

Portfolio

2024. 12





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Education

2021.9-Present Shanghai Jiao Tong University

Major Measurement Control
Technology and Instrument

Internship

2023.7-2023.9 Future Lab, Tsinghua University

HCI Researcher

Awards

2023 Huawei Scholarship

2022 Excellent B Scholarship

2023 Excellent B Scholarship

2024 Excellent B Scholarship

2024 China College Computer Competition - Mobile Application Innovation Contest (East China Region)
Second prize : Silent But Tangible

Skills



Content

► 01 GynCare 2023. 10 - 2024. 1

User research | Interaction design

Who's taking care of women's gynecological health?



► 02 Bound by Love 2024. 5 - 2024. 7

Game design | Family relationship research

Respect and trust in the parent-child bond.



► 03 HugMe 2024. 9 - 2024. 10

Engineering design

Hey, you don't have to keep eating.



► 04 VibraConnect 2024. 10 - 2024. 11

Engineering design | Accessibility design

Hello, this is a hearing-impaired delivery rider.





01

GynCare

User research | Interaction design

Industrial design | Game design

Project brief:

This app offers long-term gynecological health support with personalized AI insights, friendly care, and interactive education

2023.10 - 2024.1

Individual project



BACKGROUND RESEARCH

A woman's life is quite extraordinary. They often spend their childhood carefree. Typically, around the age of 13, they experience their first menstruation, which continues until menopause, lasting about 35 years. I am very concerned about women's gynecological health during this period.

It is well known that a significant number of women in China are relatively conservative: they rarely take the initiative to learn about gynecological diseases and even feel ashamed about having such illnesses. Based on my experience with these diseases, I chose to explore the phenomenon of gynecological diseases in China.



“

"It has been like this for about a year, but I don't think I have a heavy flow." Huahua mentioned this on social media. But she was eventually diagnosed with endometrial adenocarcinoma."

A major reason for this situation is her lack of relevant knowledge. In fact, she is not the only woman who does not understand her own body.

“

"I started having sex life in my teens, and at the age of 23, I was diagnosed with advanced cervical cancer. The tumor was so large that it invaded the rectum and eventually, I gave up treatment." Zhang regret not taking safety precautions.

“

"I endured the discomfort for a long time before finally going to the hospital, where I was diagnosed with advanced cervical cancer." Zhu didn't seek medical attention in time, which ultimately led to such severe consequences.

Body unawareness

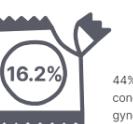


Nearly 50% of girls are unclear about the bodily changes that occur after their first menstruation.

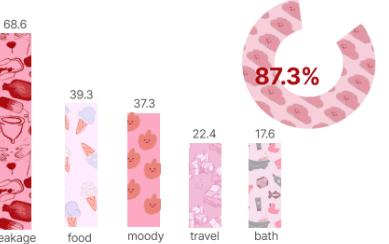
Unsafe sex



only 16.2% of girls can decide to use contraception on their own.



Menstrual troubles



An online survey found that over 2/3 girls worry that period leakage is an inconvenient issue. Over 4/5 of girls feel embarrassed about period leakage.

Women and girls's infection



The incidence rate of common gynecological diseases among Chinese women is around 85%.

Education



In a test, 63% of Chinese women did not have sufficient understanding of gynecological knowledge.



Over 70% of Chinese women with reproductive tract infections are sexually active.

Health utilization



40.15% of adult women have never had a routine gynecological exam.

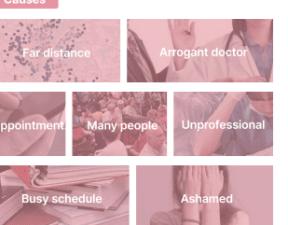
Access barriers

Data

42% of Chinese women do not go to the hospital after discovering gynecological symptoms.

Among them, 52% of people choose to self-medicate with oral or topical medications to alleviate symptoms.

Causes



Conclusion

The state of women's gynecological health is concerning. The main contributing factors are a lack of gynecological and sexual knowledge, as well as barriers between patients and healthcare facilities. Additionally, we have most girls have experienced concerns about menstrual leakage.

USER INTERVIEW

● Sample questions

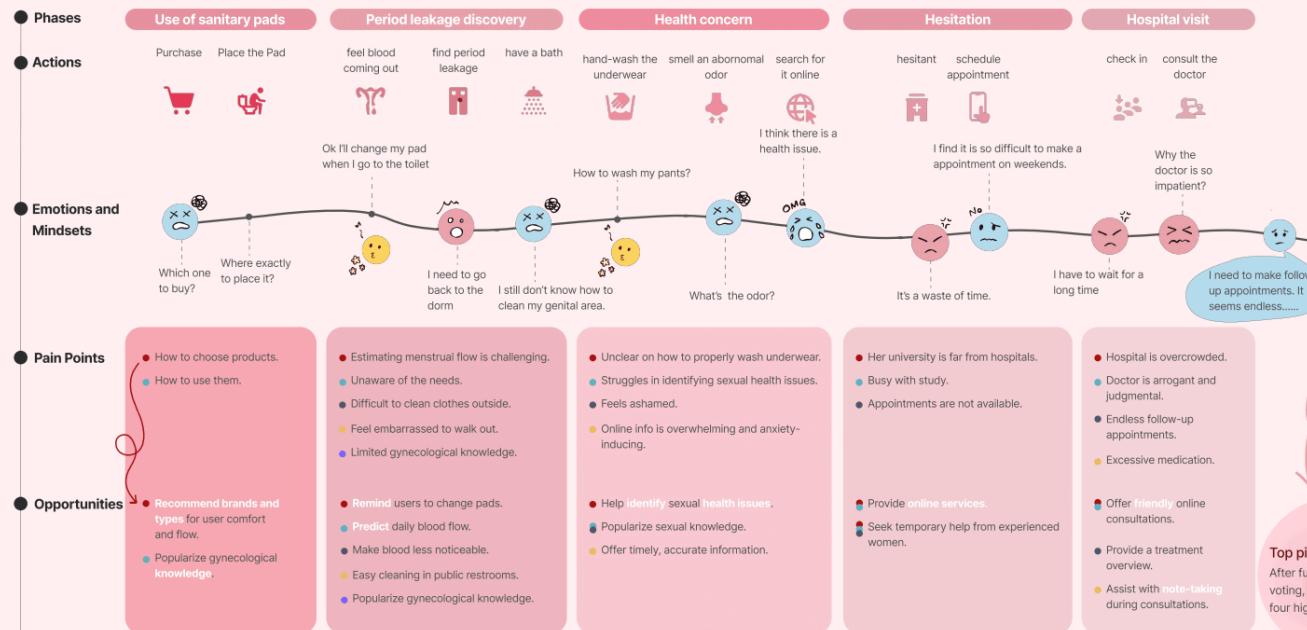
- What is your biggest frustration when seeking medical care?
- What do you think are the challenges during your menstrual period?
- How much do you know about gynecological diseases?



