate healthy diets and lifestyle.

How might we push people to operate healthy diets and lifestyle?

Figure 3.2.4-2 How might we questions

3.2.5 Scenes segmentation

The three factors resulting in obesity is excessive food intake, lack of exercise and genetic factors. Food intake is connected to the diet, exercise is associated with activities, while the genetic factors are unchangeable. Based on the interviews and research had been done before, focus on the journey of family members on diet and activities, try to explore the design opportunity.




Diet Journey	Breakfast	Lunch	Dinner	Night snacks	*Extra eating
	Home	School	Home	Home	Fruits, snacks, drinks
 *mom's focus	Home	Company	Home	/	Afternoon tea, desserts
	Home	Company	Eat out	/	/

Figure 3.2.5-1 Diet journey of the whole family

As it illustrated (figure 3.2.5-1), the family's diet journey includes breakfast, lunch, dinner, night snacks, and extra eating, basically coordinated with the timeline of a day. Moreover, the mom, as the family diet management, her focus is the kid's meal at home and her dinner at home. Both the obese targets, the mom and the son, have extra eating apart from the official three meals.



For the son, while he has breakfast and dinner at home: he has limited time for breakfast; for mom not clear of their lunch details, mom wants to make up the nutrition through dinner. That's the reason why the dinner at home is always well-prepared, then eating too much for the kid will lead to the accumulation of fat. That could be concluded as the **unreasonable allocation of meals**.

Pain point: Can't balance between various nutrition and over accumulation of fat

Considering the dinner and night snacks, the summary is **lack of cognition of obesity and health**. The child has a good appetite and eats well, the mom is worried about 'eat less' equals to 'lack of energy', 'eating much' equals to 'be obese'. But she doesn't have a clear idea about what is happening and what will happen following the tendency of obesity.

Pain point: For the obese child in the growth period, mom wants him to eat less but worried whether eating less will result in missing nutrients and energy.

For the extra eating part, it can be said as **the child is out of control and takes in too much carbohydrate**. While the boy at school, sometimes he goes to buy snacks and fizzy drinks together with friends. That's the part the parents can't know it very well.

Pain point:

1. Children's eating habits are easy to be influenced by surrounding people, result in taking in too much carbohydrate.
2. Even the mom wants to keep the child's diet under control, when they are away, the child is totally free to eat what he wants.

For the mom, when she eats at the company, she feels **eating out is unhealthy**. While eating at the company or nearby restaurants, meals are full of oil. The mom knows it's unhealthy but she doesn't have time to prepare lunch for herself.



Pain point: She knows eating out is unhealthy but there's no way for her to avoid it.

For the dinner at home, sometimes she will choose not to eat the rice to lose weight and obviously she failed in the end. The **mom tries to lose weight in her ways**. She knows some pieces of knowledge like grains are better than the rice, or eating salads is a healthy way to lose weight.

Pain point: Obese parents want to lose weight, but the effects seem limited in her own ways.

When mention to the extra eating of mom, she **can't say no to desserts while on diet**. The mom knows desserts equal to calories bomb, but she can't resist them and regrets after having them.

Pain point: She wants to lose weight, while can't resist appetite and favor.



As to the dad of the family, although he is not fat at all. He can be concluded as '**can't avoid eating out and alcohol**'. Because of the job, the dad have lots of eating out occasions, he has to drink and eat unhealthily inevitably. When he back home, he is too tired to walk or go to the gym.

Pain point: He has few chances to eat healthily and exercise during workdays.

He doesn't have extra eating and maybe that's why he is not obese at all. But he feels **not that energetic when growing older**. When doing exercise with the family (figure 3.2.5-2), he is not as energetic as he was young, even he doesn't have any diseases.

Pain point: Unhealthy diets and lacking exercise will affect people's physical condition.

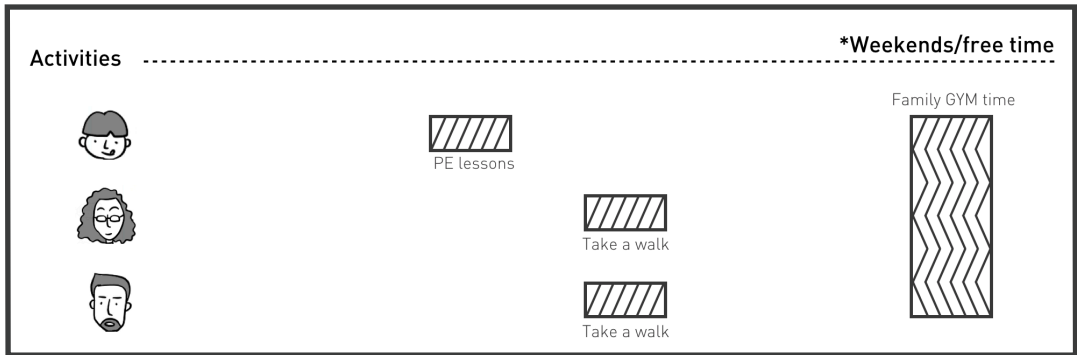


Figure 3.2.5-2 Activities of the whole family

As the journey shows (figure 3.2.5-2), for the parents, they will take a walk after the meal if they are free. But the fact is they seldom go out for a walk. After dinner, mom wants the whole family to go out for a walk, but the child is always busy with homework and the dad is often drunk when he back home.

Pain point: Mom doesn't want the whole family to accumulate fat but failed during workdays night.

As for the family gym time, they bought the gym card for the aim of exercise and body health while going to the gym is a psychological comfort for every family members. Because they seldom go there and they are not doing much exercise, it's a psychological comfort for the mom, at least they do exercise as much as possible, better than not doing anything.

Pain point: Just go to the gym a few times doesn't improve obesity status.

As the dad mentioned his diet journey during a day, he is often back home drunk for the jobs. A recent paper published in the "Chinese Journal of Epidemiology" surveyed the drinking rate of Chinese men, showing that middle-aged men had the highest drinking rate compared with other age groups. The drinking rate of men aged 30 to 59 exceeded 60%, of which 40 to 49 were the highest (figure 3.2.5-3).

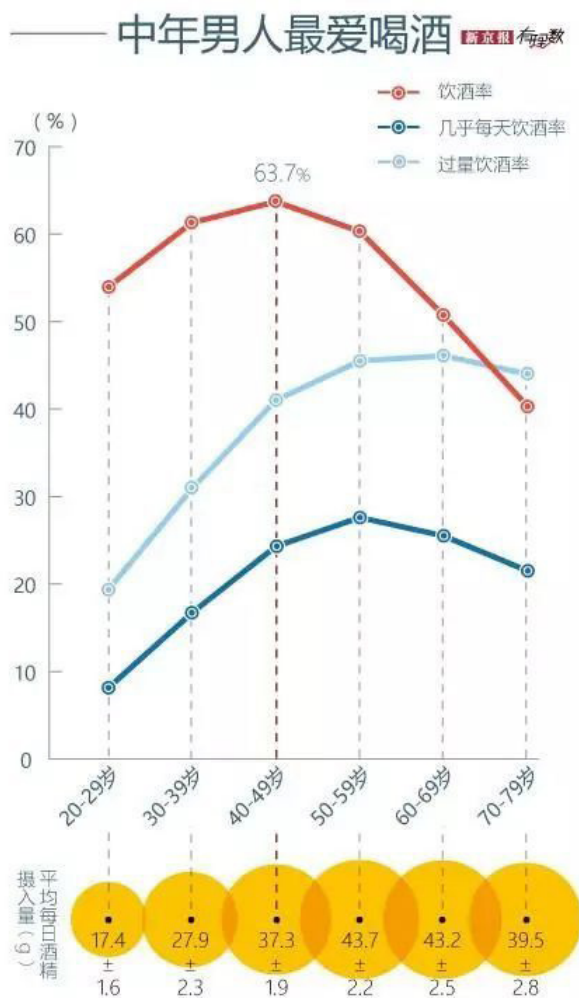


Figure 3.2.5-3 Drinking rate for Chinese men

The study found that male drinking is not only related to age, but also to **educational level and frequency of smoking** (figure 3.2.5-4). In this figure, illustrated the education level: primary school, secondary school, high school, and the junior college. With the increase of education level, the average daily alcohol intake, the composition ratio of almost daily drinking and excessive drinking rate decreased significantly.

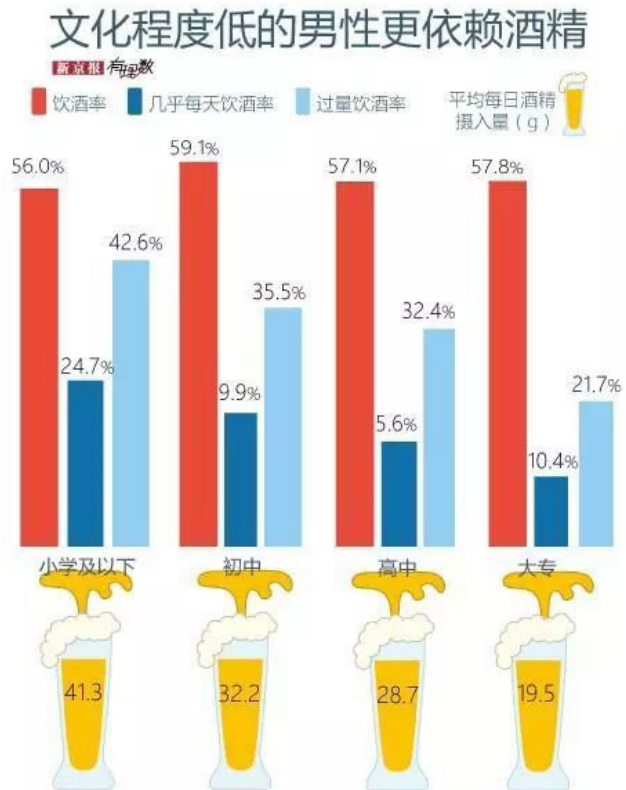


Figure 3.2.5-4 Relations between educational level and drinking rate

"The Dietary Guidelines for Chinese Residents (2016) " recommend that men should not drink more than 25 grams (pure alcohol) of alcohol a day and women should not drink more than 15 grams of alcohol, based on the nutritional and health status and basic needs of Chinese residents. What is the concept of 25 grams and 15 grams of pure alcohol that meet the health standard (figure 3.2.5-5)?



Figure 3.2.5-5 Recommendations on drinking amount

*Drinking rate: the proportion of drinking drinkers in the total population in the past 12 months
 Excessive Drinking Rate: The proportion of drinkers who exceed the recommended limits of the Dietary Guidelines for Chinese Residents (men consume no more than 25 g of alcohol a day, women consume no more than 15 g of alcohol a day)
 Dangerous drinking rate: According to the World Health Organization's International Guidelines for Alcohol Consumption and Hazard Testing, the dangerous drinking rate is defined as the proportion of men who consume an average of 61G or more alcohol per day and women who consume an average of 41g or more alcohol per day.

