Service Design | Product Design | Interface Design

MOOS

Let’s transform discarded masks !

Individual Work
2021.05 — 2021.08
Dimensions: 85cm*115cm*70cm

The project explores opportunities around a more sustainable and effective way of disposing of masks in Shanghai. Research has been investigated by following a human centered design methodology, in the area around sustainability, recycling systems and habit formation.

DISCOVER

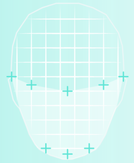
Start Point : Growing Public Concern about Masks

The COVID-19 outbreak has put masks in the spotlight, and as they become more widely used in the future, the problem of how to dispose of waste masks will follow.

Changes in the Role Of Mask

Masks were used to protect object from contamination initially. As they became widely used, they began to be used to protect the user from the outside world.

Composition & Characteristics



① Non-Woven Fabrics
The textile layer is made of fibers , characterized by foam resistance, good aeration, and lightness.

② High Density Filter Layer
The ultrafine electrostatic fiber cloth is composed of **polypropylene**, which can capture dust, filter and prevent bacteria up to 99.999%. It is the principle of isolating germs.

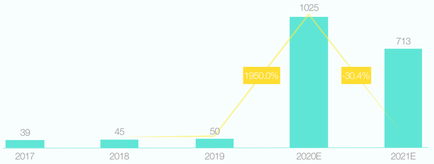
③ Direct Contact Skin Layer
The textile layer is made of fibers , characterized by water absorption and air permeability.

Desktop Research : Mask Disposal in China

Where are discarded masks **from**?

INDUSTRY

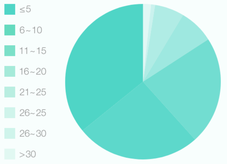
China is the largest producer and exporter of masks, accounting for 50% of the global annual production.



the Production & Forecast Data of Face Masks in Mainland China from 2017 to 2021

INDIVIDUAL

The daily use of masks per person has increased significantly due to the epidemic prevention needs of COVID-19.



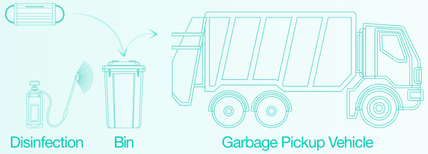
China's per Capita Use of Masks during the Outbreak

Behavioral Factors in Abandonment

Where are discarded masks **to**?

TRADITIONAL & CURRENT TREATMENT

The existing disposal of waste masks has the following steps.



POLYPROPYLENE is a kind of polymer that is difficult to be degraded by ordinary hydrolysis & biodegradation.It can be de-composed under high temperature & oxidation.

CIRCULAR ECONOMY WAY

Some individuals and organizations reuse or recycle discarded masks based on the recycling value.

- REUSE
  The physical form of the mask is retained.
  - Interlayer - Used as a Pocket
  - Plastic Strips - Used as Storage Tools
  - Mask - Used as Filler

- RECYCLE
  Mask is processed into new material by means of crushing, liquefaction and melting.
  - Crushing - Mixed Processing Road Materials
  - Liquefaction - Polypropylene Particles
  - Melting - Tough & Durable Plastic

Summary

According to the WHO, **129 billion** masks were used every month during COVID-19. Even after the epidemic, at least **533 million** masks are being used every day in China.

the MEDICAL WASTE PRODUCTION in CHINA by the NUMBERS

2600

tons every day, based on the average weight of a typical disposable mask of 5g.

The pollution caused by discarded masks cannot be ignored.

>1.56 billion

At least **1.56 billion** masks ended up in the ocean in 2020, according to OceansAsia.

>400 years

Polypropylene, used in masks, takes **over 400 years** to naturally degrade or hydrolyse.

Research Question

How Has Public Use & Consciousness of Masks Changed after Outbreak, besides Disposal?

Field Research

I chose Shanghai as the city to be focused on owing to the following aspects.

PUBLIC TRANSPORT

Shanghai government mandated the wearing of masks on public transport. 18 metro lines carry 10.1 million people a day.

