

**THE GLASGOW  
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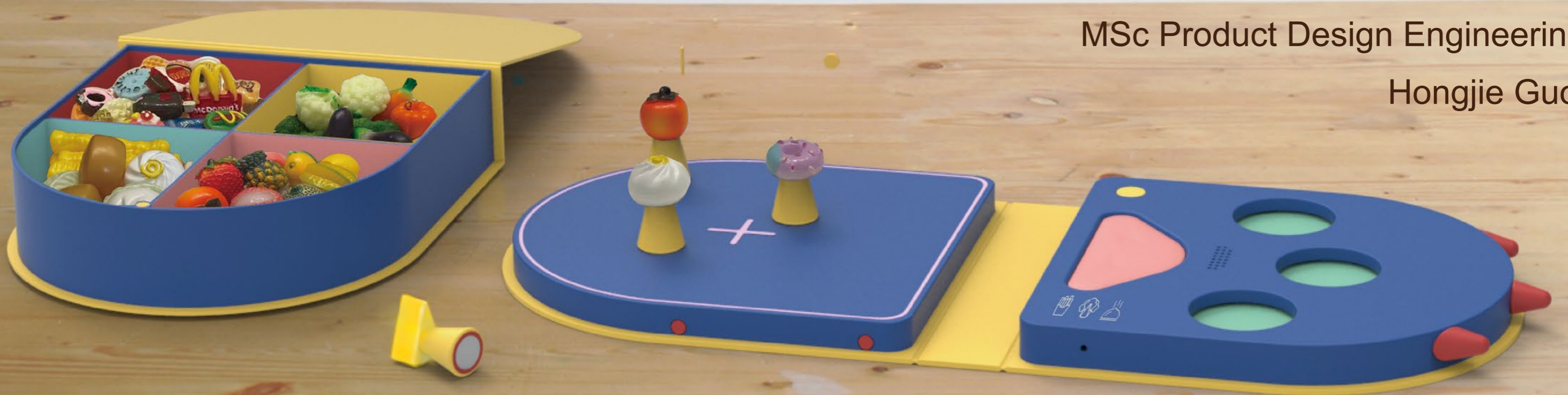
**Major Project Design Journal**

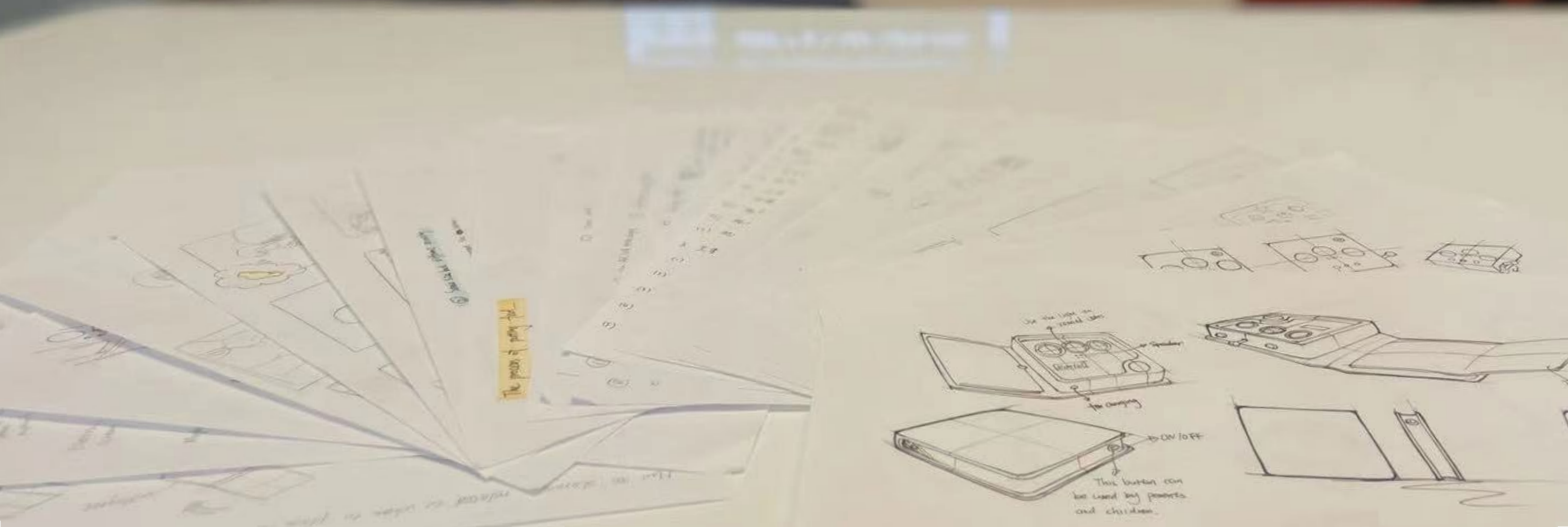
# Teddy's Diet

*An Electronic Product for Educating Children General  
Principles of Healthy Eating*

MSc Product Design Engineering

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# Research


## Background

The World Health Organization (2016) places childhood obesity as **one of the greatest global public healthcare challenges**, and the WHO Commission on Ending Childhood Obesity **calls for** comprehensive **early interventions** promoting multiple factors including longer breastfeeding, a healthy early childhood diet, and an active lifestyle ( Geneva 2016,1).


## Influence




**On Children**




**Decreased Mobility**




**Depression**, self-esteem, bullying



**Chronic Diseases**

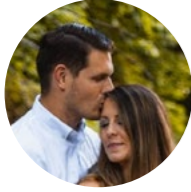


**Lower educational attainment**




Increased risk of **metabolic syndrome in adulthood**


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**On Parents**




**Loneliness & vulnerability**




**Frustration, guilty, lack of power**


## Mainly Associated to...




**Diet**




**Physical Activity**




**Sedentary**



**Genetic factors**



**Family Income**



**Being overfed**

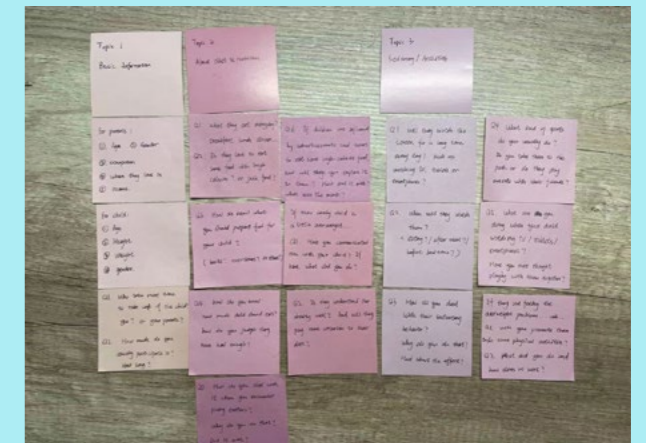
## Key Period

Evidence indicates that the period **from conception to 5 years of age** is a critical window for childhood obesity development.