User Journey Map



Personal Profile/
primary school student, 2nd year
mother, obese body size
obese body condition

Family member conditions/
father, normal body size
mother, obese body size
grandparents, normal body size

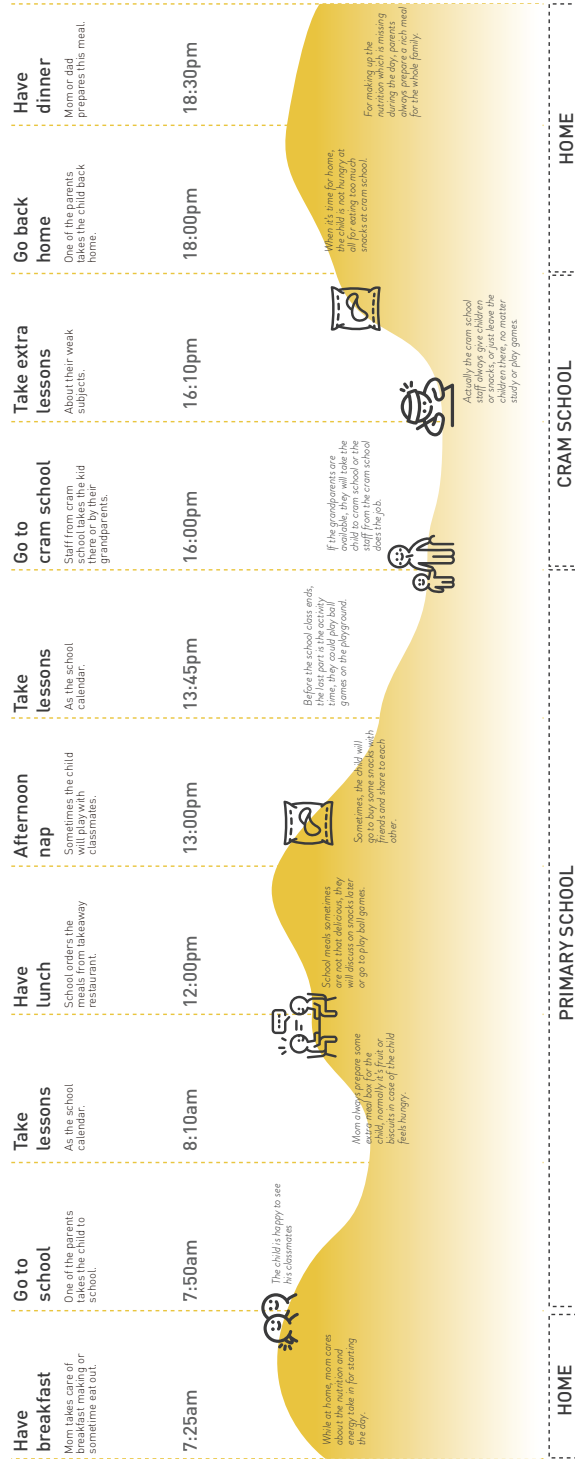


Figure 3.2.5-6 User journey map

User journey map

As the journey shows (figure 3.2.5-6), it's the detailed journey of the child, since the primary school ends early and the parents don't have time to pick their child, they choose the cram schools to pick their children then accompany them with this time while this kind of cram school doesn't that perfect. Sometimes, the staff there just leave the kids playing or eating snacks. It's the same treatment if the parents ask the grandparents to pick up the children. For this period, the mom and the child have totally opposite opinions:

"I don't want my kid to waste time after school, and I can't go to pick him because of my job, so I found the cram school to make use of the two hours, let him take lessons for weak subjects."

"Sometimes cram school teachers are just taking care of them or helping them solving problems."

"If letting grandparents pick and look after him, they will indulge the child to watch TV or have snacks."

Mom's
Descriptions

"I don't want to take extra lessons after school."

"They will give me more homework, and I hate that."

"But sometimes they are good, the teacher just sits there and gives us many snacks and drinks. That's the only part that I appreciate, also the friends there."

Son's
Descriptions

Pain point: The time gap after school, before her off

3.2.6 Pain points

Collect all the pain points from scenes segmentation, according to different pain points, try to explore the design opportunities.

1. Can't balance between various nutrition and over accumulation of fat.
2. For the obese child in the growth period, mom wants him to eat less but worried whether eating less will result in missing nutrients and energy.
3. Children's eating habits are easy to be influenced by surrounding people, result in taking in too much carbohydrate.
4. Even the mom wants to keep the child's diet under control, when they are away, the child is totally free to eat what he wants.
5. She knows eating out is unhealthy but there's no way for her to avoid it.
6. Obese parents want to lose weight, but the effects seem limited in her own ways.
7. She wants to lose weight, while can't resist appetite and favor.
8. He has few chances to eat healthily and exercise during workdays.
9. Unhealthy diets and lacking exercise will affect people's physical condition.
10. Mom doesn't want the whole family to accumulate fat but failed during workdays night.
11. Just go to the gym a few times doesn't improve obesity status.
12. The time gap after school, before her off work.

3.3 IDENTIFY OPPORTUNITY

3.3.1 Design opportunity

Try to define the accordinate needs according to the pain points.

Needs:

1. Scientific knowledge on nutrition and childhood obesity
2. Accurate physical condition and the correct guidance
3. Children need to form the right attitude and perceptions of food
4. Children need to control their appetite for high calories food when they stay away from their parents
5. Adults need to complete knowledge on healthy food and know how to choose
6. Even the adults need the right cognition on adults obesity and how to improve obesity through diets and activities
7. The adult need to form the correct perceptions on food
8. More chances or occasions for the exercise
9. Even adults need healthy diets and lifestyle
10. Chances or reasons force the family to exercise
11. Chances or reasons force the family to exercise
12. A place to take care of the children and not encourage their eating snacks habits

Design opportunity

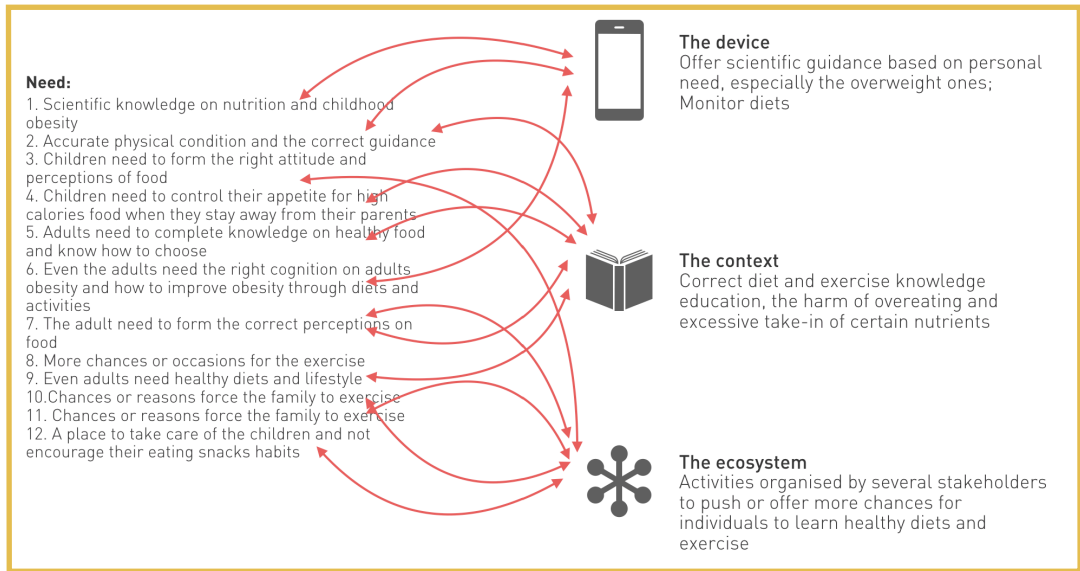


Figure 3.3.1-1 Needs and possible solutions

According to the needs, possible solutions (figure 3.3.1-1) can be the device, which offers scientific guidance based on personal need, especially the overweight ones, also, maybe offer the monitor diets function; The second solution can be the context, about the correct diet and exercise knowledge education, hazards of overeating and excessive take in of certain nutrients; The last solution can be the ecosystem where activities organized by several stakeholders to push or offer more chances for individuals to learn healthy diets and exercise. Comparing to offering single device or the context education, the ecosystem can be the final solution which covers all the areas.

3.3.2 Stakeholders map

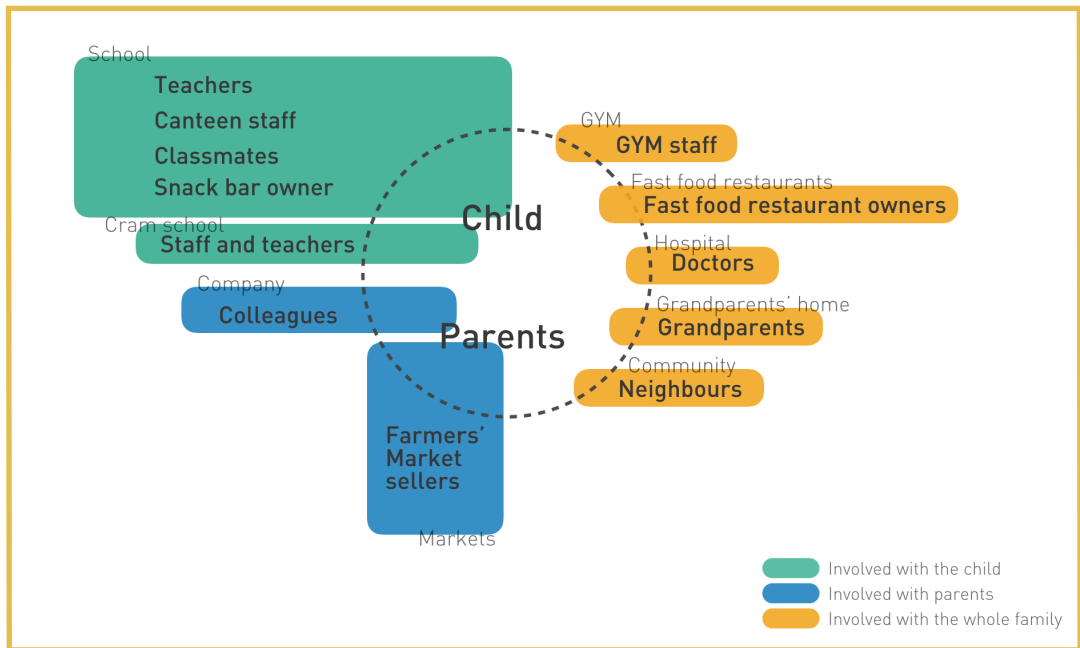


Figure 3.3.2-1 Stakeholders map

As it illustrated (figure 3.3.2-1), currently those are the stakeholders involved with the consumers in their daily life. When the children in school, he gets in touch with teachers, canteen staff, classmates and snack bar owner; also, the staff from cram school. The parents get in touch with their colleagues in the company and sellers from the farmer's market. The whole family is connected with the gym staff, fast food restaurant owners, doctors, grandparents, and their neighbors as well. If we consider the stakeholders from the perspective of the ecosystem, it should be like this (figure 3.3.2-2):