SERVICE CATERING

Service workers, who represent 70% of workforce in Shanghai, are being asked to wear masks, especially catering workers.

GARBAGE SORTING

Each residential area in Shanghai has a waste separation station, which is managed with the aid of the neighborhood committee.

Persona-Based Journey Map

Jack
32 | male
office worker

"It's hard to communicate on the subway."

- **PURCHASE HABIT** buys online to store a 2-3 month supply of masks
- **USE HABIT** only when commuting , sharing the same one on day & night
  WEEKLY DEMAND
- **KEEP HABIT** just puts it in the bag
- **DISPOSE HABIT** doesn't notice and throws it in the trash at the underground station

Lisa
27 | female
restaurant cashier

"Forgetting to wear one is a problem."

- **PURCHASE HABIT** is basically distributed by the company
- **USE HABIT** is required to wear masks during office hours, with 1~2 a day
  WEEKLY DEMAND
- **KEEP HABIT** has a special clip for them
- **DISPOSE HABIT** takes masks home and throws them at the neighborhood drop-off site

Chen
68 | female
committee aunt

"I know everything about sorting waste."

- **PURCHASE HABIT** doesn't buy masks herself ; uses masks bought by her child
- **USE HABIT** usually doesn't wear a mask, but recycles a single-use one
  WEEKLY DEMAND
- **KEEP HABIT** keeps it in the pocket of a volunteer's vest
- **DISPOSE HABIT** knows about waste sorting and knows that masks are dry waste

STAGE	BEFORE USING		USING			AFTER USING
	Select	Purchase	Carry	Wear	Keep	Dispose
	Search online for criteria for masks.	Buy masks on online shopping apps.	Masks are usually folded into the pockets.	Wear one in public places.	Mask is often placed in the bag.	Masks are often thrown randomly.
EMOTION&COMMET	"Choosing a mask is boring."	"Shopping online is convenient."	"Masks Give a sense of security."	"Wearing masks hinders facial expressions."	"I'm worried about the masks being contaminated."	"Many people don't know what waste masks are and throw them around."
NEED	" Hopefully, there is a professional platform to help reduce the time and effort consumed in choosing masks. "	" Hopefully, more public places will install vending machines to solve the problem of forgetting masks. "	" It is not known if storing masks would lead to cross contamination. "	" Are there any masks other than transparent plastic masks that do not affect social interaction? "	" A safer and more hygienic design for storing masks would be appreciated. "	" Hopefully, the bins for discarded masks will be more uniform in style. "
OPPORTUNITY	1.1 It will take some time and effort to choose masks.	2.1 Accidentally buying inferior masks will cause accumulation. 2.2 Bought masks are forgotten where they were placed.	3.1 Carrying a mask is reassuring. 3.2 Masks placed casually in pockets can cause contamination or be contaminated.	4.1 Wearing a mask can alleviate social phobia, but it can also disturb regular social and facial communication.	5.1 Masks can be better preserved.	6.1 Many people are not environmentally conscious and do not know the garbage sorting of masks. 6.2 Many people are confused by the different styles of masked bins.

Questionnaire

I designed an online questionnaire to ask people about the awareness, use and disposal of masks.

- DATE : 2021.06.01-2021.06.14
- PARTICIPANTS : 56 respondents
- CITY : Shanghai
- PLATFORM : Online Service & Wechat