**Therefore, I tend to** pay more attention to the children who are **2 to 5 years old because** during this period, it is not only important for them to have a healthy diet but also to **establish healthy behaviours**.

## Investigation Preparation



Based on above research, it can be found that the main factors which influence children's weight between their ages of 2 and 5 are '**Diet**', '**Physical Activities**' and '**Sedentary**'. Therefore, I plan to conduct **semi-structured interviews** and **observation** of children's behaviors from these aspects. Furthermore, I also prepare three topics and relevant questions to interview parents.



## Method

-  I **contacted three families** in China through personal relationships and all of them have a 2-5 years old child now.
-  The interview and observation are conducted by **video chat** mainly before, during and after their dinner time.

## Objectives

-  To know parents' **awareness/knowledge/understanding** about the childhood obesity and relative behaviors.
-  To find their **difficulties or needs** in their daily life when they interact or communicate with their child about the health behaviors.

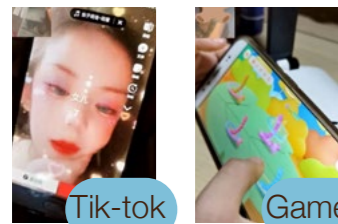
# Research



**Nini**

5 years old  
with a healthy weight

## Observation



She tend to spend most of her entertainment time on watching Tik-tok or play games.

This can cause a **high risk of sedentary**

"If I took the phone away from her, she would immediately start crying. Therefore, in order to keep her being quiet, I has to give it back to her mother."

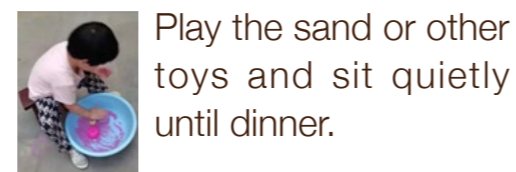
—Said by her mother



**Guoguo**

3 years old  
with a with a risk of overweight

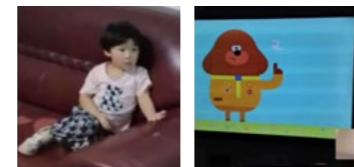
## Observation



Play the sand or other toys and sit quietly until dinner.



Don't like to eat vegetables.



Watching TV for most of the time after the dinner.

**No or Less eating vegetables is not a good habit. She also has a risk of sedentary.**

"She dose not like to eat vegetables but I have no idea about it."

—Said by her mother

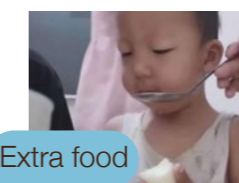
## Inverview & Observation



**Zihao**

3 years old  
Has been **overweight**

## Observation



Extra food

Ask for more food from his mother.



Cry for cookies

Ask for cookies during dinner time from his mother or he will cry.



Get peace

## His Other Eattng Situation

Pass by supermarket/ street store/ convenience store

Sometimes just see the ultra-processed food at home

"I have tried to make him understand eattng too much ultra-processed food is not good, but he is so young that he cannot understand my words well."

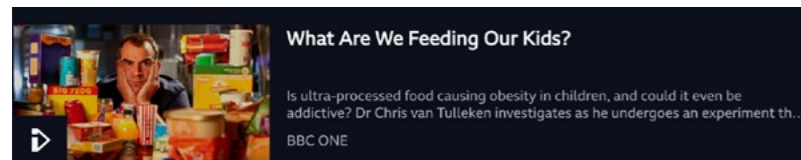
"When he cry for some-thing unhealthy food, I tried to stop him but finally I still fail because I really cannot bear his crying especially in the public place which makes me feel embarrassed."

—Said by her mother

**Enjoy eating and often eating too much, including ultra-processed food and his mother fail to persuade her son or encourage his son to eating more healthier.**

## Online Resources

### BBC Documentary

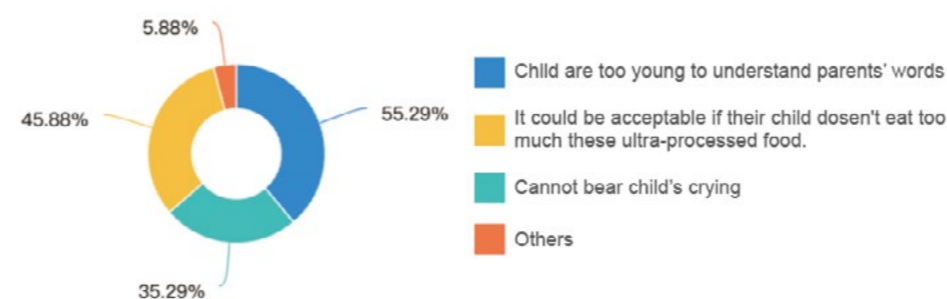


**Ultra-processed food** can influence human's weight significantly and this is the **most important** factor.

Compared with public health, the **priority of relevant manufactures is profit.**