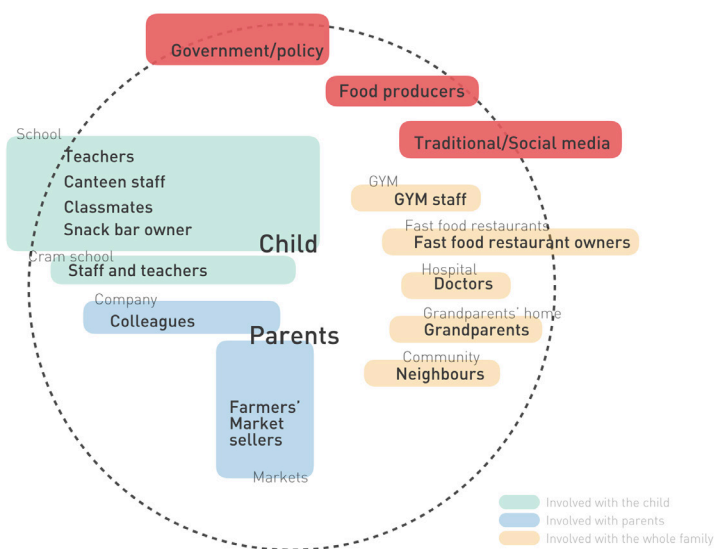


Figure 3.3.2-2 Stakeholders map 2

3.3.3 Ecosystem

If considering it as an ecosystem, the three elements need to be involved because they are going to influence people's thoughts or be influenced, government and policy, food producers and traditional or social media. From the desk research, the government published policies and measures on childhood obesity which also mentioned the school, food industries, and the media department. From the point of an ecosystem, they may be new connections or the new way of interactions (figure 3.3.3-1).

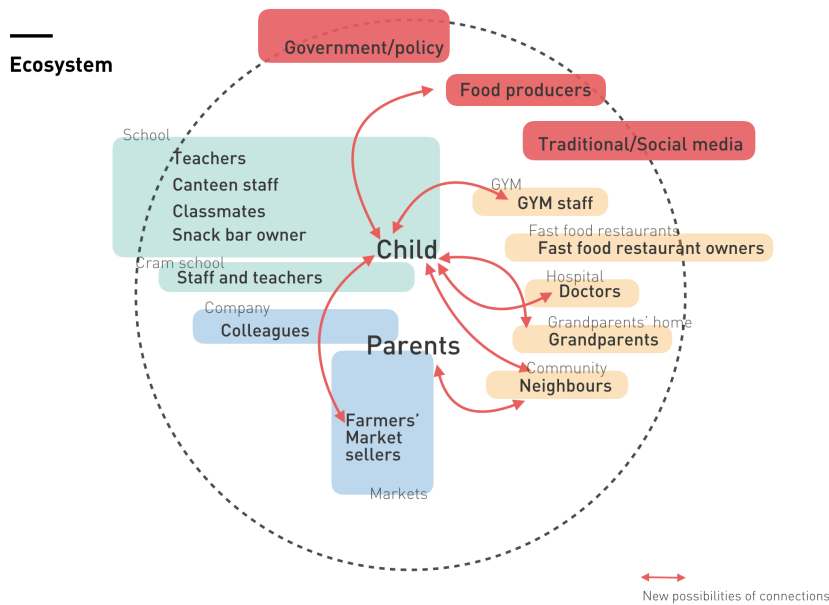


Figure 3.3.3-1 The ecosystem

3.4 CASE STUDIES

Based on the understanding and re-creation of the ecosystem, start to search and analyze case studies which topic is not limited to the childhood obesity, also involving the adult's obesity, weight loss and diet those related topics. Conclude them by this format (figure 3.4-1~3.4-10), which mentions the description, main offerings, and the inspiration can be taken advantaged.

BOOHEE APP

Category
Health & Fitness



Where
China

When
2011

Reference
<http://www.boohee.com>



Description

It's an app used by weight loss professional to record calories, fitness, and weight. Now it already has 80 million weight loss fitness users and ever got Apple home recommendation for 6 times as a necessary tool for weight loss fitness.

Main offerings

- Intelligent health slimming tool
Calories, weight, steps, circumference recording, and data analysis
- Professional weight loss fitness nutrition recipes
Powerful food database helps to eat healthier and healthier
- Professional sports timetable
Sports plan, special training, weight loss, and shaping, to help you change
- Professional health products
Health food, intelligent hardware, sports equipment

Inspiration

With the topic of weight loss, it forms a systematic service including the recipes, sports plan, and products. What they are offering is related to others.

Figure 3.4-1 Case studies (1)

WEIGHT WATCHERS

Category

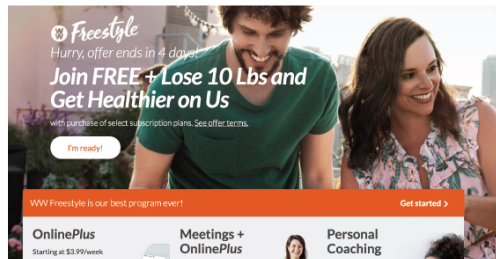
Weight loss and maintenance

Where

The United States

When

1963



Reference

<https://www.weightwatchers.com/us/>

Description

It's an American company that offers various products and services to assist weight loss and maintenance. The core philosophy behind Weight Watchers programs is to use a science-driven approach to help participants lose weight by forming helpful habits, eating smarter, getting more exercise, and providing support.

Main offerings

There are three primary ways individuals can work with Weight Watchers:

-in-person meetings

insightful weekly lessons from an expert; members meeting

-an online-only program

easy-to-use app and website; recipe database; total support in real time

-coaching through texts

personal coach; designed plan for lifestyle, schedule, and habits

Inspiration

It offers the online and offline two methods for consumers, as they prefer, they can choose the best way for them. And the offline community influences more than the online community.

Figure 3.4-2 Case studies (2)

KURBO

Category
Health & Fitness

Where
The United States

When
2013

Reference
<https://kurbo.com/>



Description

Kurbo is a mobile health coaching app designed specifically for kids, teens and families. It is fun and easy to use. It helps you make smarter eating and exercise decisions and develop healthy habits.

Main offerings

- Get coach matched
ask a series of questions to match with the best possible health coach to help users develop healthy habits
- Create Goals
- Track Food & Exercise
the app helps users learn healthy habits, track exercise, and log food while engaging in fun games
- Review Progress

Inspiration

Online help with weight loss; helps to know food calories other than justing calculate the overall take-in calories amount; have the personal coach

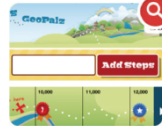
Figure 3.4-3 Case studies (3)

GEOPALZ

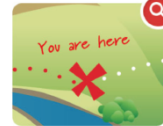
Category
Game



Get a GeoPal
Every 3 months new GeoPalz will be available. When you buy GeoPalz, they will be your virtual guides on the site, give tips, advice and instructional Visit Store



Log Steps
Wear your GeoPal and let it start counting your steps, then at the end of the day log them on GeoPalz.com to earn points.



Travel GeoPalz World
The steps you log, moves you further on the map of the GeoPalz world, where you can see upcoming prizes and awards.

Where
Boulder, CO

When
2010



Earn Free Toys & Prizes



Earn Awards



Have Fun!!!

Reference

http://geopalz.com/index_classic.php

Description

GeoPalz is the first fitness tracker that lets you “Walk to Win.” The more steps you take, the more pedpoints you get. Trade ‘em in for all types of prizes, from Frisbees and jump ropes to baseball bats and footballs, you can also save your points to win a Bike or skateboard.

Main offerings

The activity tracker and online game

- records your child’s physical activity by tracking steps throughout the day and exchanging those steps for parent directed rewards, like screen time, game time and adventures

- With trackers, children will have their character blast off and explore the galaxy in a spaceship powered by their steps. The more active the child is, the more they can explore and the more rewards they can earn. Kids can even earn coins and exclusive content through Disney’s Club Penguin.

Inspiration

- Online game incorporation with the portable device;
- Online combined with offline;
- Rewards system as the motivation for children moving.

Figure 3.4-4 Case studies (4)

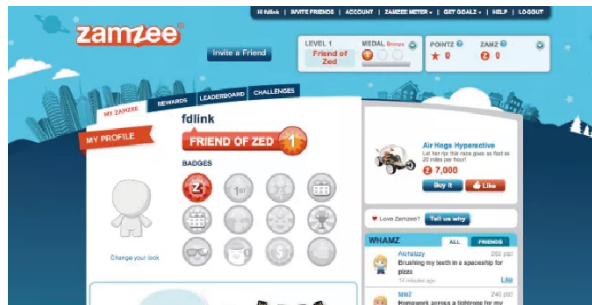
ZAMZEE

Category
Game

Where
Redwood City, CA

When
2010

Reference
<https://www.zamzee.com/>



Description

Zamzee is a game that gets kids moving. Zamzee uses an activity monitor and website to make movement fun and rewarding.

Main offerings

Making physical activity fun and rewarding

- use rewards to bring kids into the fold of Zamzee, to capture their attention and make them excited about using Zamzee
- Every component of the website, from your activity graph, to challenges, to rewards is driven by your offline actions (Eg, how much you move around). In order to unlock the good stuff, like passing levels on the website, earning rewards, or taking Challenges, kids need to unplug from their computer and move.

Inspiration

Add motivation and target for children, as the power for their exercise;
Give rewards when they reach the set goals.

Figure 3.4-5 Case studies (5)

SWORKIT KIDS

Category

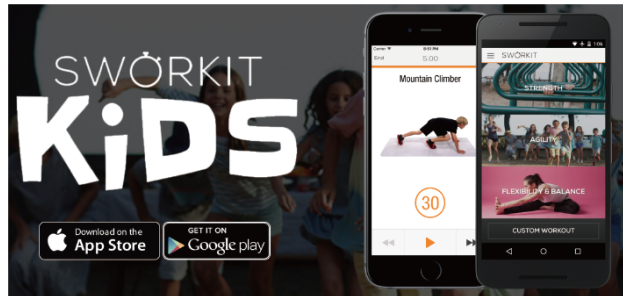
Health & Fitness

Where

The United States

When

2016



Reference

<http://kids.sworkit.com/>

Description

It's an app that turns Fitness into a game with your children with customizable workouts for Strength, Agility, and Flexibility! No matter where you are, every moment is an opportunity to get active and have fun getting fit.