- Knowledge of Masks

Misunderstood | Ambiguous | Clear & Correct

Contamination Components | Discarded Mask Garbage Sorting | Expiration Date

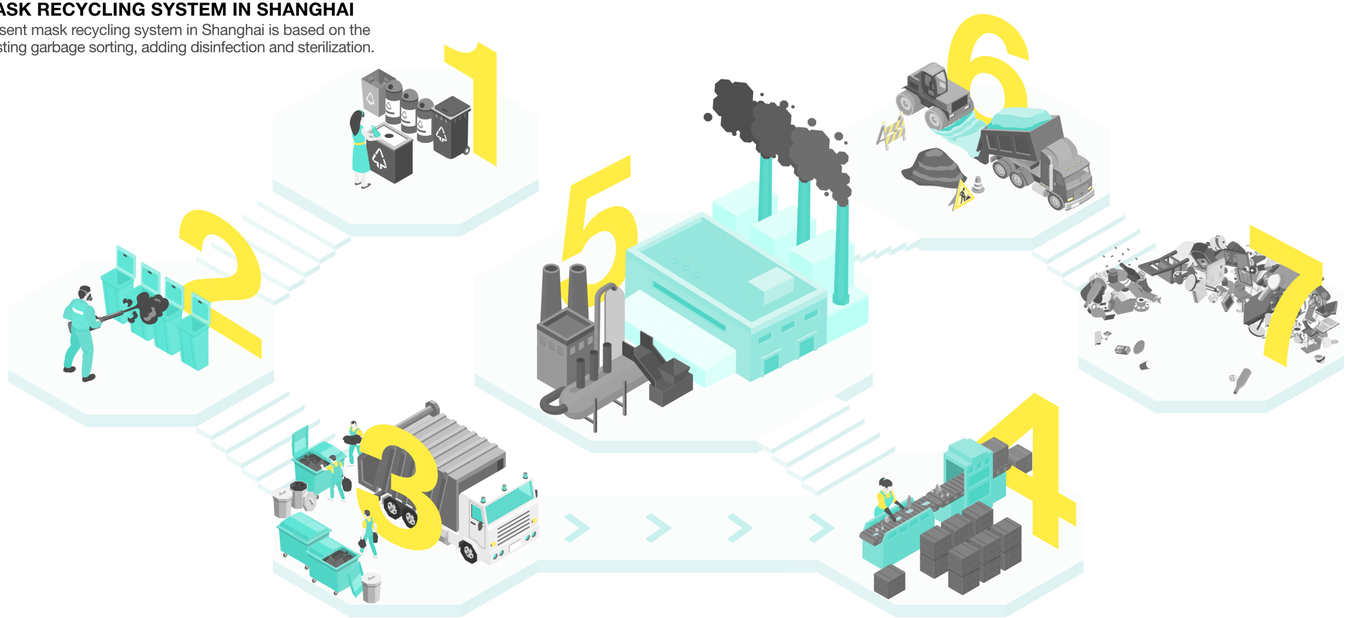
- the Most Common Places to Discard Masks

- Attitudes to Environmental Activities

Further Research

MASK RECYCLING SYSTEM IN SHANGHAI

Present mask recycling system in Shanghai is based on the existing garbage sorting, adding disinfection and sterilization.



1 Mask Classification
is the only direct contact with the public, without directly spreading mask classification knowledge.

2 Disinfection
motivates the public to drop off masks at designated locations.

3 Transport
is the last part of the process that faces the public.

4 Sorting
is an integral part of improving the level of harmlessness, minimization and resource use.

5 Incineration
requires a temperature of over 850°C to implement harmless treatment.

6 Integrated Utilization
of slag, as in road materials.

7 Landfill
waste that can't be used.

SWOT ANALYSIS

STRENGTHS

The availability of classified bins in public places enhances citizens' awareness of environmental protection.

WEAKNESSES

Mask recycling knowledge is not widespread and bin styles are not unified for identification.

OPPORTUNITIES

The mask recycling system can refer to and be based on the existing waste recycling system.

THREATS

As the use of masks decreases, the number of masks recovered will also decrease.

DEFINE

Insight

Existing and universal disposal systems for discarded masks are defective.

TO MAXIMIZE UTILIZATION

People's habits about discarding masks have also changed considerably.

CHANGING HABITS

In Shanghai, there is generally a positive commitment to environmental activities and regulations.

ENVIRONMENTAL WILLINGNESS

Reframed Question

How Might We Improve the Mask Recycling Reform Based on the Existing System?