● Conclusion

The research mentioned above partly indicates that Chinese women have relatively weak awareness of gynecological health, and that hospitals often feel inconvenient and unfriendly to them. Therefore, I want to design an app focusing on prevention, examination, and medical consultation to promote women's gynecological health.

JOURNEY MAP



PERSONAS

● Some answers

Products selection

- "It's so stuffy in the summer, and wearing a sanitary pad makes that area swell up."
- "Sometimes I don't know what kind of sanitary pad to choose."



Public education

- "I don't know much about sexually transmitted diseases, except that I'm aware of how HIV is transmitted."
- "I feel that sex education in China starts too late and covers too little. I've barely had any exposure to sexual health education."
- "Even though sex education is being actively promoted, there are still issues with how it's being taught, which leads to resistance from parents."



Period troubles

- "Because my flow is quite heavy, I often experience leakage at school during the day and at night while sleeping, which is really frustrating."
- "When there's leakage, I have to wash my pants and bedsheet, which really annoys me."



Hospital visit

- "If I go to the hospital, I usually take a picture of the medicine I've taken to show the doctor in advance."
- "When I went to the hospital for a gynecological exam, the equipment there was really intimidating, and the doctors were very disrespectful."
- "When seeking medical treatment, I worry about issues of privacy and feeling embarrassed."
- "Taking a cab to the hospital is expensive, and the hospital is always crowded with staff who have poor attitudes."
- "Last year, my periods started becoming irregular, but I didn't think much of it at the time and just assumed it was because of staying up late. It wasn't until a few days ago that I found out it was PCOS."



Bio

Raised in a conservative family, Mei Liu is a science major in a high school, whose emphasis is heavily on academics, with no sex education classes.

“ I have to wash my sheet and pants because of period leakage.

Opportunities

- Gain sex education
- A friendly discussion environment
- When menstrual blood leakage occurs, there is an emergency plan
- Learn to correctly choose and use menstrual products

Pain Points

- Lack of sex education
- Feels embarrassed about periods
- Busy with studies, no time
- How to choose and use menstrual products

Bio

A easy, convenient, and private examination

Understands blood volume and reminds you to change menstrual products timely

Services for gynecological health

02

I get very nervous every time I go to the hospital. ”

Bio

Na Li is a student in a Chinese college, which is located in the suburbs, far away from hospital. She has started her sexual life and has been paying considerable attention to sexual health.

Pain Points

- The hospital is far, crowded, and hard to schedule appointments.
- Sometimes the doctor's attitude is poor.
- No concept of blood volume, leading to leakage
- No awareness of regular check-ups.

Opportunities

- A easy, convenient, and private examination
- Understands blood volume and reminds you to change menstrual products timely
- Services for gynecological health

AGE: 21
MAJOR: Computer Science
SCHOOL: Shanghai Jiao Tong University

Na Li

BRAINSTORM

Combining opportunities and research, I brainstormed several potential directions from different angles



	Innovativeness	Feasibility	Practicability	Economic	Convenience	Total Score
Medical service	4	4	4	5	5	22
Gamification knowledge	5	4	4	5	4	22
Innovative tracker	5	4	3	5	5	22
Gynecological products	4	3	4	5	4	20
Discussions	3	3	3	5	4	18
Package design	5	4	2	4	2	17
Make the blood less visible	5	1	3	2	3	14
Immersive experience	4	3	3	2	2	13

Top picks

After further analysis and voting, I selected these four highest-scoring ideas.

Unselected

Conclusion

After voting, classifying and evaluating the options, I ultimately identified the most feasible solutions that are most convenient for users, and can also help alleviate the discomfort caused by menstrual leakage to some extent.

DESIGN DISPLAY

2 AI-Driven Support

Comprehensive range
The app offers a variety of menstrual products to meet different user needs.

Private tracking
Simple strokes to actively track variations in blood flow and vaginal discharge, protecting the privacy.

Enhanced discharge understanding
It makes it easier to track vaginal discharge patterns with simple, clear texture stickers.

Sense Every Change

Customizable AI interactions
It lets users customize the style and tone of AI interactions, like a friendly tone.

Proactive health monitoring
AI analyzes past data to create a health journal and track potential issues.

User convenience
Automatically sets tracking values based on historical data.

Doctor rating
Doctor rankings are based on consultation experience like friendliness that patients value.

AI in consultations
Recommends doctors based on user feedback and creates consultation notes with key details, plus treatment reminders.

Product Recommendations
The AI recommends the best products and provides details, like sanitary pads to prevent leakage.

Interactive games
Features characters in various scenarios that mirror real-life gynecological health challenges.

Tailored learning
Recommends gynecological education games based on the user's age and stage of life for relevant content.

User incentives
Users earn coupons from educational games, redeemable in your online mall.

Game sample

Maintaining clean underwear is crucial for gynecological health, so we designed a mini-game that teaches game characters how to properly wash their underwear, which is suitable for most girls.