Main offerings

Fun exercise routines demonstrated by possible future personal trainers (or future doctors). Sworkit Kids uses kids for the videos to make it easy to follow along.

Sworkit Kids uses a scientifically proven technique of combining interval training with randomized exercises so you can never get bored of the same old routines. You can do a workout for 5 minutes or 30+ minutes.

Inspiration

Exercise guidance videos for kid and children as the actors; Fitness app only for children.

Figure 3.4-6 Case studies (6)

PRITIKIN

Category

Lifestyle program

Where

The United States

When

1975



Reference

<https://www.pritikin.com/>

Description

It's adult fitness camp evolved. Pritikin is where the health and adult-fitness-camp revolution began. It's where more than 100,000 people worldwide have traveled over the past four decades to learn the healthiest, most scientifically proven lifestyle on earth.

Main offerings

- Safe and sustainable exercise
- Healthy nutrition education
- Healthy dining that informs your taste buds with a whole new appreciation of the pure flavors of fresh whole foods plus
- Healthy cooking courses that focus on home cooking made simple plus
- Behavioral education that fires you up with the motivation to live well plus
- Expert medical care that ensures everything you're doing is best for you.

Inspiration

The comprehensive and integrated system for weight losing and health management;

Figure 3.4-7 Case studies (7)

FOODUCATE

Category

Health & Fitness

Where

The United States

When

2008



Reference

<https://www.fooducate.com/>

Description

Fooducate is an app that helps lose weight and keep it off. Eat tasty, healthy, real food. Track the calories, macros, exercise, sleep, hunger, and mood. Make people get motivation from the most supportive community in the world.

Main offerings

-Nutrition & Health Tracker

Track the food intake and exercise; Track the quality of calories; Track your macros: protein, fats, carbs; Track your sleep, mood, and hunger levels

-Huge Food Database

-The Best Diet Tips

Free health & diet tips from nutrition professionals; Free weight loss tips

-Teaches You To Eat For Health

Fooducate analyzes information found in product nutrition panels and ingredient lists.

Inspiration

Integrated functions about weight loss and diet management; Community structure.

Figure 3.4-8 Case studies (8)

LOSE IT!

Category

Health & Fitness

Where

The United States

When

2008

Reference

<https://www.loseit.com/>



Description

It's a calorie counting app. Simply download the app, set your goal, and track the foods you love to lose weight.

Main offerings

- Quickly scan barcodes

Search our database or use our quick Barcode Scanner to easily scan in foods you've eaten; Log food by simply taking a photo with Snap It.

- Connect your Fitbit and other trackers, apps, & devices

- Dial in on your nutrients by setting custom goals for macronutrients, water, health, and body measurements.

Inspiration

Through database and image recognition technology, easy to record the calories take-in; Accurate calculate the calories from food.

Figure 3.4-9 Case studies (9)

WANTSEA

Category

Physical motor
function training

Where

China

When

2015

Reference

<http://www.wantsea.com/index.html>



Description

It's providing a physical training base for 2-15-year-olds, and through different courses for different needs and physical conditions.

Main offerings

Differnt modes of training:

Comprehensive physical trainging; special physical training; emotional intelligence class; weight loss course; sports entrance examination courses; physical fitness camp

Inspiration

Their course structure is based on people's need and totally in an offline way which focuses on physical training.

Figure 3.4-10 Case studies (10)

3.5 POSITION MAP

Map those case studies in a matrix, summarize the keywords according to their characteristics and category, to see what exists on the market are showing which kind of developing trends (figure 3.5-1).



Figure 3.5-1 Position map

Here those keywords describe that the application or the service is offline (physical) or online (digital); it is serving a personal-based user or it has a community as the base. Most of those cases belong to the area with the characteristics of personal-based and online. few of them are located in the area forming by offline and community-based. Because of the re-create ecosystem, it is necessary to define the opportunity for the community-based area, but not just the single touchpoint for online or offline. It will have both the physical and digital touchpoints and service to form to the ecosystem, as the red point located in figure 3.5-1.

04 DESIGN DELIVER

4.1 DESIGN BRIEF

It's a service design in the community which aims to enhance children's perceptions on childhood obesity and its hazards, educate children to know about food and nutrition in an entertainment way, offer children special environment for exercise, moreover, a place for the parent-children time, involving educating parents obesity knowledge in the service system. In addition, try to associate with the stakeholders in the community.

4.1.1 Value

The value of the service includes the professional guidance on childhood obesity, the edutainment environment for families, improving childhood obesity, management for children's physical activities and strengthening connections with communities (figure 4.1.1-1).

4.1.2 Mission

Currently, the mission is to correct people's cognition on childhood obesity and its hazards, including the causing factors.

4.1.3 Vision

The vision is to build collaboration with communities, change parents' perceptions towards obesity and develop healthy diets and lifestyle.

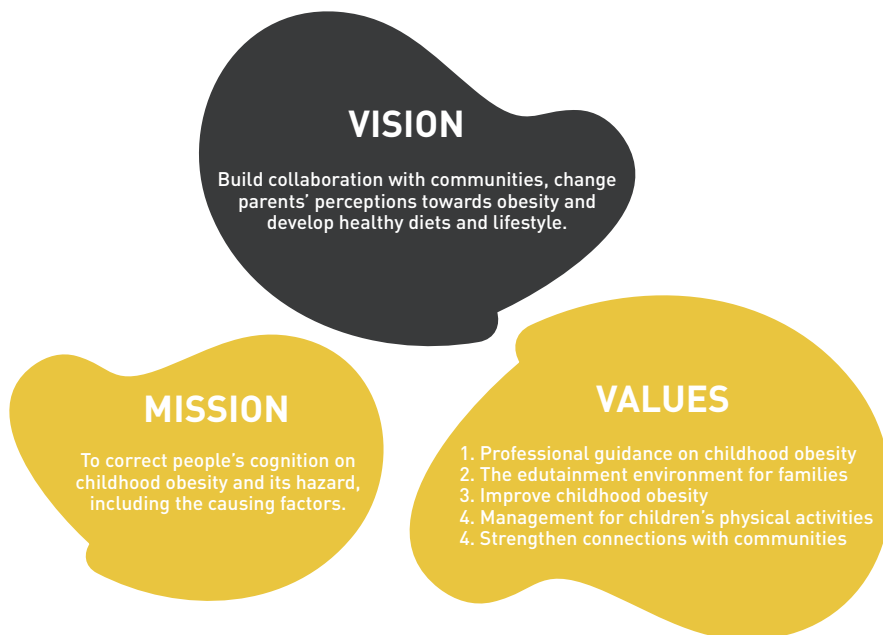


Figure 4.1.1-1 Values, mission and vision

4.2 OFFERING MAP

As it shows (figure 4.2-1), the main offering target is the obese children, the service is offering them the edutainment courses whose topic is about food nutrition, and the children gym where the activities and types of equipment are designed for children. For their parents, they will get the app helps to manage children's obesity situation; through the app, parents are able to check the daily activity report, feedback on exercise courses information and get chances for experiencing the edutainment courses. The other offer for parents is the parent-child occasions where be prepared with edutainment areas and experienced courses. As to the retired elderly which including the children's grandparents, the service offers them the recruitment for being the volunteers or children caring jobs.

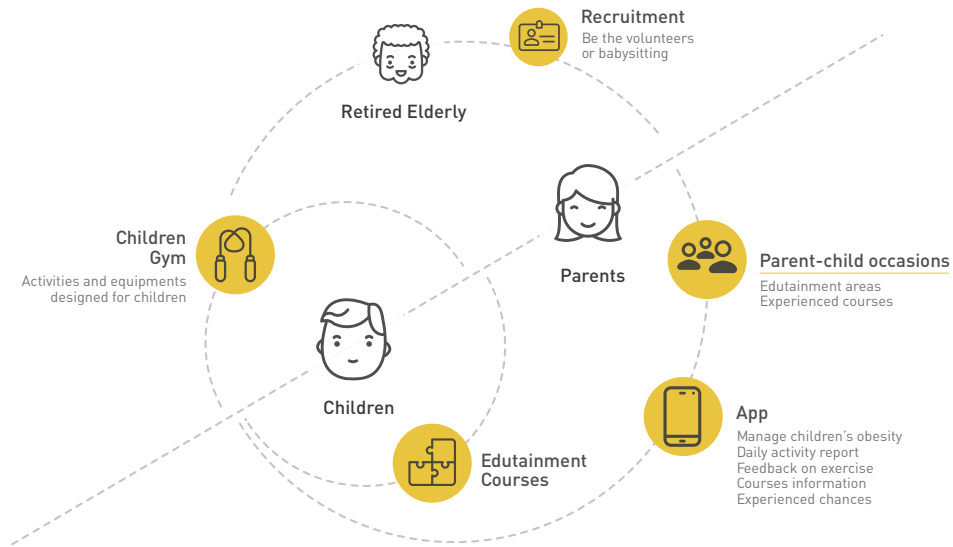


Figure 4.2-1 Offering map

4.3 SYSTEM MAP

As it presents (figure 4.3-1), the system can be described as two parts, one is inside the community, one is the part outside the community. Parents pay for the service, then "YUN DONG BU" will offering the obese children edutainment courses and exercise equipment designed for children. Parents can get the update daily activities and feedbacks through the app. The retired elderly in the community can get the chances to be hired as the staff or be the volunteers for children teaching assistants, also in the meantime, they will be educated with childhood obesity, which benefits for themselves and their grandchildren as well. "YUN DONG BU" cooperates with the clinic inside the community for regular physical examinations for children, which will be updated to parents too. The food producers who are obviously outside the community is cooperated with "YUN DONG BU" for providing materials for edutainment or for their business advertisements.

SYSTEM MAP

Financial Flow - - - - ->
 Information Flow - - - - ->
 Material Flow - - - - ->

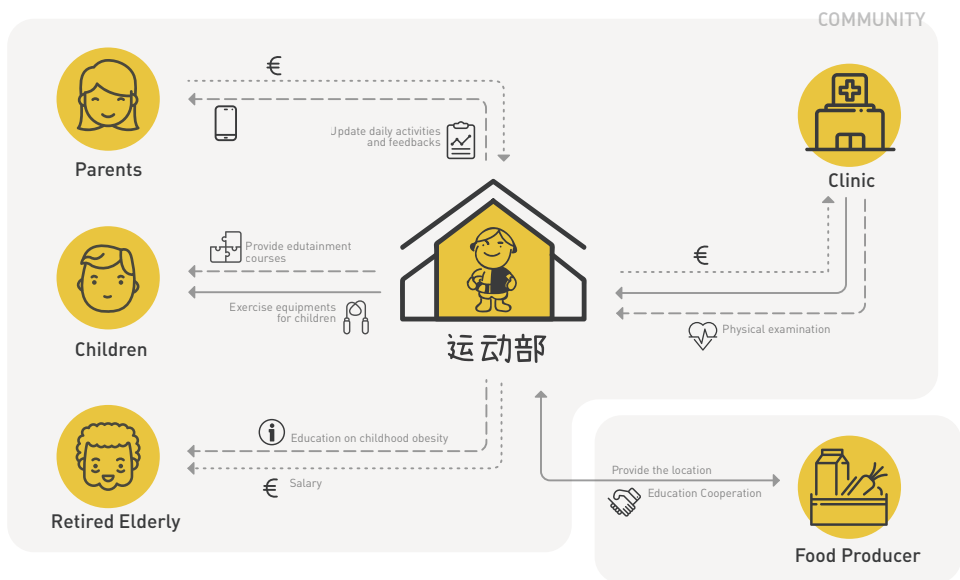


Figure 4.3-1 System map

4.4 TOUCHPOINT DESIGN

The touchpoint involved in the service system includes the two-part, the digital touchpoint and the physical one. Firstly it's the branding, which represents the value and first impression for consumers. And the branding can belong to the digital or physical touchpoint for its diverse usage. Digital touchpoint is mainly referred to as the application design and the design of the website while the environment or the space design work as the physical touchpoint.