DEVELOP

Ideation

LOGICAL MINDMAP

Complete Mask Recycling
short-term behavior

Get Reward
user goals

- **Information**
  -mask related information
- **Socialization**
  -ranking & friend recognition
- **Entity**
  -Coupon
- **Self**
  -environmental identity

Long-Term Behavior & Habit Formation
design purpose

INSPIRATION

1. **Frequency of Behavior**
   If a behavior occurs frequently enough, it becomes habitual.
2. **Chinese Specific Behavioral Psychology**
   Public recognition encourage Chinese to regulate their behaviour voluntarily.
3. **Weaknesses of Comparison Systems**
   Comparative systems have single incentives and little information is available to the public.

Reference

Wang Can, an expert on the legislation of garbage classification, pointed out that the main reason for the incomplete legislation of garbage classification is the **lack of publicity and education**.

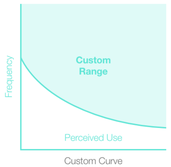
According to MAO Da, policy advisor of the Zero Waste Alliance, this requires citizens to **understand the current situation** of garbage collection, including the classification, flow and product.

How are habits **formed**?

NEUROLOGIC PERSPECTIVE

The conditioned reflexes that arise in the unconscious are stored in basal ganglia in the form of habits. Habits are developed when the brain does not actively consider what to do next.

<Neurological Plasticity & Habituation>



CULTURE PERSPECTIVE

The core of Confucius' thought, "ritual", has ingrained in the Chinese a sense of rules and reinforces the sense of shame when rules are broken, leading Chinese to develop good habits.

<The Analects Of Confucius>

礼

Case Study

What are the existing innovative recycling systems?

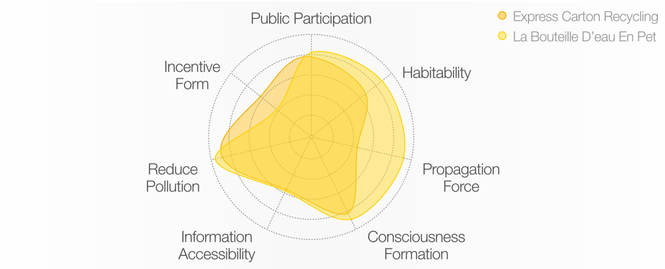
EXPRESS CARTON RECYCLING

The cartons are recycled after receiving the courier and are disinfected and reused in the courier industry.

LA BOUTEILLE D'EAU EN PET

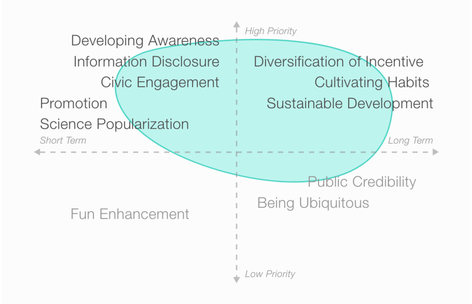
Pet bottles reduce energy use in industrial recycling by 50% and can be 100% recycled.

COMPARATIVE ANALYSIS

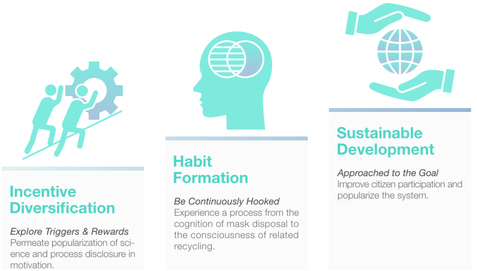


OPPORTUNITY

I use KJ method to integrate and evaluate design opportunities based on Insights, Competitor Analysis & Hooked Model.