Product design

Pain points
If sanitary pads are used incorrectly, menstrual blood can easily leak. When women are out, menstrual blood can sometimes leak, especially on the first day of their period. Most women find this embarrassing and troublesome.

What we did
Therefore, my team and I designed a product that makes it easy to clean blood stains in public restrooms. The product's appearance is inspired by sex toys—it's simple, clean, and easy to carry. The size and functional features are ergonomically designed, and we hope to sell it in the app's mall.

Blood leakage

Place a tissue under the clothes

Press and hold the power button to turn on the device

Start cleaning

Slide to refill the cleaning solution tank

Long press to turn off after cleaning

After use, you can pack it into a bag for easy carrying

FUTURE OPPORTUNITIES

Adding partner support:
The partner feature allows partners to better understand each other's physical changes, which can help strengthen the relationship. Users can choose the types of information they wish to share with their partner.

Creative product design:
We will focus on the issue of menstrual stigma and gradually design some creative products. On the left is an attempt we made.

Better privacy protection:

- Notify users when the app shares data with external parties, protecting their right to know.
- Inform users about the encryption methods used by the app, such as end-to-end encryption.
- Allow users to decide what content in their health logs can be sent to doctors.
- Allow users to delete the analysis content of their health logs.

A lot of work has been completed on this project, but there is still more to explore and improve...





02

Bound by Love

Game design | Role-playing games | Family relationship research

Project brief:

The game lets players experience the oppressive parent-child relationship in a Chinese family, which encourages mutual respect and trust for true communication between parents and children.

2024.5 - 2024.7

Individual project

INSPIRATION

A true story of an incoming freshman

I came across a story from network about Jia-Jia, who posted that her mom stole her university admission letter because her mom wanted her to become a local teacher. This sparked a heated discussion online about extreme control from parents.



"My mom has strong controlling tendencies; She has interfered in every aspect of my life."

My similar experience

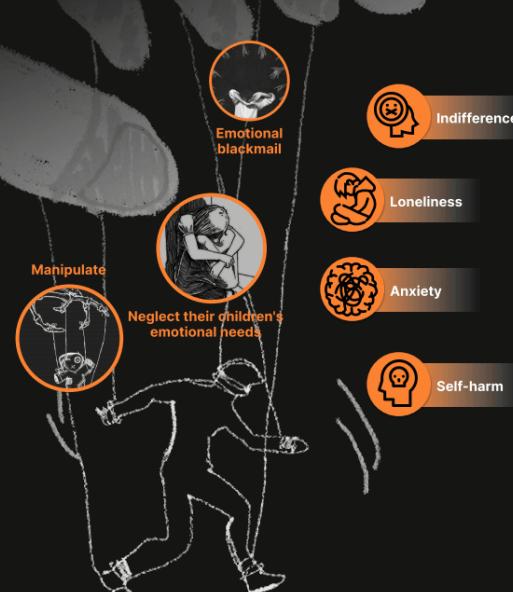
For me, though my mom doesn't control me in such an extreme way, she still put a lot of subtle pressure on me. Before entering university, I felt exhausted under her extreme care. Even though I got into one of China's top universities, it seems like I still have endless heavy goals.



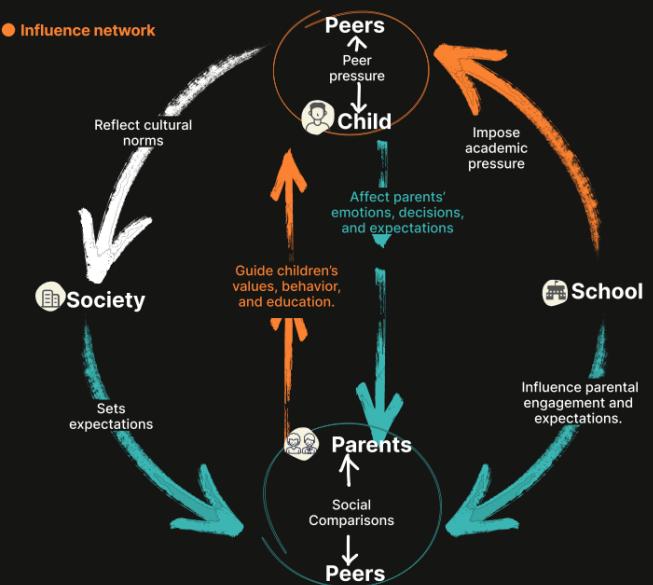
RESEARCH ON CHINESE FAMILIES

How parental control shapes relationships and its impact

In many traditional Chinese families, there seems to be a strong emphasis on parental control and authority. Parents often take an overly involved or controlling role in their children's lives.



Influence network



External pressures on families put parents in the spotlights. In an oppressive parent-child relationship, parents, who should help manage stress, end up being the main source of it. I want to understand how both parents and children view this relationship and its reasons.

● Parent-child user research

-Extracurricular overload

78% of parents in Beijing choose to enroll their children in extracurricular tutoring classes.

Education and success
83% of respondents agree that a person's level of education is an important factor for success.

Limited equality
43% of mothers hope to establish an equal interactive relationship with their children.

Academic focus
80% of 8th-grade students say their parents care most about their academic performance.

Neglected interests
11% of students think their parents focus on their interests or talents.

Communication
22% of eighth-grade students said "Parents almost never spend time talking with me."

Lack of support
38% of teenagers turn to their parents as their main source of support when facing troubles.

83%

43%

78%

38%

80%

11%

22%

38%

30%

Education-first mindset
38% of parents agree with the statement "In order for my child to have a happy future, I believe education should be prioritized while they are young."

Clear arrangements
30% of parents have clear arrangements and expectations for their children's daily life and studies.