4.4.1 Branding

As it illustrated (figure 4.4.1-1), the name is "YUN DONG BU", normally it means the sports department in college, but here mean the places for children to exercise and enjoy edutainment courses. Also, in Chinese, it sounds like "Do you want to exercise". With this name, I wish to engage people into moving and exercise. The simple is a boy with a round face, his right hand is holding a swimming ring, his body seems not that round as his face. But the right side of the body, he is wearing a shirt with his left hand holding the stomach. His stomach looks matching his face. With this cute character, it's designed for expressing the meaning, exercise can make people lose weight and it's a suitable and healthy method to children. Since it's a service mainly focus on children and offering edutainment course for them, by this character and the name, it will bring an easy, comfort and lovely feeling to children.



Figure 4.4.1-1 Logo and brand name

Selection of colors

There is a large body of literature on the psychology of color. Researchers are working related to those topics: cooler reactions as functions of personality and psychopathology; physiological reactions to color; color presences; color effects on emotions; color effects on behavior, and reactions to color concepts (Valdez and Mehrabian, 1994).

Investigations had been done to study the association between children's emotional and colors. Sixty children including 30 girls and 30 boys were shown nine different colors, one at a time and in a random color. Children were asked about the feeling when they saw the color. Results show that children have positive reactions such as happiness and excitement to bright color (e.g., red, yellow, pink), and they expressed the negative emotions for the dark colors (e.g., brown, black). Moreover, researchers suggest that children's emotional reactions to bright colors became increasingly positive with age, and girls, in particular, showed a preference for brighter colors and a dislike for dark colors. Boys were likely than girls were to have positive emotional associations with dark colors (Boyatzis and Varghese, 1994)

Color psychology suggests that certain colors are capable of evoking certain moods and may even have an influence on behavior and well-being. While color associations can be influenced by a number of different factors, including past experiences and cultural associations, some colors do tend to evoke certain moods or feelings. Color may have totally opposite influences on people's feelings. The color yellow can be bright and intense, which is perhaps why it can often invoke such strong feelings. Yellow can quickly grab attention, but it can also be abrasive when overused. It can appear warm and bright, yet it can also lead to visual fatigue (Cherry, 2017).

The color psychology of yellow

Some of the key characteristics that are often connected to the color yellow include:

-Warmth

Yellow is a bright color that is often described as cheery and warm.

-Difficult to read

Yellow is also the most fatiguing to the eye due to the high amount of light that is reflected. Using yellow as a background on paper or computer monitors can lead to eyestrain or vision loss in extreme cases.

-Frustration

Yellow can also create feelings of frustration and anger. While it is considered a cheerful color, people are more likely to lose their tempers in yellow rooms and babies tend to cry more in yellow rooms.

-Energetic

Yellow can also increase the metabolism.

-Attention-grabbing

Since yellow is the most visible color, it is also the most attention-getting color. Yellow can be used in small amount to draw notice, such as on traffic sign or advertisements.

As seen in the following descriptions from the investigated users, yellow is often perceived as being a high-energy color and it is often used in situation and products intended to create a sense of excitement or energy. Someone described, "Yellow makes me feels cheerful and energized. I love the bright sunny color and the way it makes me feel. I feel like summer. Perhaps sometimes starting, but then that is what energizes me." As Vincent Van Gogh written, "How wonderful yellow is. It stands for the sun". Since yellow is seen as a bright and cheerful color, advertisers may use it to not only draw attention but also to evoke a sense of happiness.

Based on the theoretical research and the meaning that the yellow color represents, the sense of happiness and easiness is also what I want to express through this brand, I chose yellow, the bright yellow as the main color for the branding design. When children see this brand, it could convey the value of being happier and being healthier, children could totally enjoy the freedom here.

As it shows (figure 4.4.1-2), the bright color is chosen as the main color for the branding and a dark one to mark the logo and letters. The two-color matches and it's very well-marked. People will remember this logo in just a glance.



Figure 4.4.1-2 Icon and color

4.4.2 App design

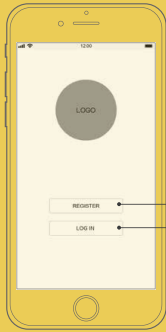
App Wireframe

To design the app, a wireframe (figure 4.4.2-1) is needed to define the main stages since the user habits and user experiences have to be considered. A wireframe is helpful to understand the main functions and easily be modified after testing. According to the numbers, it's the journey of using this application. First is the welcome page with two linked page for register and log in. If the two pages are linked by the lines, it means they could be reached by some certain buttons.

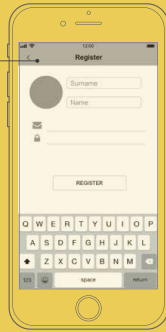
APP WIREFRAME

If the user already a member of FACULTY, choose the Log in option.

1 Welcome



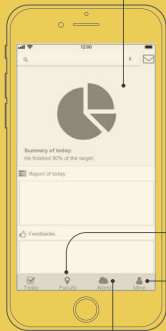
2 Register



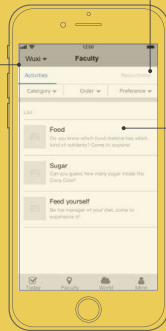
3 Log in



4 Today



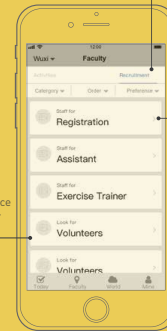
5 Faculty



6 Activity details



7 Recruitment



It's the main page of the App, the user will see today's process summary by the chart, then the details and feedback from the staff there.

The retail elderly in the community are the main target of recruitment.

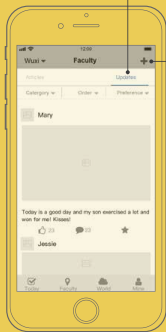
When the user is interested in one activity, she can click on to see the details.

Parents can experience the course as volunteers or assistants.

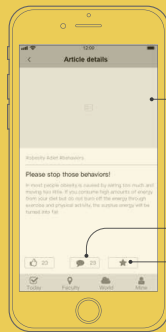
From the main page, click on the world, the user would come this page.

The other option on the page, the update post from the users recommended.

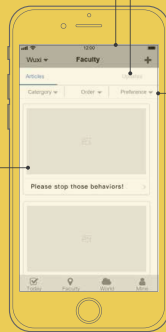
11 Updates



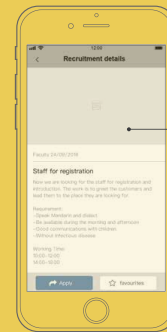
10 Article details



9 World



8 Recruitment details



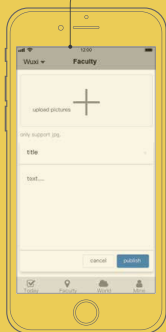
Interactions are available for users to like or comment or save.

Here all about the selected articles on obesity, nutrition, education. Users could check it for their preferences.

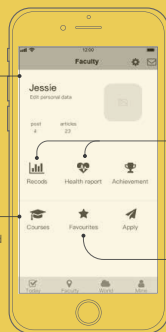
If interested, the user could see the details of the position and apply or save it as favourites.

Click the plus, users could post articles or daily news, even the moods freely.

12 Edit



13 Mine



Records about the details of exercises of today the past days.

All the health report from the doctor will be kept here for checking.

From course, the already attended and the interested one are included.

Figure 4.4.2-1 App wireframe



运动不？运动部！

运动部



Figure 4.4.2-2. Poster of the app

Interface design

The following figures (figure 4.4.2-2~4.4.2-7) are showing the interface design of the five main pages: the Welcome page, the Today page, the Faculty page, the World page, and the Mine page. The last four pages are matching the four main function buttons at the bottom of the page.

1. Welcome Page Register/ Log in



Figure 4.4.2-3 Interface design (1)

2. Today Reports/ Feedbacks



Figure 4.4.2-4 Interface design (2)

3. Faculty

Courses, activities /Recruitment



Figure 4.4.2-5 Interface design (3)

4. World

Selected articles /Updates



Figure 4.4.2-6 Interface design (4)

5. Mine

Records, reports, achievements, courses, favourites



Figure 4.4.2-7 Interface design (5)