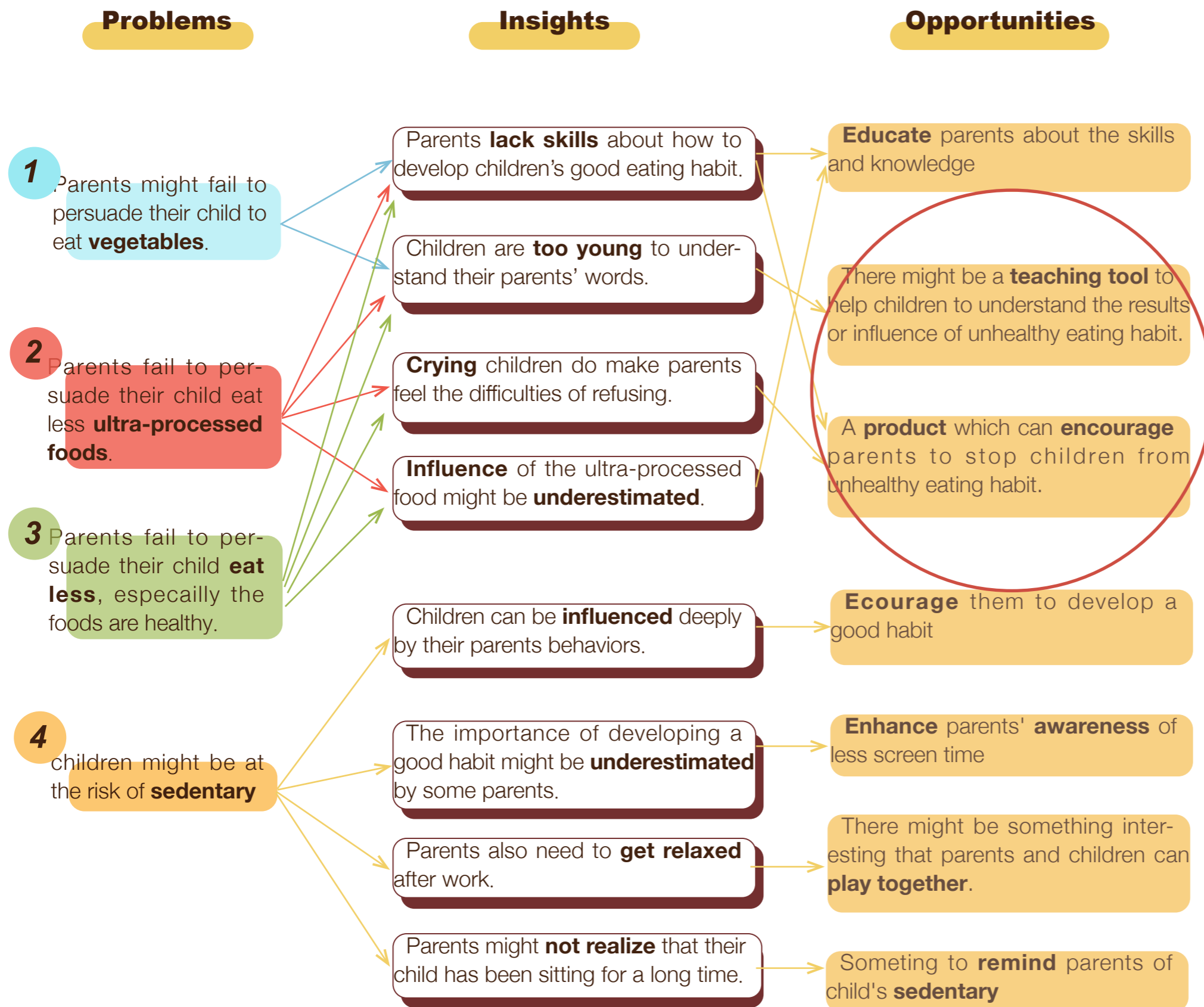
## Questionnaire

I made an **online questionnaire** in China, and invited **mothers who have 2~5 years old child** to participate. Finally, I got 239 feedback



**More than 50% parents** think their **children are too young to understand their words** when they persuade or encourage their children to eat more healthily.

# Defination



## Design Direction:

- Problem 1, problem 2 and problem 3 are related to the **eating habit** and Problem 4 is related to **sedentary**.

According to the desk research, all of these are related to childhood obesity, but eating habit are significantly more important than other factors.

Therefore, in my project, I would like to **focus on** the problems about **developing eating habit**, which might be more helpful to contribute to prevent and relieve this issue.

- As for educating parents about the skills and knowledge, as well as enhancing their awareness of healthy eating, I think it **might not be necessary** to **rely on a tangible product** to deal with it.

Just like the previous desk research, there might be some training classes or home visits, and maybe the online traing could also be available or cheap to them.

Therefore, at present I tend to **focus on the teaching tool design** or **a product** used to encourage parents efforts to stop child's unhealthy eating habit, **especially** reducing the intake of **ultra-processed food** in their daily life.

# Persona



**Xiaona Gao**

**Age** 31  
**Gender** Female  
**Location** Tianjing in China  
**Education** Associate Degree  
**Occupation** Accountant

## BIO

She is a mother of a **3 year old boy**, who enjoying eating very much. Her family income is not high in China but it is enough for them to get fresh vegetable and meat everyday. During the week days, her child will go to the kindergarten and has lunch here. She takes care of her child mainly after her work and on the weekends, and during other period, her child will be taken care by grandparents.

## Frustrations

She know her son has already eaten enough, but her son's expressions of eating made managing food intake **particularly challenging**, especially when he is crying for these foods.

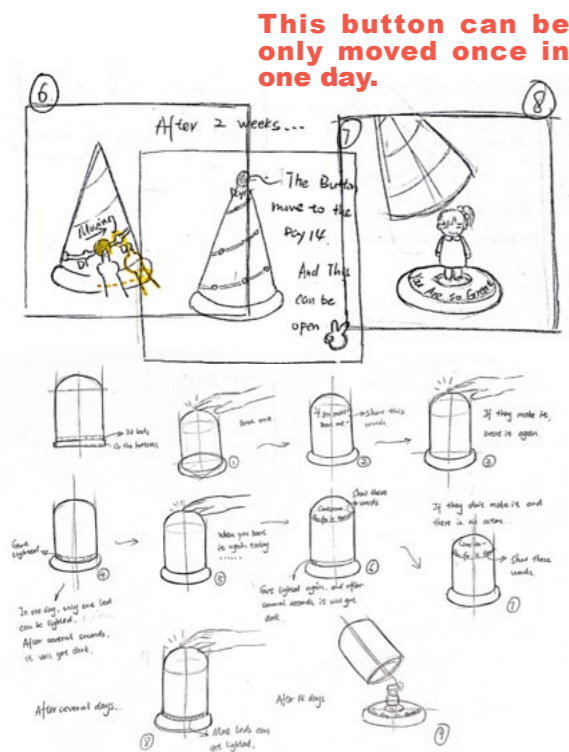
When she persuade her son to eat more vegetables or eat less ultra-processed food such as chips or cookies, her son **cannot understand** her words well.

## Core Needs

Be encouraged to not give up easily to help her son to develop the good habit especially when his son is crying for these foods.