● Parent-child insight

Ensure their children meet societal expectations

Recognition within their social circle

The return on their investment is disproportionate

Stereotypes about children and their children's friends

the lack of enough communication → Blurry boundaries

Verbal violence → Control → Monitor

Focus all their attention on their children, neglecting their own needs

Self-exploration → Cognitive abilities development → Influenced by societal pressures

Unmet needs → Verbal defiance → Behavioral defiance

In China, this tense parent-child relationship is very common. However, its effect are hardly be noticed. So, I created a game where people can experience this oppressive, Chinese-style family dynamic and to inspire them to build relationships with mutual respect and trust.

IDEATION

● Why game?

Emotions expression session



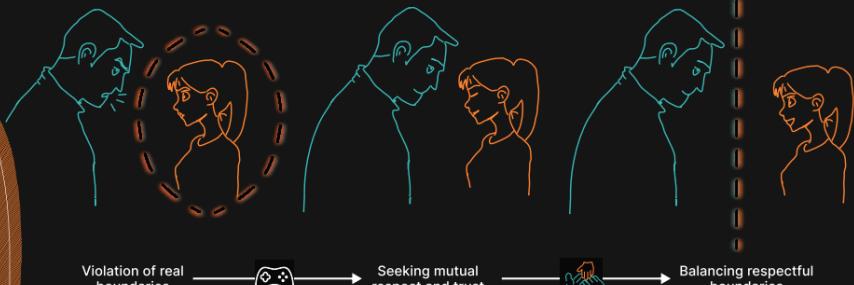
The game uses task mechanics, scene changes, and other elements to express complex emotions.

Deep role immersion session



The game creates a strong connection between the user and the character, allowing for deep focus and engagement.

● What they can get from the game?



STORYLINE

● Target players

Parents



For those looking to better understand the impact of their behavior on their teenage children and learn how to foster healthier interactions.

Teenagers



For those who may be facing challenges in their relationships with their parents, offering them a way to reflect on and understand their emotions and reactions.

Play mode

Single-player: Players experience the game from the child's perspective



Game mechanics

Challenges should be designed to reflect the parent's different typical behaviors

Core themes

Show a trained parent-child relationship from different aspects

About "Control"



Symbol of control

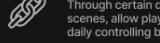
Visualize control using a spider, a puppet, or anything with threads.

Other characters



Use other characters to represent the child's friends, making it easier to express the parents' social interference in the child's life.

Control behaviors



Through certain detailed objects or scenes, allow players to understand the daily controlling behaviors of parents.

About "Love"



Small spider

Touch players with adorable characters.

Parents' past



Through parents' excellent experiences, understand that they were once independent and positive.

Parents' care



Expressing parents' instinctive love through certain detailed objects.

● I hope

Parents

Let parents experience the impact of their own actions from the child's perspective, encourage them to try to understand their children and also care about their needs.

Teenagers

Through playing this game, children can understand that their parents' love is unquestionable and intuitive, and that the suffocating control comes from misguided beliefs or approaches.



Winning conditions

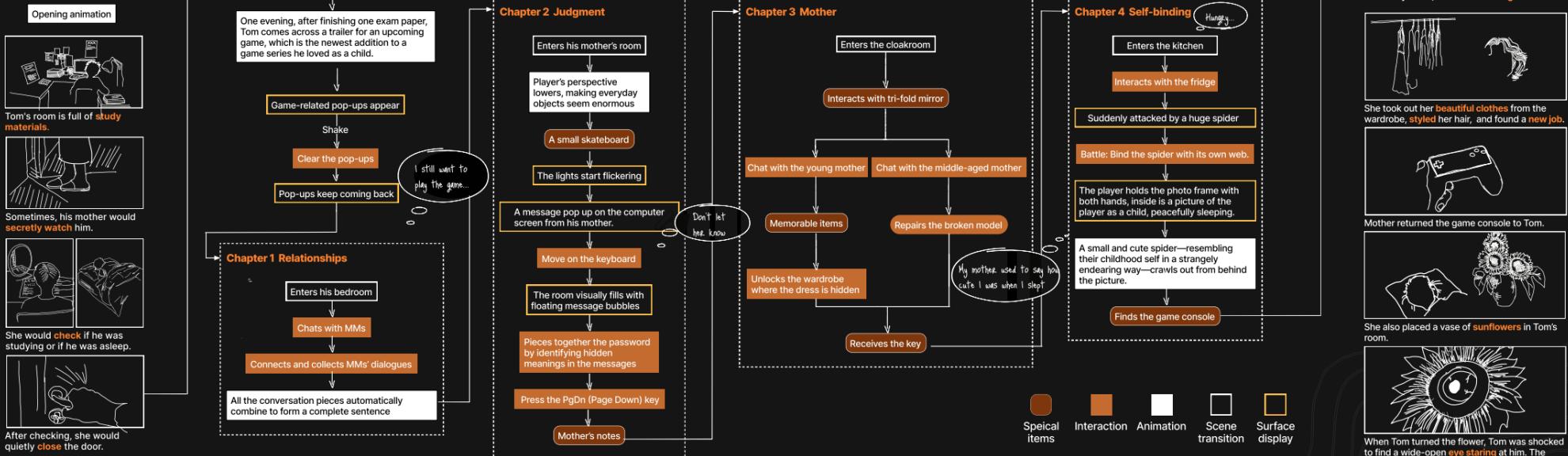
The player "wins" by asserting child rights



Ending

The child gains respect but loses it again

GAME FLOW



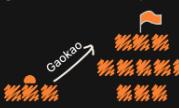
GAME WORLDBUILDING

Game Type

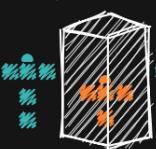
RPG (Role-playing game) + Exploration + Storytelling
(Plot's emotional impact)

Background

In China, almost all high school seniors must take the Gaokao (National Higher Education Entrance Examination), an **important exam** that give chances to enter top universities.



Parents also pay a lot of attention to the exam and some even go so far as to closely **monitor** and **control** their children's daily lives to help them succeed.



Character design



Tom
Lives in Beijing
Senior at a **prestigious** high school.
Excels in his studies.