4.4.3 Website design

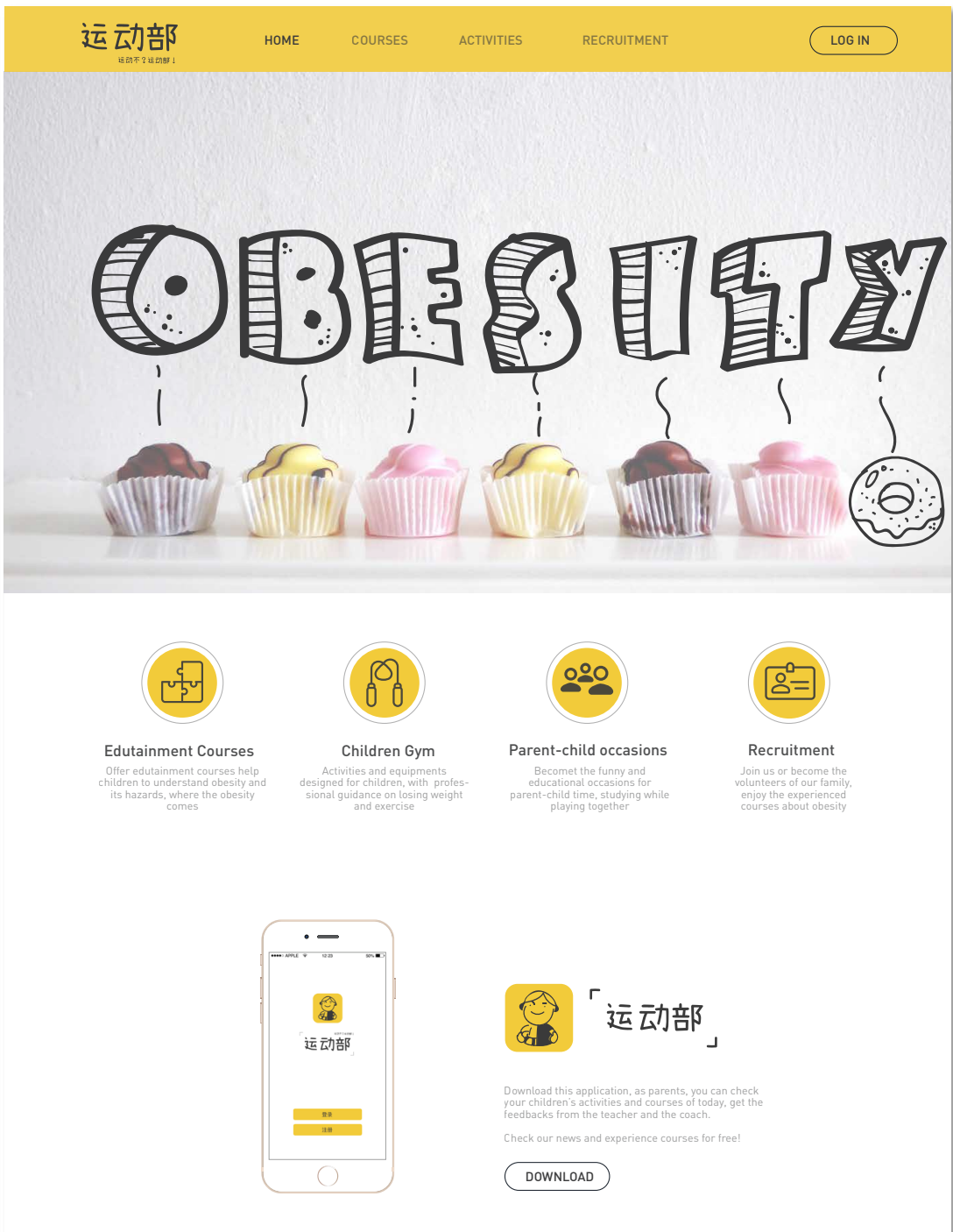


Figure 4.4.3-1 Website design (1)

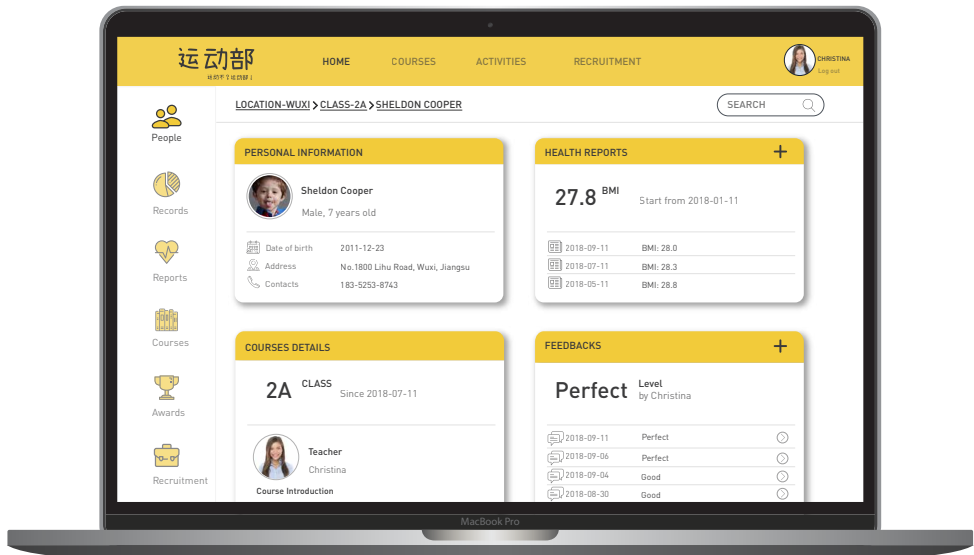


Figure 4.4.3-2 Website design (2)

As illustrated (figure 4.4.3-1), it's the home page of the website, users check the course and activities details through the website, the recruitment as well. For parents, the application is quite recommended for getting feedbacks and sharing updates anytime, anywhere. Staff from the "YUN DONG BU" will log in as the administrator for managing children's profiles (figure 4.4.3-2). They can check all the information about health reports, courses records, their awards and etc. The administrator needs to update health reports at stated intervals and add feedbacks from the teacher, so parents are able to check what happened today and how their children acted through the application.

4.4.4 Environment design

The environment needs to be created matching the edutainment topic, and there are some space typical for the teaching and playing food games. The following are some scenarios to demonstrate how it could be, and how children and adult interact within this environment. The place for teaching children knowledge on nutrition and obesity need to be decorated with bright color, appealing to their habits (figure 4.4.4-1). Space for edutainment need to be equipped with some toys as the teaching tools, and tables for writing or creating (figure 4.4.4-2, 4.4.4-3).



Figure 4.4.4-1 Environment design (1)



Figure 4.4.4-2 Environment design (2)

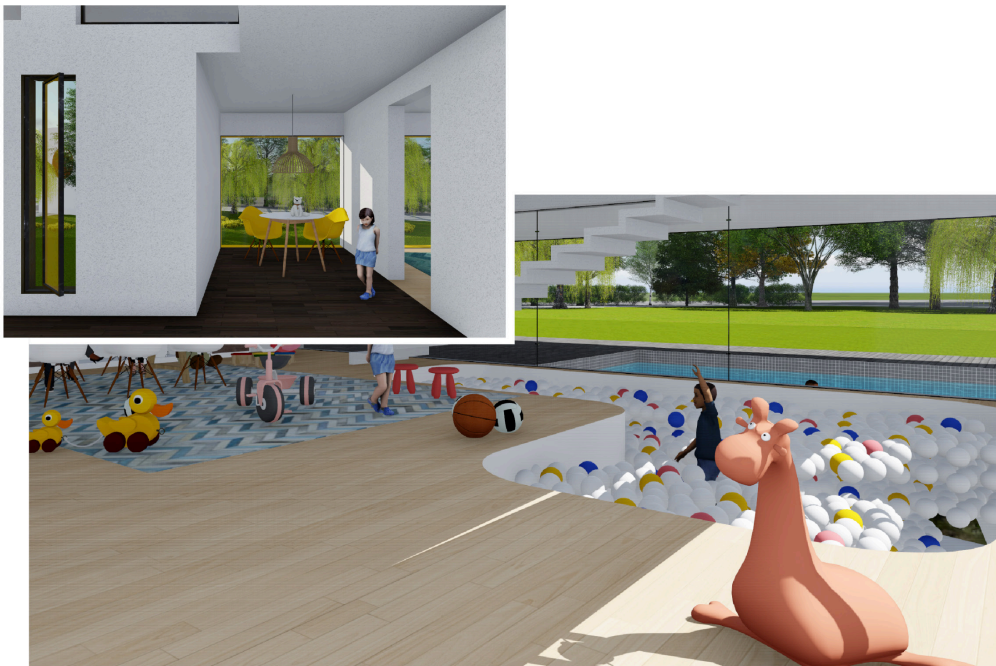


Figure 4.4.4-3 Environment design (3)

4.5 SCENARIOS

Here are some main scenarios for the three main stakeholders, describing how they interact with this service. The first and the most significant stakeholders, **the obese children**. As it illustrated (figure 4.5-1), when she ends the primary school, the staff from “YUN DONG BU” will take her to the place, she can take edutainment courses with friends or exercise in that area according to the schedule until her parents come to take her home. When she arrives at the place, no matter she takes courses or exercise, there will be professional teachers or coach is responsible for her.



Figure 4.5-1 Scenarios for children

The **second stakeholder is the parents** (figure 4.5-2). During the weekend, they can take the edutainment courses together or participate in the specially planned activities. For the family, the service is offering them extra occasion for parent-child time with the education aim. Parents can get the feedback on the application and check what activities or courses will be open the next week.



Figure 4.5-2 Scenarios for parents

The third stakeholder is the retired elderly in the community (figure 4.5-3). Elderly could see the posters in advertisement columns or hear the news through neighbors, if they match the recruitment requirements or want to be the volunteers, they can come to consult, if they succeed, they will be the assistant for the courses or doing the things that the teacher need. As they will be the volunteers or assistant for edutainment courses, they will be educated with the scientific knowledge about obesity, food nutrition in the meantime. It also benefits the retired elderly in the community, because they also have the role of being grandparents of children, so the correction of their perceptions of obesity and food helps to improve the diet and lifestyle of their children as well.



Figure 4.5-3 Scenarios for retired elderly

4.6 SERVICE BLUEPRINT

Here illustrating the service blueprint (figure 4.6), according to the customer journey, it shows how the frontstage interact with the customers, and how it be supported by the backstage. If consumers want to experience this service, they have to come to the physical place.

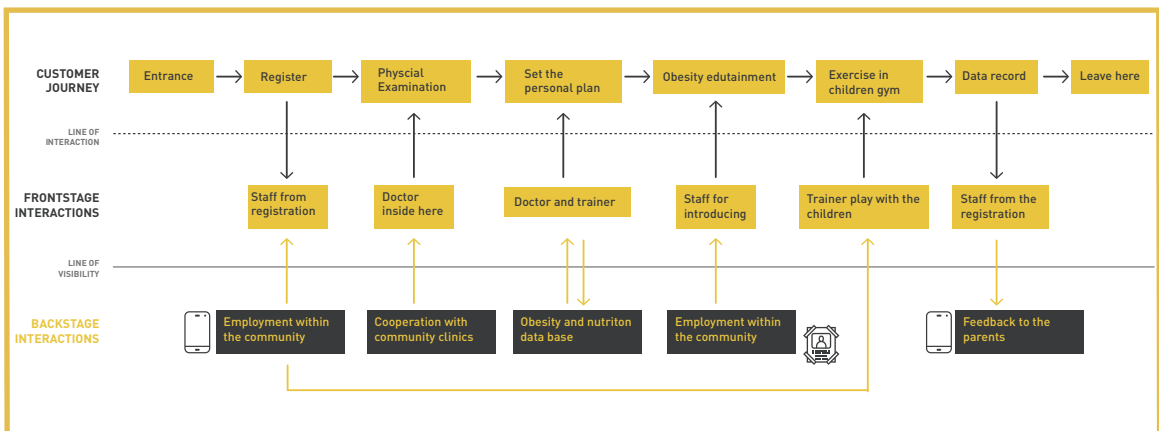


Figure 4.6 Service blueprint

05 BUSINESS PLAN

As it is not a service project that based on the existing one and just adding the improvement or innovations on. On the opposite side, it's brand new service system design and it must need an entity to launch or support it so that it becomes a realistic project, not a non-foundation one.