KEY CUT-IN POINT & INTERNAL LOGIC



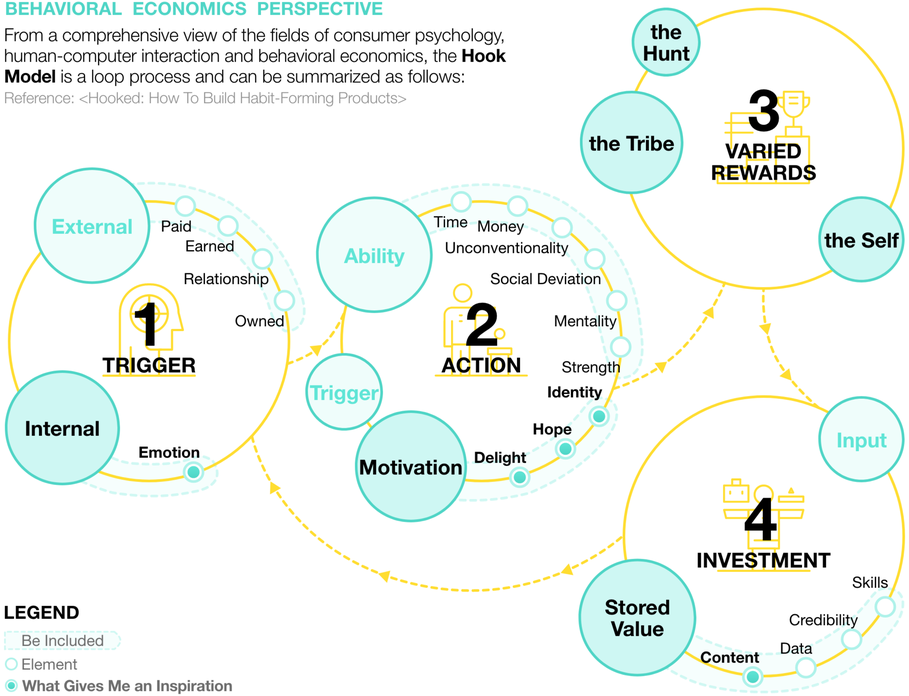
Design Theory of Hook Model

What are the **incentives for habit formation**?

BEHAVIORAL ECONOMICS PERSPECTIVE

From a comprehensive view of the fields of consumer psychology, human-computer interaction and behavioral economics, the **Hook Model** is a loop process and can be summarized as follows:

Reference: <Hooked: How To Build Habit-Forming Products>



Habit & Behavior Conversion Testing Based on Hook Model

Aim : Identify the user needs that lead to the trigger

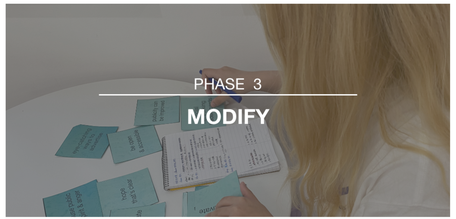
Method : AB Test & Desirability Testing

STATE	MOOD		NEED		TRIGGER
see pollution caused by masks	introspection	none of my business	hope it will not happen		
see mask recycling	curiosity	clear	hope that's clear	be open & accessible	arouse public curiosity
masks thrown around	anger		hope that everyone will be public-spirited	hope for improved supervision	arouse public spirit & anger
see the categorized banner	be willing to know	just pass by	publicity can be improved		eye-catching ways to advertise
caught on camera	ashamed		can motivate		arouse civic consciousness

Aim : Understand what incentives are sufficient to motivate users to provide discarded masks

Method : Interview & Technology Acceptance Model

the HUNT	the TRIBE	the SELF
	complete environmental activities together	pride in participating in environmental activities
get the latest news		
	get likes	
get points or coupons	social networking leaderboards	get medals
	can motivate	



Aim : Redefine concepts based on habit testing

Method : Brainstorm

NECESSARY DESIGN CONTENT

① Mask Science
② Process Disclosure
③ Centralized Processing

EXPLOITED PUBLIC PSYCHOLOGY

① Public-Spiritedness
② Intellectual Curiosity

BEHAVIOR PURPOSE

Let the user throw the mask to the designated place, and become addicted to this behavior, so as to develop the habit of discarding the mask.

DELIVER

Final Concept

Based on psychological incentives, MOOS aims to explore the possibilities of improving people's behavior in discarding disposable masks through the integration of the online app and offline devices.