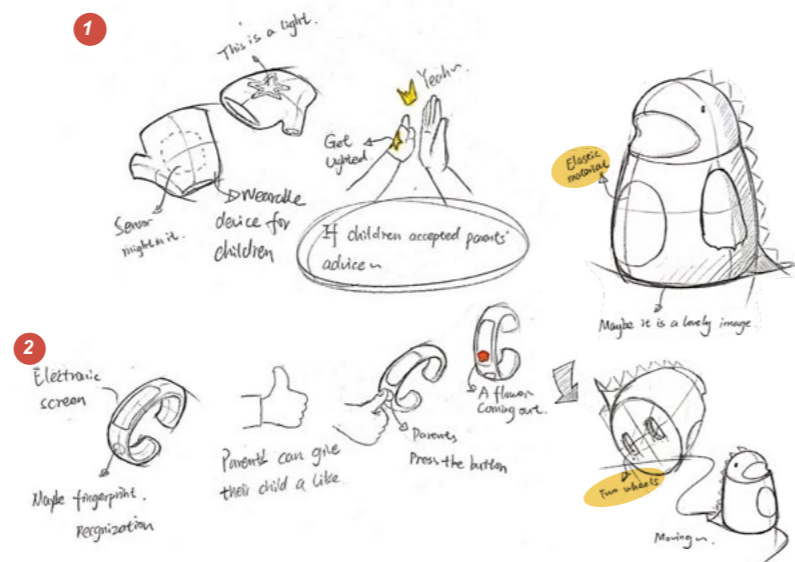
Something can help her son to understand the importance of eating more healthy food or to understand it would be better to eat less ultra-process food.

# Concepts



## Concept 1

**Encourage parents** to make more efforts to persuade children to eat more healthily and do not spoil their child.



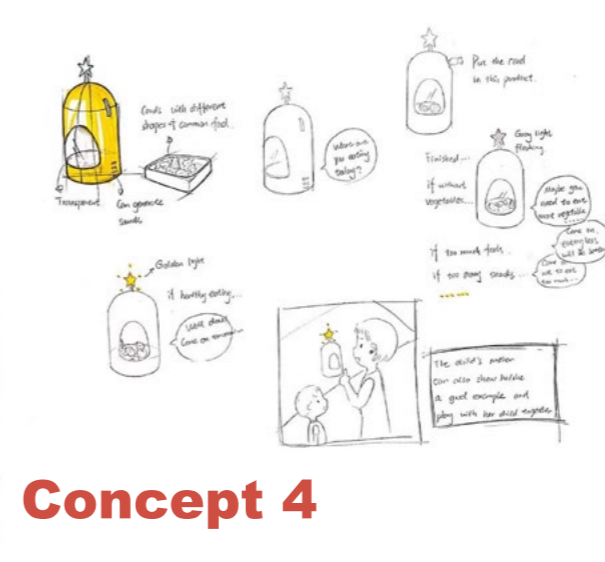
## Concept 2

Give children **immediate praise** when they accept their parents advice about healthy eating.



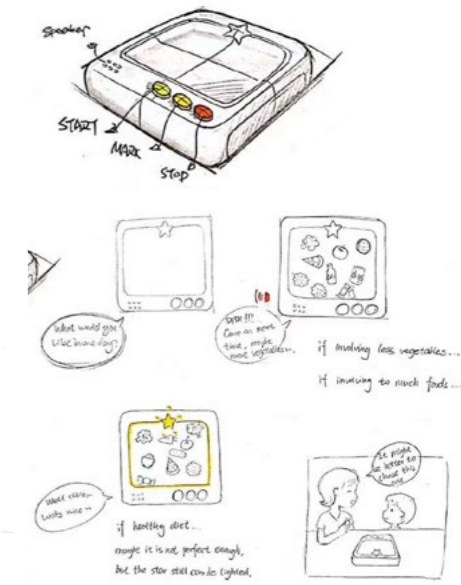
## Concept 3

Combine **storytelling** way to help children to **understand the influence** if they eat too much unhealthy foods.



## Concept 4

**Assess children's actual daily diet.** This product is used to assess what they have eaten in one day and give children a feedback. Parents need to explain why it happens if they get an unsatisfied result and encourage them to try it better.

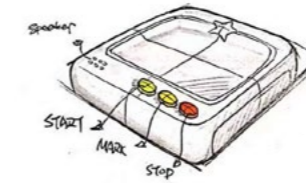


## Concept 5

**Teaching tool for diet stratege.** Place the food models they would like to eat for one day at a recognition area and the product will assess it and give children a feedback. Parents also are involved.

# Concepts

## Users Engagement



## Design Intention

In order to know parents' opinions towards the concepts, I **interview 5 parents** through **WeChat**.

	Encouragement		Teaching Tool		
	Encourage Parents	Immediate Praise	Storytelling	Assess Daily Diet	Diet Strategy Game
<b>Yan Chen</b> Has a 2 year old child and would like to prevent obesity.		I like the wristband to praise her daughter, and she also hope there would be a statistic function to know how many likes their child can get.			I love this idea, especially this can help my child to <b>practice to make food decision</b> .
<b>Limei Liu</b> Has a 5 year old child who don't like eating vegetables.			The appearance looks lovely and attractive, and my child might like it.		I think it seems to be very helpful. Besides, it could be better if its appearance is attractive.
<b>Xiaomei Guo</b> Has a 13 year old daughter and the child has been overweight.	I think I <b>need</b> this product to encourage myself to be more motivated when my child was young.	I think the wristband looks very <b>convenient</b> compared with other concepts.			I think using this way will cost my time but it definitely helpful to <b>strengthen the bonds</b> between me and my child.
<b>Yue Zhao</b> A teacher who has 12-year experience of teaching 4-7 year old children			I think it is <b>Ok</b> to tell children the influence, and this way can <b>show it directly</b> .	I think it is <b>helpful</b> to develop children's good habit <b>day by day</b> .	I think this idea is good, and this might can combine with last two concepts together.
<b>Liang Li</b> A teacher who has 14-year experience of teaching 4-7 year old children.		I like it and I also think this product can have other functions, such as monitor sugar intake.	Knowing the result of unhealthy eating habit can have an influence on their choice.		This looks interesting and can <b>enhance children's awareness</b> about healthy eating.

### Other Key Feedback

It might be better to **combine them together**.  
**It can be acceptable to tell children some simple influence** in term of unhealthy eating habit.

### Summary

Based on the feedback from interviewees, the Concept "Diet Strategy Game" is the favorite one, and through the analysis, at present, this concept dosen't have obvious disadvantages. Therefore, **I tend to choose Concept 5**.

Besides, although the **Concept 3 Storytelling** dosen't involve the parents' engagement at present, I think it deserve to consider **combine this with Concept 5**, and **I also will try it** at next stage.