5.1 ENTITY DEFINE

As it is a service design proposal and there must be an entity to launch and support it. A person, partnership, organization or business? Which entity in this society has the possibility to launch this project? Here comes the term, **Corporate Social Responsibility (CSR)**. CSR is a type of international private business self-regulation. Over the last decade, it has moved considerably from voluntary decisions at the level of individual organizations, to mandatory schemes at regional, national and even transnational levels. CSR strategies encourage the company to make a positive impact on the environment and stakeholders including consumers, employees, investors, communities, and others. Moreover, from the perspective of consumers, most of them agree that while achieving business targets, companies should engage in CSR efforts at the same time. Most consumers believe companies doing charity work will receive a positive response.

Corporate social responsibility includes six types of corporate social initiatives:

- Corporate philanthropy: company donations to charity, including cash, goods, and services, sometimes via a corporate foundation
- Community volunteering: company-organized volunteer activities, sometimes while an employee receives pay for pro-bono work on behalf of a non-profit organization
- Socially-responsible business practices: ethically produced products which appeal to a customer segment
- Cause promotions: company-funded advocacy campaigns
- Cause-related marketing: donations to charity based on product sales
- Corporate social marketing: company-funded behavior-change campaigns

All six of the corporate initiatives are forms of corporate citizenship. However, only some of these CSR activities rise to the level of cause marketing, defined as "a type of corporate social responsibility (CSR) in which a company's promotional campaign has the dual purpose of increasing profitability while bettering society."

Companies generally do not have a profit motive when participating in corporate philanthropy and community volunteering. On the other hand, the remaining corporate social initiatives can be examples of cause marketing, in which there is both a societal interest and profit motive.

Based on the understanding of corporate social responsibility and its types, considering the of the specialty of service design, it could belong to corporate social marketing which totally matches the responsibility that the business enterprise needs to shoulder.

Yili Group

As the report on “Corporate Social Responsibility of China’s food industry in 2017” published, it comprehensively shows the responsibility of food enterprises over the past year, released ten cases of social responsibility of Chinese food enterprises in 2017. From the winner list of the gold award of corporate social responsibility of food industry in China, the Yili Group drew my attention.

Yili Group, whose full name is Inner Mongolia Yili Industrial Group Company Limited, is a state-owned company of dairy industry in China. It is engaged in processing and manufacturing of milk products, including ice cream, milk tea powder, sterilized milk, fresh milk, organic milk and so on. In 2018, it is the world’s 3rd best-performing food brands. In addition, from the annual report of Corporate Social Responsibility of Food Industry in China in 2016 (figure 5.1.-1), their public welfare project which called “Yili Ark”, won the top award of the excellent case of the food industry. Worth to mention, in the “China Enterprise Public Welfare Research Report 2017”, which is the most authoritative report for researching and demonstrating the social welfare of Chinese enterprises, it also been selected for the report and won the authoritative recognition of the domestic first-class research

2016中国食品企业社会责任优秀案例获奖名单

排名	企业名称	获奖名称
1	内蒙古伊利实业集团股份有限公司	伊利方舟公益项目
2	华润怡宝饮料中国有限公司	2016年百图十年公益项目
3	中国贵州茅台酒厂集团有限责任公司	金奖百年纪念林义务植树活动
4	雀巢中国有限公司	双城奶牛养殖培训中心项目
5	如新中国日用保健品有限公司	如新中华儿童心脏病基金项目
6	九三粮油工业集团有限公司	爱心基金会项目
7	新希望六和股份有限公司	情系雅安，放飞希望行动
8	杭州贝因美集团有限公司	靠谱奶粉授权门店放心买模式
9	内蒙古田牧实业集团股份有限公司	大爱有声公益行动

Figure 5.1-1 Award lists

Yili Ark

“Yili Ark” is a public welfare project initiated by Yili Group in 2012 to protect children’s growth and safety. In the five years of project promotion, through a series of expert training, case analysis, field trips, safety drills and other activities, they continued to help many areas of the country to establish an adaptive and sustainable child safety construction model, and launched the first national The campus safety assessment indicator system “Ark Hologram” provides a safe growth protection for children across the country.

Public welfare

Yili Group's practices provide a model for the exploration of the direction of public welfare.

Over the years, Yili Group has always adhered to the balanced development of management and responsibility and has deeply cultivated public welfare practices and fulfilled social responsibilities in the three core areas of "youth", "community" and "environment". The enterprise not only launched the "Yili Ark", but also the "Yili Star", which concerning children and traditional culture education, and the "biodiversity" projects to protect the earth's biology. The accumulated investment reaches 800 million ren min bi and they motivated the systematic construction.

In 2007, Yili Group pioneered the "healthy China social responsibility system". In 2017, with the process of internationalization and the realization of higher vision goals, Yili marked the United Nations Sustainable Development Goal 2030, upgraded the system to a "shared healthy sustainable development system", and became the first enterprise in the industry to land the United Nations sustainable development goals.

As Yili Group CEO said: "For enterprises, public welfare is a part of the corporate social responsibility, is the embodiment of corporate social citizenship in the depths of their hearts." This not only embodies the "initial public interest" of the enterprise but also embodies the "initial responsibility" of the Yili family. In the future, under the guidance of the brand-new "sharing healthy and sustainable development system", Yili Group will continue to explore public welfare practices and continue to lead the sustainable development of Chinese enterprises.

What Yili Group have done, no matter the Yili Ark or other projects involved in public welfare, their enterprise core value and proposition which is to bring rich nutritional support for everyone and make them enjoy an easy and simple healthy lifestyle, fits well the value proposition of the service system design project, "YUN DONG BU". It's the ideal choice for the entity to financial support and launch the project (figure 5.1-2).



Figure 5.1-2 Entity cooperation

5.2 BUSINESS CANVAS

As it describes (figure 5.2), the key partner is the Yili Group, who is responsible for negotiating with local government and the place construction, project promotion and providing course materials if it is related to the food. Descriptions in a different color corresponding to the customer segments.

For obese children, their key activities are taking the edutainment courses and exercising in the children gym. The service project provides the food and health education, adventure playground, designed types of equipment to obese children, the most value proposition is the improvement of their health. For the parents, they also engaged in the edutainment activities and have the application for managing children activities and health condition conveniently. As for the retired elderly in communities, they have the chance to become the assistants or volunteers. The last customer segment is the clinic which needs to work on the physical examination, the involvement of clinics enhance the engagement between the community and the utilization of community resources.

The main cost for the food producer which is the Yili Group includes the cost of space design and construction, cost of application and platform management, and the salary for teachers and staff.

If it is a public welfare project, there will be no beneficial revenue from the parents directly, while it will obviously help to build the brand reputation and reliability as the enterprise takes the responsibility for social issues. And it may bring the cooperation income from other food producers.

Or if it charges the project at a low price, tuition payment will still be part of the revenue streams.

**BUSINESS
CANVAS**

KEY PARTNERS	KEY ACTIVITIES	VALUE PROPOSITION	CUSTOMER RELATIONSHIPS	CUSTOMER SEGMENTS
Yili	<p>Negotiate with local government Construction Promotion Provide course materials Edutainment courses Children gym Assist the course teaching Edutainment activities Physical examination</p>	<p>Food and health education Adventure playground Designed equipments for exercise Health improvement Management of children activities Parent-child occasions Recruitment Education on childhood obesity Promote the brand value Attract consumers Enhance the engagement among the community</p>	<p>Cooperation among community entities Brand value communication Utilization of community resources</p>	<p>Obese children Parents Retired elderly Food producers Clinics</p>
	<p>KEY RESOURCES</p> <p>Space for children gym and edutainment courses Teachers and training coaches Health data base</p>		<p>CHANNELS</p> <p>Partner platform Community billboard Clinics promotion</p>	
<p>COST STRUCTURE</p> <p>Cost of space design and construction Application and platform management Salary for teachers and staff Cost of cooperation</p>		<p>REVENUE STREAMS</p> <p>Tuition payment Cooperation income from other food producers Brand reputation and reliability</p>		

Figure 5.2 Business canvas

5.3 PILOT AREA

Before the official launch of this service projects, a test on the pilot area could be done to see how it works and does it worth the investigation of enterprises.

I choose a primary school and its surroundings from one of the Second-tier cities of China, which are mostly provincial capitals, strong economic cities in the east or regional central cities with the developed economy. Those Second-tier cities have a certain economic base, relatively strong business activity, and have a certain attraction to large companies, big brands, and excellent talent, and are becoming or will soon become the focus of the layout of large companies in the next few years. Another key reason for choosing a second-tier city instead of a first-tier city such as Beijing or Shanghai is the urban architecture is not that crowded.

As it maps (figure 5.3-1), the red area is the Yuhong Primary School in Wuxi, Jiangsu Province, China. The areas marked with the black lines are the residential neighborhoods. As in China, we have the policy that the children need to go to the nearby school within certain distances, it forms the typical geographical distribution.

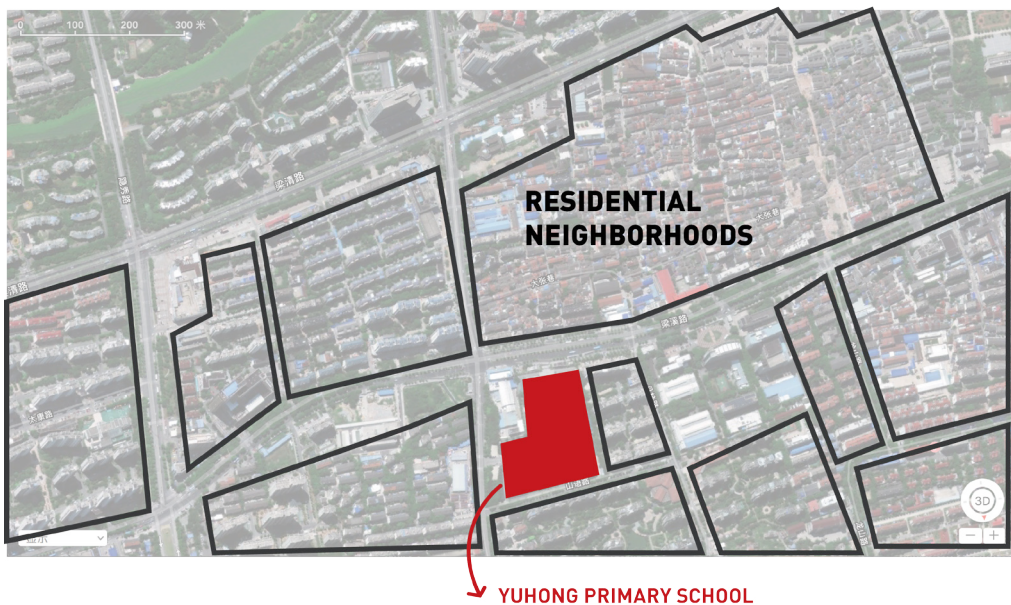


Figure 5.3-1 Pilot area (1)

Based on the geographical distribution, the only possible pilot area is located near to the primary school, which is marked with the yellow color (figure 5.3-2). According to the map scale, it covers an area of 4500 square meters. When it used as the pilot area, the actual area demand ranges from 700 to 1000 square meters.