Introverted Empathetic Lonely



Emma
Tom's mother
Passionate about programming
Former senior algorithm engineer
Quit her job to focus on supervising Tom's studies
Has little to no personal time
Strong-willed Controlling Lonely

Scene setting

I designed several scenes and the objects within them to present the complex and dynamic parent-child relationship from different aspects, and listed the dimensions each scene would showcase.



Tom's bedroom
The place where Tom sleeps and studies

The giant eye dominates the room, evoking a sense of being watched or surveilled.



Emma's bedroom
The place where Emma sleeps and works

The blank computer screen suggests a lack of clarity or direction in her own goals or ambitions, possibly sacrificed to prioritize the family's needs.



Control Monitor Understand Break the control

Cloakroom
The place piled with Tom's clothes mostly



Kitchen
The place where Emma goes to great lengths to prepare three meals a day for Tom



Kitchen
The cold, detached atmosphere of this central space for family reflects a lack of emotional warmth or connection within the family dynamic.

Visual style

Pencil drawing Dark atmosphere Psychological horror



Items

Tom's bedroom



Diary



Contact list



MM

Demonstrating the mother's desire for monitor through recording and analyzing the child's social life, showing her need to know everything about the child.

Emma's bedroom



Skateboard



Laptop

Demonstrate the mother's controlling nature and competitive mindset by limiting the player's skateboard usage time and bombarding them with messages from the mother.

Cloakroom



Trophies



Books



Tickets



Gown

Use these items to present the image of an independent and accomplished woman.

Kitchen



Spider mother and her baby

Use the spider mother to represent mothers and the little spiders to move the players emotionally.

Chapter 2

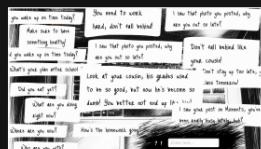


Find the skateboard.

I'm taking a break.
Interact with the number corresponding to the option on the keyboard



Pay attention to the interaction timing. Mom doesn't allow Tom to play with the skateboard, so make sure not to get caught by her while pressing.



Complete an online chat with their mother within a limited time and find a four-digit password hidden in the **chat bubbles**, whose content reveals the Emma's tendency for comparison and sense of superiority.

INTERFACE AND CONTROL

Control



Click



Interact with objects



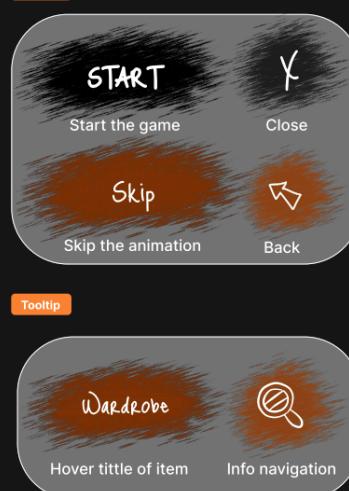
Movement controls



Jump

UI design

Button



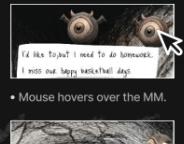
GAME GALLERY

Opening animation

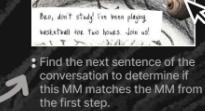


I introduced Tom's daily life through this opening animation, **showing Emma's controlling role** through her monitoring behavior, which Tom may be unaware of or too afraid to express anger about.

Chapter 1



Mouse hovers over the MM.



Find the next sentence of the conversation to determine if this MM matches the MM from the first step.



This screen will appear once all matches are successfully paired

Chapter 2

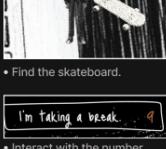
Chapter 3



Chapter 4

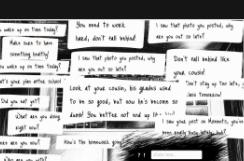


Bind the large spider with spider webs to beat it, reminding people that a mother's love can also bind her.



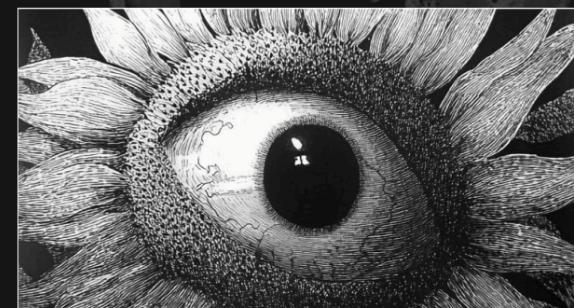
Find the skateboard.

I'm taking a break.
Interact with the number corresponding to the option on the keyboard



Explore the wardrobe to **uncover Emma's past**. By finding the young mother's dress and repairing the middle-aged mother's model, the player obtains a key to proceed to the next chapter.

Ending animation



I created an animated bad ending for the game, where everything seems to be **getting better**, but ultimately it **returns to square one**. This represents the **repetition** of negative patterns in a parent-child relationship, indicating that the issues are not easily resolved and continue to recur despite efforts to break free.



03

HugMe

Engineering design | Interaction design

Project brief:

This project combines an app and a device design to manage **binge eating** by providing distraction, group support, motivation, and monitoring food-related behavior, while the device tracks binge eating and transmits care.

2024.9 - 2024.10

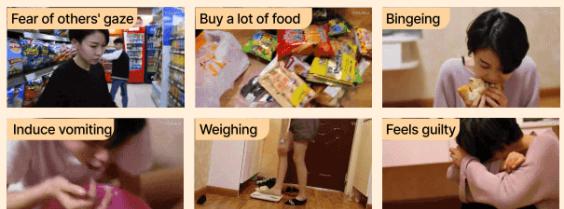
Individual project



RESEARCH

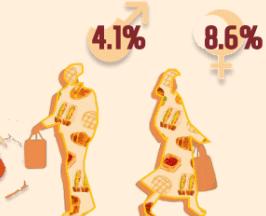
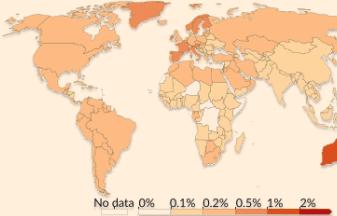
Inspiration

I've personally struggled with **binge eating disorder** in the past, and one time, while watching a documentary on bulimia nervosa, I was reminded of the painful experiences I went through. That moment made me realize how much I want to help others facing these challenges, as I truly understand what they are experiencing.