### Hope children to know:

- Don't eat too much, even they are healthy food. ✗
- High proportion of ultra-processed food is not acceptable. ✗
- No or less vegetables is not good. ✗
- Appropriate amounts of ultra-processed food is acceptable. ○
- All healthy foods are encouraged to the greatest extent. ★



### During this process, children are expected to...

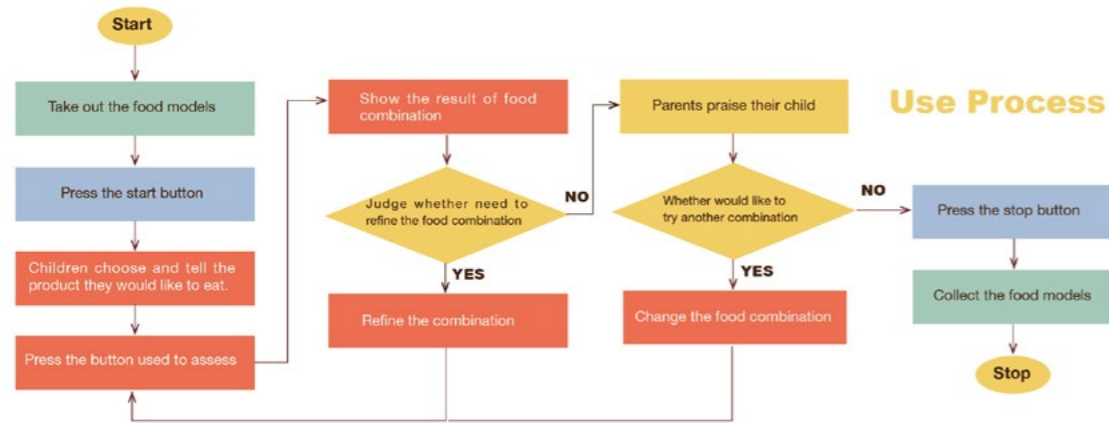
- 1 Learn what kind of food is ultra-processed food, and what kind of food is healthy
- 2 Learn what they are encouraged to do in terms of eating.
- 3 Enhance healthy eating awareness.
- 4 Practice to make decision about their diet.

### Parents' role in this process:

- Parents need to accompany their child when they play it.
- If the light doesn't get lighted, parents will explain why it is not good, and give them a advice and children can try again.
- If the light get lighted, parents will give their child a praise and then encourage them to try another food combination .

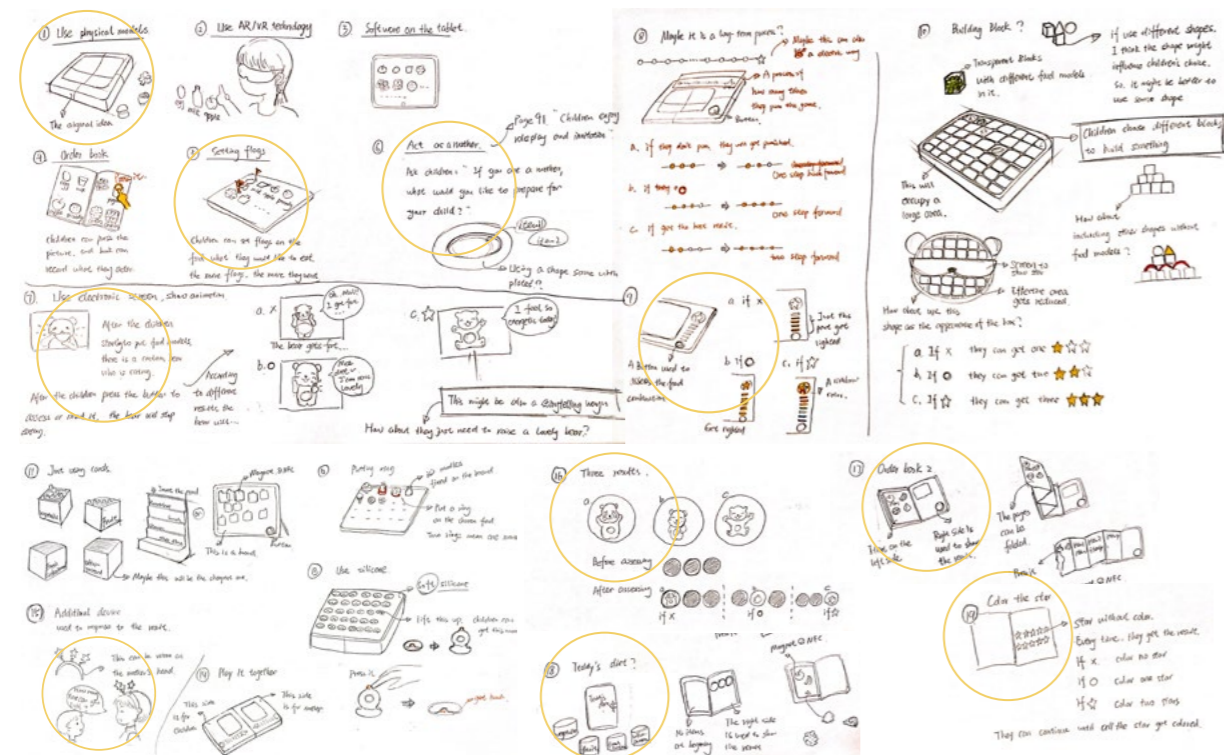
# Interaction Exploration

At this stage, I will design the details of the product, and the **key point** is to make the product **interesting and attractive** to promote the children's engagement.



Through analyse the use process, I think how to choose the food models and how to show the results of their food combination are very important, because it is strongly related to whether it is attractive. Therefore, firstly, I would like to design these parts.

## Brainstorming...



## Test Preparation

I picked up some ideas from the sketches, and make models used to test which one children prefer.

### Food models Preparation

I prepared two types of models, all of them are common in daily life.



### Story Setting

- 1 Your Tomorrow Diet.** Ask children what they would like to eat tomorrow. This built a relationship with their actual life.
- 2 Raise a Little Bear.** Tell them they need to raise a little bear and ask what they would like to prepare for the bear. This will combine a storytelling way to show the result.
- 3 Role Exchange.** Ask them if they are a 'mother', what they would like to prepare for their mother.

## Choosing Food

### 1. Physical Models



Just choose the food models in different box and put them on the targeted area.

### 3. Order Book



Just press the food on the left side and then the product can record what users have chosen.

### 2. Setting Flags



Set flags on the board when they choose the food.

### 4. Teddy's diet



This combine the storytelling directly. Children can put the models on the targeted area.