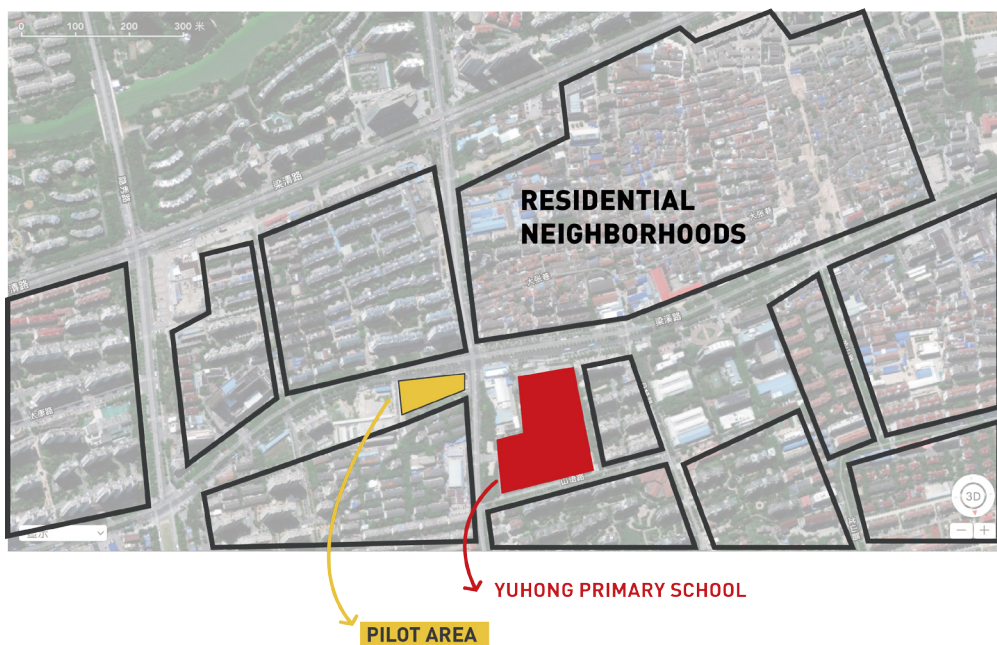


Figure 5.3-2 Pilot area (2)

Resources

children

As this pilot area is located next to a primary school and there is no other competitive primary school, it will have a large number of potential users. Even the obese children are not before primary school or just graduate from primary school, the pilot area still has the population advantage from the nearby residential neighborhoods.

Parents

As in the current social environment, children are living with their families, if we gain the large population of children, it equals to the large population of the parents.

Elderly retired

As the residential neighborhoods are consisting of the very old ones and the new-built ones, based on its development history, it covers different ages of individuals, from the new-born baby to the retired elderly. Even in certain residential neighborhoods, there are less retired elderly living there, we still consider the surrounding residential neighborhoods as the support for the testing target group.

Volunteers

Not far away from the pilot area is a university and that's one of the reasons why I chose this area for the pilot project. For testing how it works, maybe for now we can't find the professional teachers or training coach for a very short time. The students from the nearby university are the potential volunteers for supporting the prototype of the service project. Based on their educational background, they already have the skills and understanding for testing the project in an ideal environment.

Government

The local government has released the policy about guiding entrepreneurs to perform their duties and social responsibilities, and actively participate in social charity. Enterprises are encouraged to actively perform their social responsibilities, enhance the vitality of social development, and enhance the quality and efficiency of economic development.

5.4 ITERATION AND MODIFY

Thought the prototype, here are the key points need to be tested: Can obese children and parents easily involve in the project? Do children learn knowledge of obesity and food from the edutainment courses? Are the equipment well-designed for children? Does the application and website work as imagined? Can the different stakeholders in communities engaged in the system? How do the parents feel about the service project? Answers to those questions are closely associated with the design of edutainment courses, the approaching ways of the service, user interaction design of application and website, the technology and database behind. Modifies need to be done after the testing for improving the user journey and better user experience, then run the iteration and modify again. Even all the information and pain points come from the target users, but how the service design will help them need to be operated in reality to see its influences.

And the next step of the business plan depends on the effects of the prototype, including the scale of the service design and in how many cities it could cast, in which kind of cities. Those are the inevitable factors need to be considered for the further business strategy.

CONCLUSION

Before I work on the childhood obesity in China, I have to admit that I know less about the fact that a large population of childhood obesity exists in China. I, like most people, consider the obesity would happen mainly for adults. Although I knew no matter the children or adults, can not avoid the disease. With the deeper interviews with target families, many reasons have emerged, such as parents' misperception of obesity and food, the pressure from grandparents, the engagement of children's classmates, and the society food environment. Some of the factors are hard to change in a short time or in current economic condition. As a service designer, the only thing that we can do is to dig their pain points, explore design opportunities, then creating a service system wishing to improve the childhood obesity epidemic.

What I gained from the service project, one part is the process of embarking from a common social phenomenon, get to closely understand the target group and propose a solution in the end; the other gaining is the thinking on Corporate Social Responsibility. It's a new concept for me that as the enterprises, they have to shoulder their responsibility not only on products or service quality but also the public welfare or charity. That makes me comprehend deeper about how a service project can be realized or developing trends.

ACKNOWLEDGEMENTS

The completion of the thesis is attributed to many peoples support and encouragement.

First and foremost, I want to extend my heartfelt gratitude to my supervisor, Professor Francesco Zurlo, for his constant encouragement and guidance. He has walked me through all the stages of the writing of this thesis. Without his consistent and illuminating instruction, this thesis could not have reached its present form.

Also, I would like to express my sincere gratitude to all the professors who have taught me in this university. Their instructions have helped broaden my horizon and their enlightening teaching has provided me with a solid foundation to accomplish this paper and will always be of great value for my future career and academic research.

Last but not least, I would like to express my special thanks to my parents, whose care and support motivate me to move on and make me want to be a better person.

BIBLIOGRAPHY

1. Kolimechkov, Stefan. (2016). Body Mass Index. *STK Sport UK*
Obesity and overweight. (n.d.). Retrieved from <http://www.who.int/en/news-room/fact-sheets/detail/obesity-and-overweight>
2. Obesity update 2017 (Rep.). (n.d.).
<http://www.oecd.org/health/health-systems/Obesity-Update-2017.pdf>
3. Must A, Spadano J, Coakley EH, Field AE, Colditz G, Dietz WH. The Disease Burden Associated With Overweight and Obesity. *JAMA*. 1999;282(16):1523–1529.
4. T Burton, B & R Foster, W. (1985). Health implications of obesity: An NIH Consensus Development Conference. *Journal of the American Dietetic Association*. 85. 1117-21.
5. S Strauss, Richard. (2000). Childhood Obesity and Self-Esteem. *Pediatrics*. 105(1): e15.
6. Weinsier RL. Genes and Obesity: Is There Reason To Change Our Behaviors?. *Ann Intern Med*. ;130:938–939.
7. Kuchler, Fred & Golan, Elise H. & Variyam, Jayachandran N. & Crutchfield, Stephen R., 2005. "Obesity Policy and the Law of Unintended Consequences," *Amber Waves: The Economics of Food, Farming, Natural Resources, and Rural America*, United States Department of Agriculture, Economic Research Service, pages 1-8, June.
8. Zhang, Y., Liu, J., Yao, J., Ji, G., Qian, L., Wang, J., ... Liu, Y. (2014). Obesity: Pathophysiology and Intervention. *Nutrients*, 6(11), 5153–5183.
9. Sacks, Gary & Swinburn, Boyd & Lawrence, Mark. (2008). Obesity Policy Action framework and analysis grids for a comprehensive policy approach to reducing obesity. *Obesity reviews : an official journal of the International Association for the Study of Obesity*. 10. 76-86.
10. The Design Process: What is the Double Diamond? (n.d.). Retrieved from <https://www.designcouncil.org.uk/news-opinion/design-process-what-double-diamond>
11. Cottam, H., & Leadbeater, C. (2004). *Health: Co-creating services*. London: Design Council.
12. M. Rodriguez and D. Charvel, "Fighting Against Obesity and Overweight: Approach to Design a New Service in Nutrition Education," *Journal of Service Science and Management*, Vol. 6 No. 1, 2013, pp. 110-116.
13. Li, Bai & Adab, Peymané & Cheng, KK. (2015). The role of grandparents in childhood obesity in China - evidence from a mixed methods study. *The international journal of behavioral nutrition and physical activity*. 12(1): 91.
14. Huijun, W., & Fengying, Z. (2013). Program and Policy Options for Preventing Obesity in China. *Obesity Reviews : An Official Journal of the International Association for the Study of Obesity*, 14(0 2), 134–140.
15. Valdez, Patricia & Mehrabian, Albert. (1995). Effects of Color on Emotions. *Journal of experimental psychology. General*. 123. 394-409.
16. Chris J. Boyatzis & Reenu Varghese (1994) Children's Emotional Associations with Colors, *The Journal of Genetic Psychology*, 155:1, 77-85.
17. Cherry, K. (2017, December 06). How Does the Color Yellow Make You Feel? Discover the Psychology of Color. Retrieved from <https://www.verywellmind.com/the-color-psychology-of-yellow-2795823>

18. 杜松明, 马冠生. (2017). 《中国学龄儿童膳食指南 (2016)》及解读. 营养学报. 39. 1-4.
19. 房玥晖, 何宇纳, 白国银, 等. 2012 年中国 20~79 岁男性饮酒现状分析 [J]. 中华流行病学杂志, 2018, 39(3): 280-285.
20. 许晓丽, 赵丽云, 房红芸等. 《2010—2012 年中国 15 岁及以上居民饮酒状况》. 卫生研究. 2016 年 7 月: 534-537

REPORT

《2017 年中国健康调查数据》
(China health survey 2017)
http://www.sohu.com/a/160926010_423114

《中国学龄儿童膳食指南 2016》
(Dietary guidelines for Chinese school-age children 2016)
http://www.xinhuanet.com/health/2017-01/11/c_1120288242.htm

《中国居民膳食指南 2016》
(The Chinese Dietary Guidelines)
<http://dg.cnsoc.org/>

《2016 中国食品行业社会责任报告》
(The Corporate Social Responsibility of Food Industry in China 2016)
<https://www.china-10.com/news/472318.html>

《2017 中国食品行业社会责任报告》
(The Corporate Social Responsibility of Food Industry in China 2017)
<https://www.maigoo.com/news/495042.html>