Binge Eating Disorder Documentary: It's Food • Not Love

Prevalence and mortality



Over **3.3 million** healthy life years worldwide are lost yearly because of eating disorders.

Rates of eating disorders in males are increasing at a **faster rate** than those in females.

Understanding Bingeing

Why dieting?

Patients often set **strict rules** regarding the types of food, quantity, and meal times.



Judgment of body appearance



Exposure to dieting



Practice dieting methods

Dietary restraint theory

Once any of these rules are **violated**, it can uncontrollably lead to binge eating.

Counter-regulation experiment [1]



[1] C. Peter Herman, The illusion of counter-regulation,

Emotional factors

It is also a form of emotional eating. In a study, **47.7%** of binge eating was attributed by the participants to **emotional states**, particularly anxiety related to body image and appearance. Anger is the primary emotion. [2]

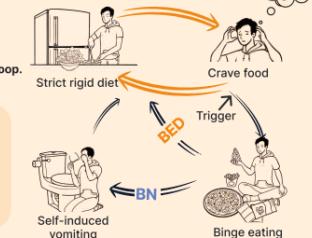
fear surprise hurt lonely contempt boredom
guilt disgust hurt lonely contempt boredom
exhausted shame sadness interest disappointed
disgust powerless

[2] A. Zeeck, Emotion and eating in binge eating disorder and obesity.

Repeated loop



Patients follow **strict dieting** while their bodies crave food. A trigger event causes a **counter regulation**, leading to **binge eating**. Afterward, they return to strict dieting, creating a **vicious loop**.



BN and BED

- **Binge Eating Disorder (BED)** patients do not purge.
- **Bulimia Nervosa (BN)** patients use purging behaviors like vomiting to compensate.

These eating disorders are common, dangerous, and difficult to control. When patients become aware of the problem, they seek help from the outside world. So, how effective is this help?

Available help

When facing an eating disorder, patients can seek help through two options.



But these seem to offer little help.

WHY NOT HELPFUL?

01 Vahagn

Support group idea
Connection
Forget advice
Understanding

I like ANAD's support group. Because it gives me a sense of connection and understanding. However, the meetings don't seem to be very helpful for me... When I binge, I can't seem to recall what they said or apply their strategies in the moment.

02 Xianshu

Nobody to talk
Loneliness
Immediate support
Understanding

Maybe it's because I feel so alone and helpless in this struggle. I think it would really help if someone could remind me and support me at that moment. Someone who truly understands me and doesn't judge me.

04 Ryan

Stereotypes
Stigma
Hard to get treatment

I have tried but being a man made it hard to get treatment, as people didn't see me as someone who could have problems with eating

03 Feifei

Doubt
Calorie fear
Hesitation
Medication concerns

To be honest, can the hospital really cure me? I have my doubts about it. Plus, seeing a doctor definitely means taking medication, and meds have calories too...

After user interviews, I found that there are many reasons why the help they sought didn't provide positive feedback or why they couldn't effectively implement it themselves. I plan to focus on these issues during the brainstorming session.

PERSONA

Bio

She feels **overshadowed by more confident or thinner friends**. She's **active on social media** and highly influenced by the beauty standards she sees online. She has been struggling with **binge-purge cycles for 5 years**.

Needs

- Regain control over her self-worth
- Healthier coping mechanisms
- Gets more attention, Desires emotional relief
- Body image anxiety
- Peer pressure

Painpoints

- Social media influence
- Whenever I am sad, I want to use food to make me happy.

Sarah

01

Age:
21
Job:
Magazine editor



02 Ethan

Age:
26
Job:
Youtuber



Bio

He shared his fitness journey on **social media**. This increased his pressure to **maintain an ideal physique**, which worsened his struggles with body image and disordered eating.

Needs

- Find a balance between his fitness Goals, and personal life
- Excel in his career
- Develop other interests
- Loneliness
- Pressure to maintain image
- Health consequences

Painpoints

I need to maintain my physique, but sometimes I can't control the cravings in my mind.

JOURNEY MAP

Phases

Teased by others



Search for methods



Weight control



Trigger event



Purchase



Binge eating



Post-Binge guilt



Purgung



Attempts to be "normal"

Actions

Internalizing the teasing

Exploration

Follows a very strict diet

Faces stress
Urge to binge

Hesitation



Buy large amounts of food

Retreats to isolation
Eats food rapidly



Thinking about how to "undo" the binge

Vomiting or using laxatives

Emotions and hunger

Pain points

Opportunities

- Body image struggles
- Shift focus from appearance
- Introduce school activities or programs
- Early beauty education

- Overload of information
- Lack of proper guidance and support
- Reduce exposure to food-based and appearance-based media content
- Evaluate the information he obtained
- Provide accurate and balanced nutrition education

- Food becomes an obsession
- Body feels weak
- frequently counts calories
- Impatience for quick results
- Teaching balanced, sustainable eating habits
- Highlight the beauty in diversity
- Learn emotional management skills
- Emotional support
- Recognize triggers earlier
- Recommend to portion meals and snacks in advance
- Avoid "All-or-Nothing" thinking

Hunger-satiety

Slightly hungry

Become stuffed

Less stuffed

But trapped in the vicious circle

Affraid of being discovered, especially by acquaintances

- Believes that she'll "start over" tomorrow
- Struggles to control and stop herself

Products need to make no sound

- Remind her of past experiences
- Mindful eating

Monitor and alert binge behaviour

- Build a support system
- Cognitive behavioral therapy

Distraction techniques

Feels physically uncomfortable

- Negative self-talk and self-worth plummet

Physically harmful

- Fear of seeking help

Feels isolated and stuck in a repetitive cycle, with no way out.