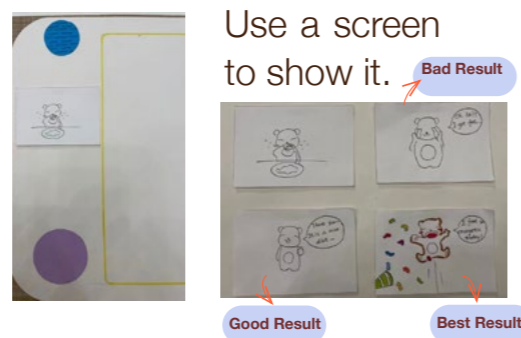
# Interaction Exploration

## Models for showing results

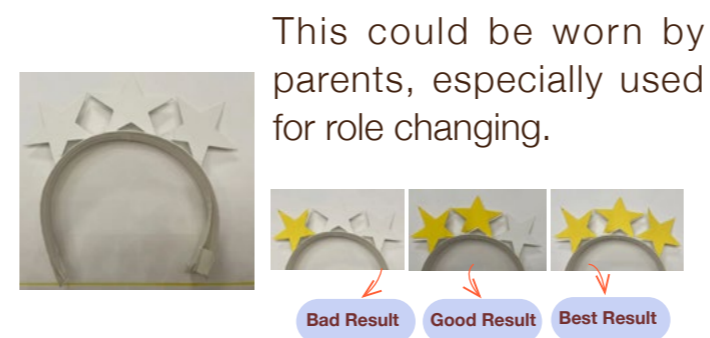
### 1. Star Light



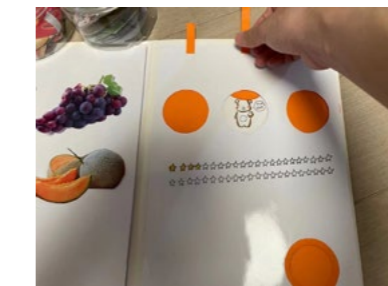
### 2. Animation Bear



### 3. Star Light on hair band



### 4. Covered Bear



There are three results which are same with the animation bear.

However, at the beginning, all of them are covered, after pressign the button to assess, then one result can get unlocked.

## Interaction Test

Invited four children from three families to engage this test.



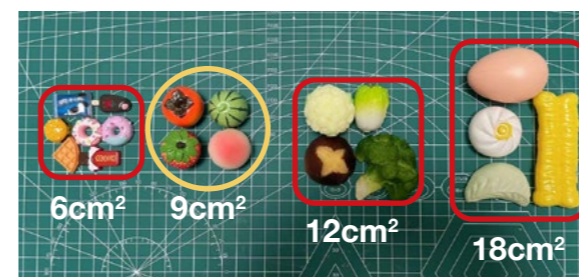
### Feedback from Children

	Story Mode			Choosing Process			Result Show				
	Children's Tomorrow Diet	Raise A Bear	Role Play	Physical Models	Order Book	Setting Flags	Teddy's Diet	Star Light	Animation Bear	Hair band	Covered Bears
Niuniu		♥ It looks like my pet and I want to raise it.		♥ These models look very lovely!					♥		♥
Bao		♥	♥			♥	♥	♥ I love stars because they can twinkle		♥ It is really funny!	
ZiMeng		♥	♥			♥	♥	♥ It looks beautiful~		♥	♥
ZiHao		♥		♥			♥	♥			♥

## Summaries

Overall, I finally choose the story **setting of raising a bear** ( although this is 'raising an animal', they still treat is the foods what they wouldgenarely eat), **Teddy's Diet** and show the result by **covered bears**.

## Other Findings



1. The **size of the second models** is their **favorite**.

2. It could be appropriate to **only prepare one model for each food**.

3. It could be better to aim at **3-4 years old children**.

4. **Provide prompt for parents** after the assessing the food combination to make them know what is the specific problem more clearly.

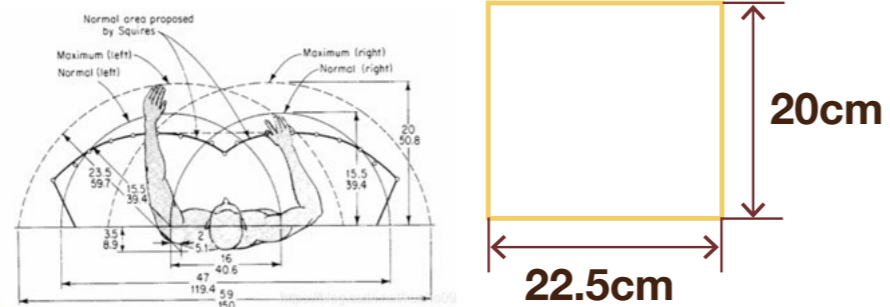
5. **Provide some tips for children** when they collect the food models.

6. **Rules should be slightly change**.

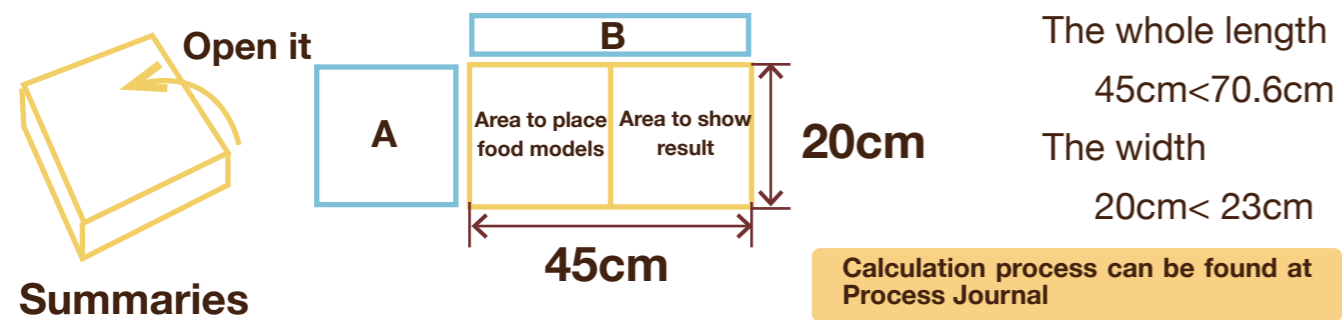
- Don't eat too much, even they are healthy food. ✗ **A terrible result**
- High proportion of ultra-processed food is not acceptable. ✗ **A terrible result**
- No or less vegetables is not good. □ **Encourage them to get a better one**
- A medium proportion of ultra-processed food. □ **Encourage them to get a better one**
- Appropriate amounts of ultra-processed food is acceptable. ★ **Best Result**