MOOS

LET'S TRANSFORM THE MASK

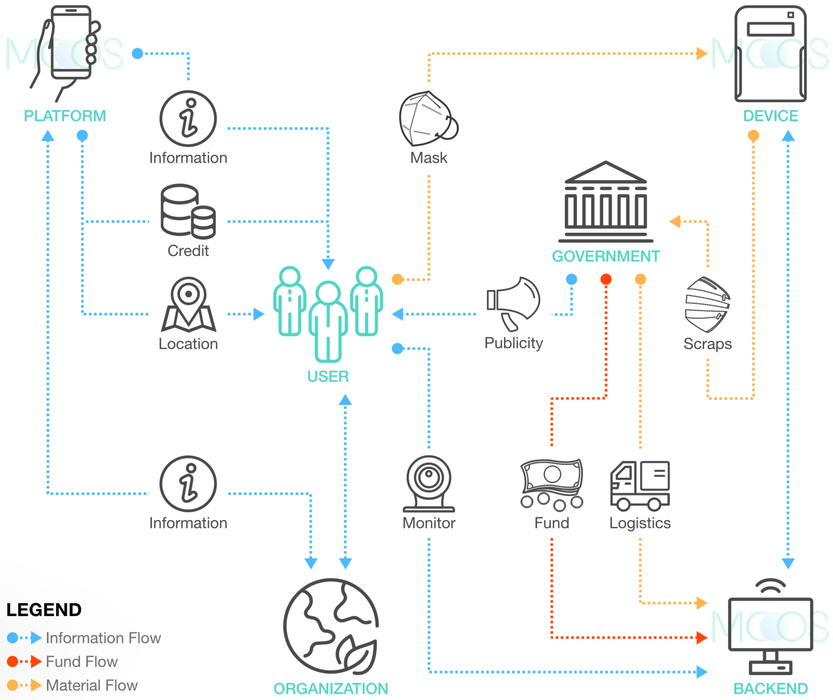
various rewards

self-processing

disclosed process

unified recovery

SYSTEM MAP

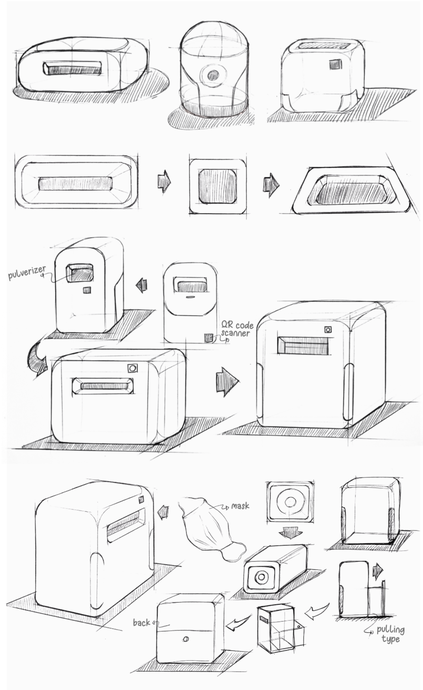


LEGEND

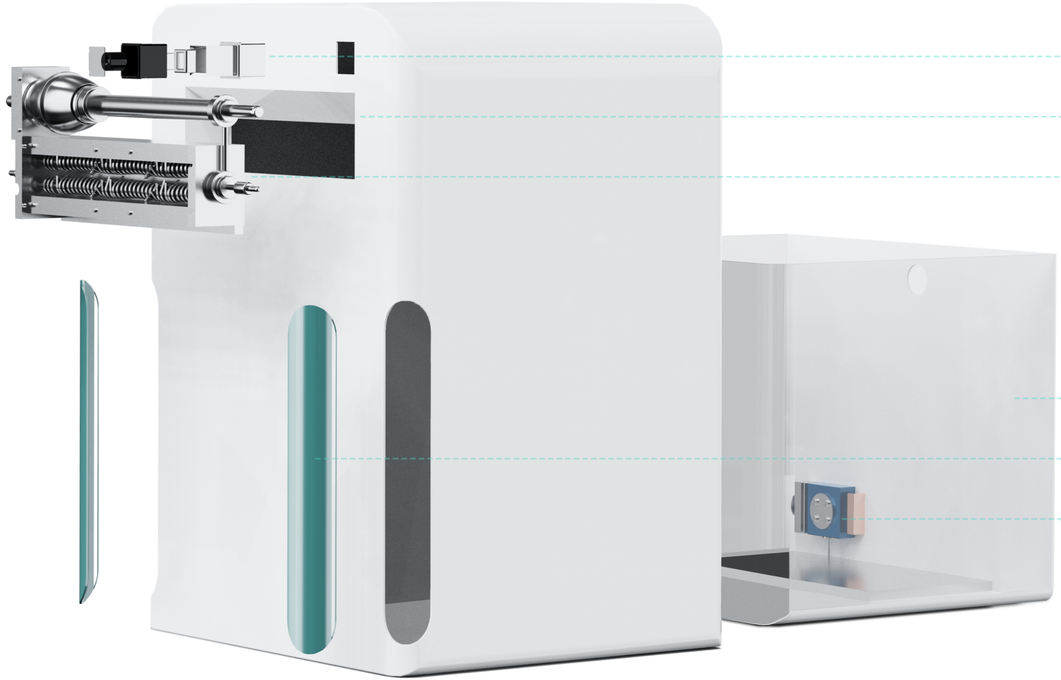
- Information Flow
- Fund Flow
- Material Flow

Offline Equipment Design

SKETCH



FUNCTION DESCRIPTION



Client & Service

QR CODE SCANNER
To collect QR codes to get and confirm users' data.

FEEDING INLET
With a certain angle of inlet design, 3~5 masks can be put in each time.

PULVERIZER
To provide efficient & timely disposal of masks.

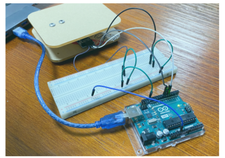
Back End

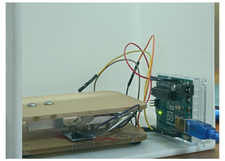
DEBRIS BIN
To help back-end staff to recycle debris quickly.

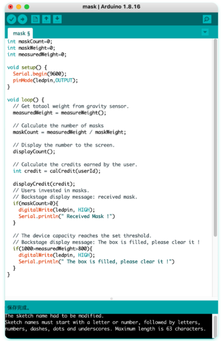
SIDEWALLS
To inform the public of the functions of the device via the sidewalls.

GRAVITY SENSOR
To transform gravity into signal to the backend and indicate the capacity information.