- Monitor purging behaviour
- Offer tools to stop purging
- Offer emotional help

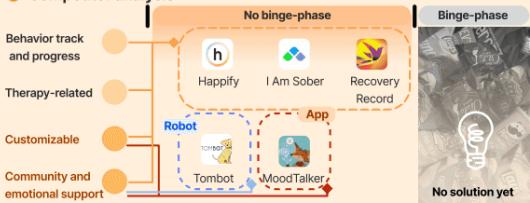
The opportunity related to painpoint 1 and painpoint 2

- Painpoint 1
- Painpoint 2



BRAINSTORM

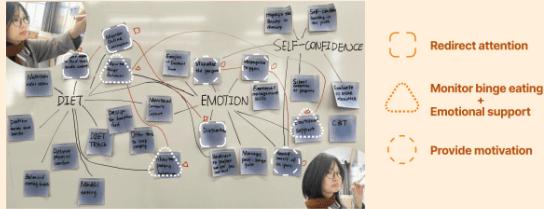
● Competitor analysis



I found that existing solutions have not paid attention to the binge phase, so I plan to focus on this point and two key features in the next step.

Ideas

Based on previous research and key points that need to be addressed, I brainstormed some ideas.



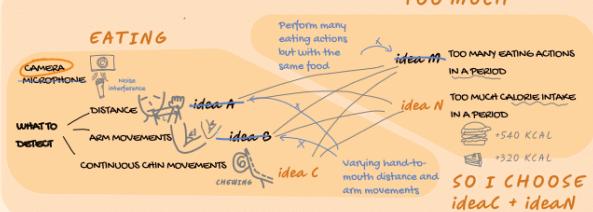
Although the previous 'counter-regulation' and emotional states can help me recognize trigger events to predict binge eating, with the current restraint, I don't have good solutions yet.

So I decided to deprioritize this problem and chose to combine the app with a wearable device, applying these functions to help patients manage binge eating impulses.

SYSTEM DESIGN

● Concept development

HOW TO MONITOR BINGE EATING



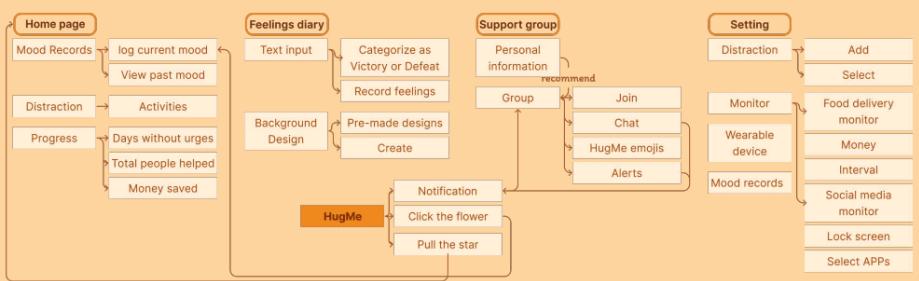
Key findings behind my decision

I browsed videos related to binge eating on social media, summarized the key points, and discussed the feasibility of the ideas based on that.

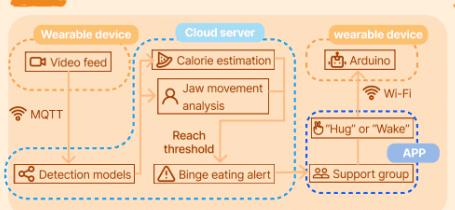


MOBILE DESIGN

● Information architecture



Data flow



- Molecular Methods

1. Modify or build a wearable device
 2. Think about how the device responds to "Hug" and "Waking"
 3. Write code to monitor hinge eating



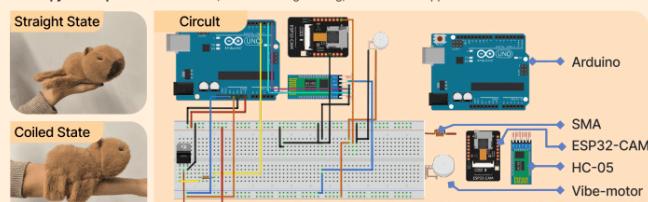
Part of coding



● Prototyping

• Prototyp

Plush toys help regulate emotions by providing **tactile comfort**, helping to relieve stress. So I choose to modify the cute **canybara slan bracelet** to monitor, remind of binge eating, and transmit support and care.



Who Are Not The Same? □

When **mimicking patients'** eating actions, I found that placing the camera on the **lower part of the device** (near the patient's body) captures the chin and food in most eating postures. Also, wearing the device near the elbow works better than the wrist.





04 VibraConnect

Engineering design | Interaction design | Accessibility design

Project brief:

This project designs a system for **delivery workers with hearing impairments**, creating a more friendly, connected, and accessible community.

2024.10 - 2024.11

Team project: Yue Wen, JiaYing Li



RESEARCH

According to the World Report on Hearing, about 20% of the global population has some hearing loss, and severe hearing loss often limits job opportunities. However, the food delivery industry offers high income and easy entry, creating new opportunities for people with hearing impairments. As a result, many have become hearing-impaired delivery riders, which is called **DHH delivery riders**.

Delivery riders skills

In China, countless delivery riders **ride electric bikes** through the streets and alleys to make a living. To earn a higher salary, they need to possess a variety of **skills**.



Hearing impairment in delivery

Written communication barriers

Converting sign language into written language^[2]

Sign language

Hand gestures

No facial expressions

No postures

100% Communication content

Written language

The job requires communication

1 Hand gestures

2 No facial expressions

3 No postures

50% Communication content

Customers/vendors

1 Unreliable input suggestions

2 Slow typing

3 Low information transfer efficiency

4 Lack of emotional information

5 Misunderstood as impolite

6 Customers/vendors

7 Lack of care and understanding

Care and understanding

36% of delivery riders faced occupational discrimination.^[3]

27% of delivery riders experienced verbal abuse or insults from customers.^[3]

Riding safety

One characteristic of the food delivery industry is '**speed**', which means delivering orders on time, taking more orders, and earning more money. This has also partially contributed to the **safety issues** faced by delivery riders.^{[3][4]}



In contextual inquiry, we found that, unlike other riders, DHH riders frequently rely more on visual cues to check their phones for information, which poses a greater danger. Then I listed the **functional information** they often received.