# Usability Exploration

## Size of the Product



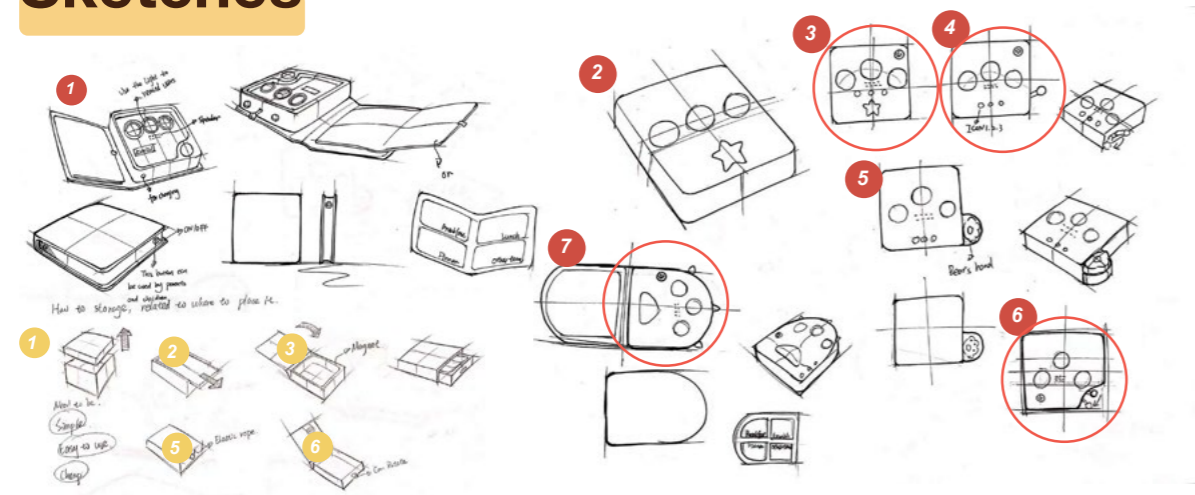
Firstly, I reference the size of the common children's book to design the size of the product. Then based on the shoulder width of 3 years old children, I estimate the size of working area and test whether the size of the product is appropriate.



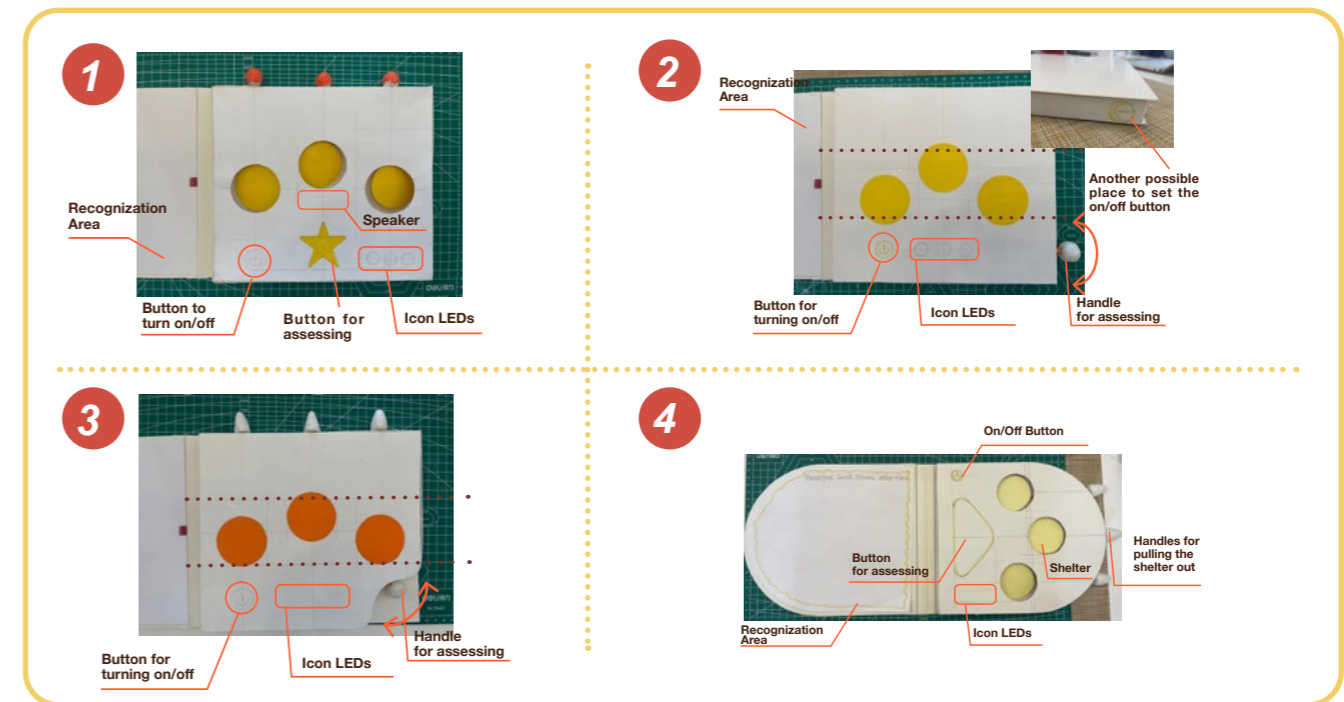
## Summaries

1. This size of the product can meet the requirement in term of ergonomics.
2. Place the food model box at A area.

## Sketches



## Making 1:1 Models



## Recognition Area



Different ways to show breakfast, lunch, dinner and other time on the recognition area.

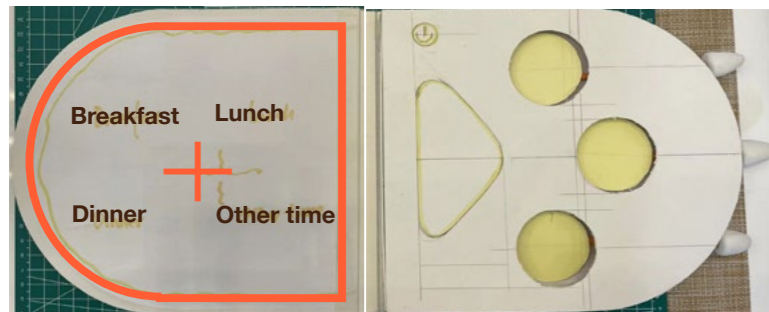
Besides, the area would be enough for children to place more than 40 food models.

## Usability Test



# Usability Exploration

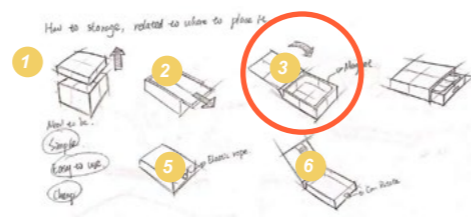
## Final Decision



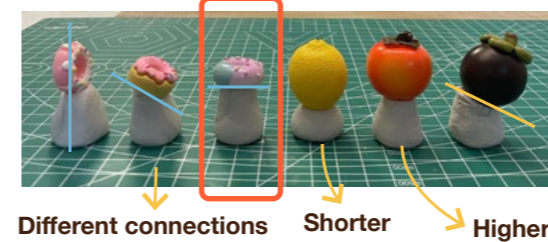
### Reasons:

1. **Attractive appearance**
2. **Better experience** in terms of the button's position, the direction of pulling the handle, etc

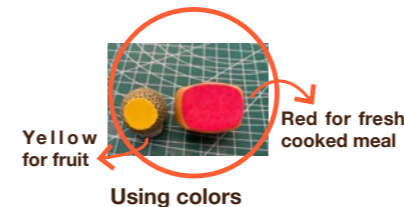
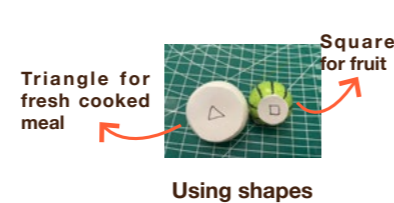
### Box for Food Model



### Models' Shape



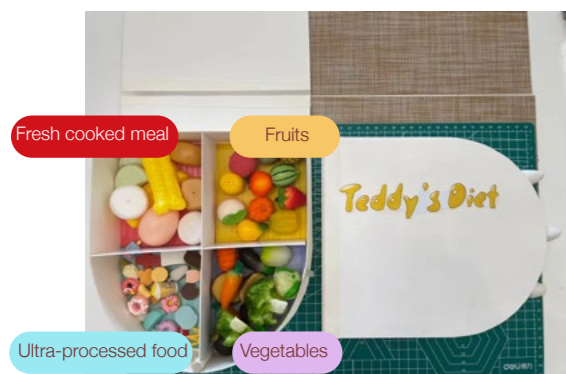
How to provide tips for their children to put the food models in right area?



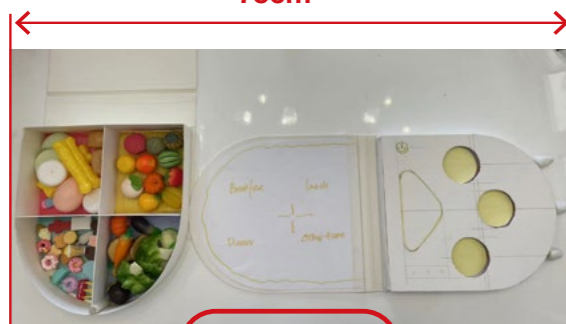
## Other suggestions

- 1 The shelter can **move slightly after it gets unlocked** to indicate that this one is the feedback.
- 2 The product can **play its name when it is identified** because she found that her children do not know all the name of the food models.

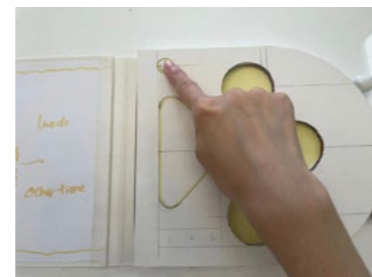
# Usage Journey



75cm



Children Position



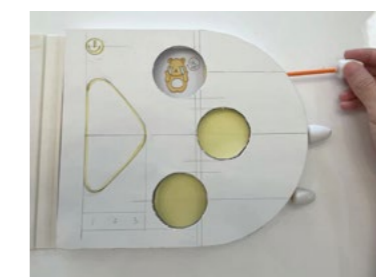
Press the button to turn on



Choose the food models on the targeted area. After identifying the model, the product will play its name.



Press the button to assess the food combination.



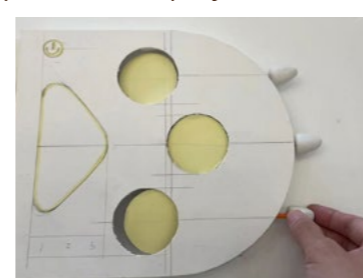
One of the result will get unlocked.



If it doesn't contain vegetables.



If it is healthy enough, get the third bear.



Pull it back and they can play it again.



Press the button to turn off



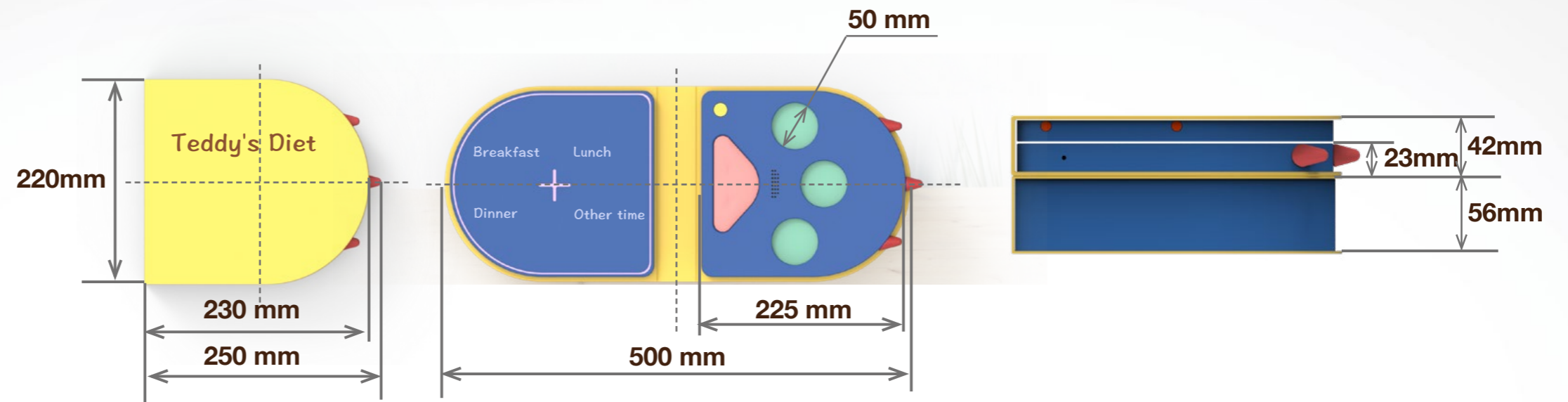
Put these models back to the box.



Put the box and the assessment part together

# 3D Model

The product employs RFID (Radio Frequency Identification Devices) to identify what the food models placed on the left board. More information about the inner structure and electronic components can be found in Appendix.



## Box for Collecting Food Models



Food Shape

Tip

Same color for same category

RFID Tag

Sunk Screw

Port for Charging

Icon LED

Shelter

Food Models

Recognition Area

On/Off Button

Button for Assessing

Speaker

Handle

# Appendix Explosive view of 3D Model