^[4]Jiang, Xiufeng. "Sustainability Development Survey Report on Delivery Riders." Beijing News

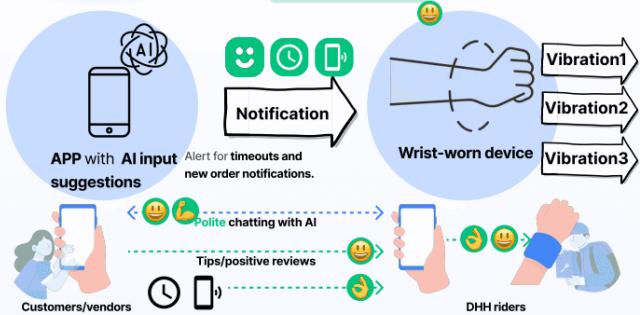
Conclusion

Currently, delivery riders generally lack social interaction and participation, which causes significant psychological stress for this group.^[5] The following is the conclusion I have summarized.



CONCEPT

We aim to use an app + a haptic wearable device to achieve **safer and more efficient** information transmission and reception, while also facilitating **positive and polite emotional** conveyance and reception.



Why did we choose to use haptic(vibration)?

Selection of most existing methods

Most existing DHH assistive methods use visual and haptic feedback to replace or compensate for their hearing.^[6]

Effectiveness of haptic information transmission

My research during my internship has shown that haptic feedback can effectively convey both functional and emotional information.

Replace the auditory channel and reduce visual load

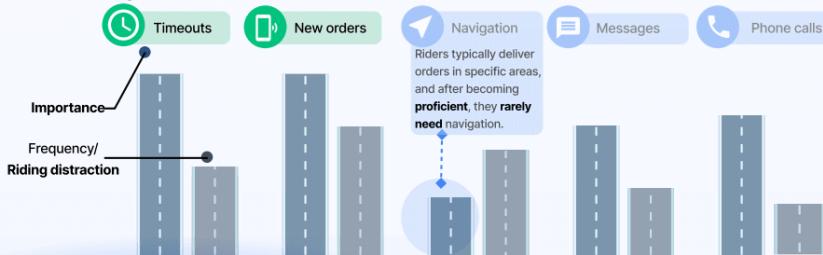
DHH riders need to focus their vision on traffic conditions, but haptic sensation has not been fully used, which can help DHH riders.^[6]

Why choose the wrist?



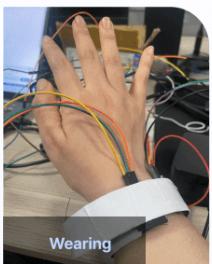
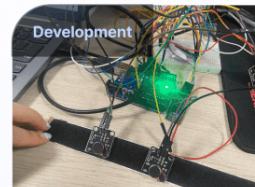
Why did we choose to alert for these two functional information?

During the driving process, only the vibration alerts for higher-priority notifications are retained to **reduce the cognitive load** for DHH riders using the wearable device.



How to enhance the positive emotions?

I chose to use vibration to enhance the positive emotions from tips/positive reviews, designing specific vibration patterns. Our user experiment has shown that **vibration effectively** complements and enhances the positive emotions conveyed through visuals.



MOBILE DESIGN

Enhance positive emotions

Combining visual and haptic feedbacks to enhance the positive emotions brought by tips/positive reviews

AI-Powered text refinement

Make delivery information more relaxed and faster, with AI automatically refining communication texts to make it more polite

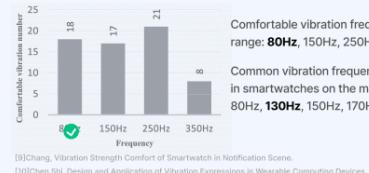
Smart replies

By inputting keywords, the AI suggests appropriate sentences based on the order details

PATTERN INTERACTION ITERATION

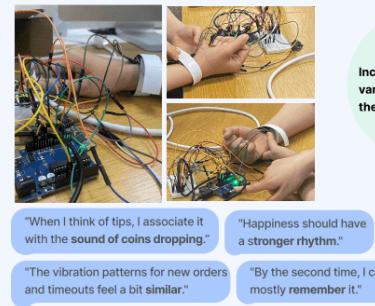
Vibration pattern design v1

Referencing to several papers, we first envisioned and conceptualized **the rhythm** of order timeouts, new orders, and tips, then applied these concepts to our prototype. Through continuous **internal testing**, we designed **a set of vibration patterns**.



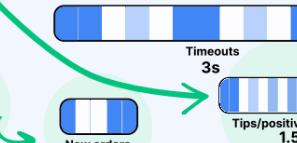
Vibration pattern design v2

We recruited 20 volunteers for **user testing** and collected their feedbacks. Based on their feedback, we **iterated** on the vibration patterns.



Increase the frequency variation, and enhance the rhythm.

Change the frequency



REFLECTIONS

Algorithm

In the food delivery industry, algorithms help design more efficient pick-up and delivery routes, but they **overlook the emotional needs** of delivery riders, turning them into **robots**.



The algorithm's **averaging** approach does not take into account DHH riders, who need more time to deliver food.



The communication may take more time



The riding speed could be slower (due to extra attention to traffic safety)

Balancing Customer Rights

A consumer once posted on social media saying, "I understand their difficulties, but I also work very hard every day. What's wrong with my order on time? Why should I have to bear the cost of delayed delivery?" Therefore, when we call for more care and understanding for delivery riders, we must also consider the **interests of customers and other stakeholders**.