MOCKUP

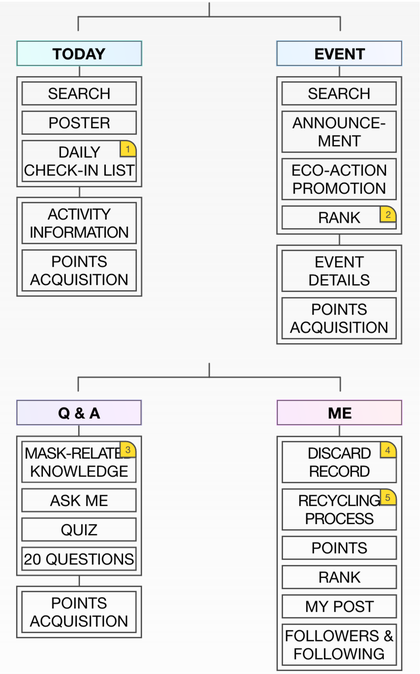




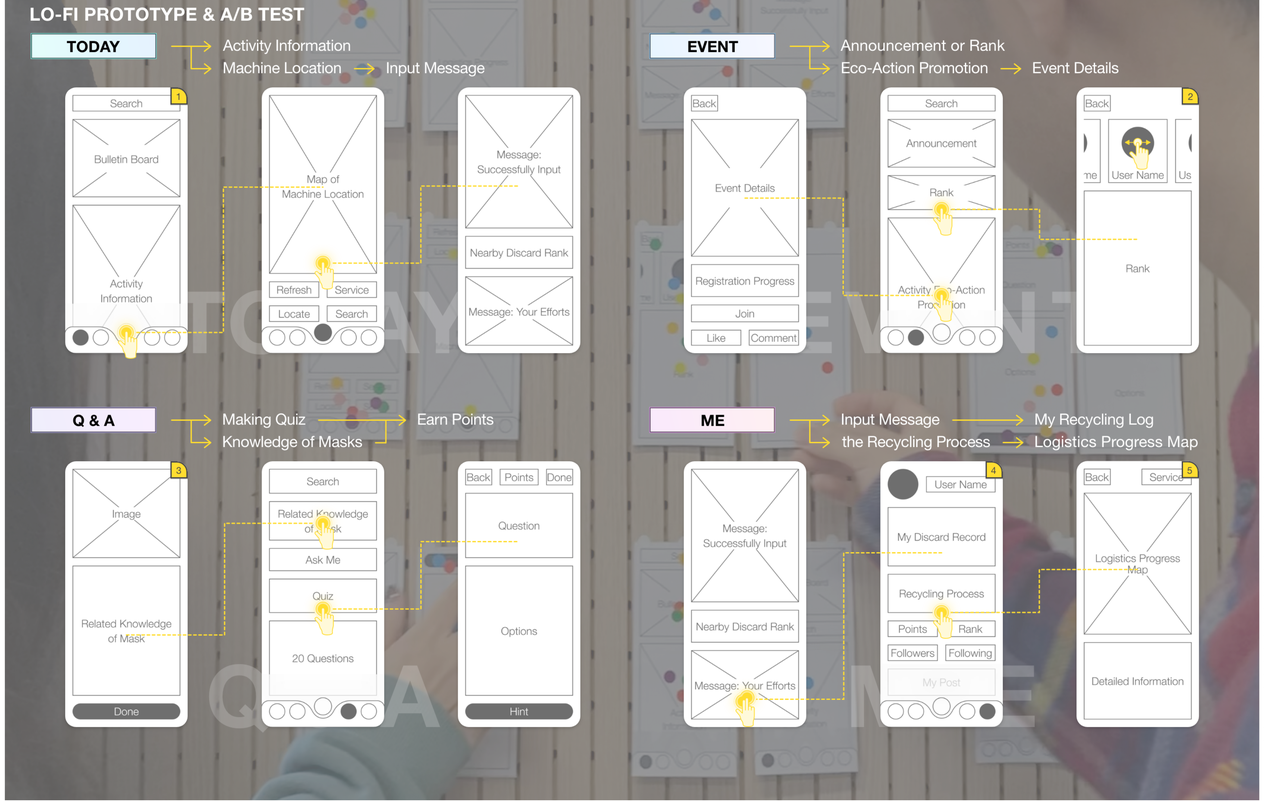


Online User Interface Design

MOOS APP INFORMATION ARCHITECTURE

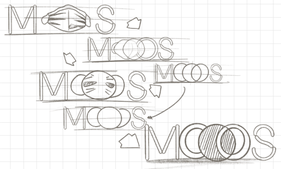


LO-FI PROTOTYPE & A/B TEST



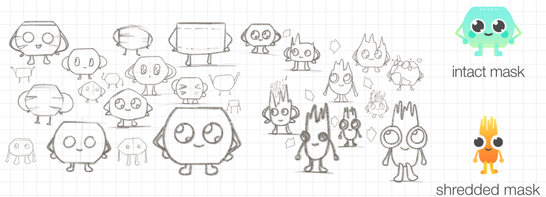
VISUAL IDENTITY

LOGO



M stands for the mask. The name is taken from the crushing sound of the device in operation, and the design is inspired by the conversion from masks to pieces.

IP IMAGE



COLOR PALETTE

#90E8C0

#51D6C6

#5Fe5D6

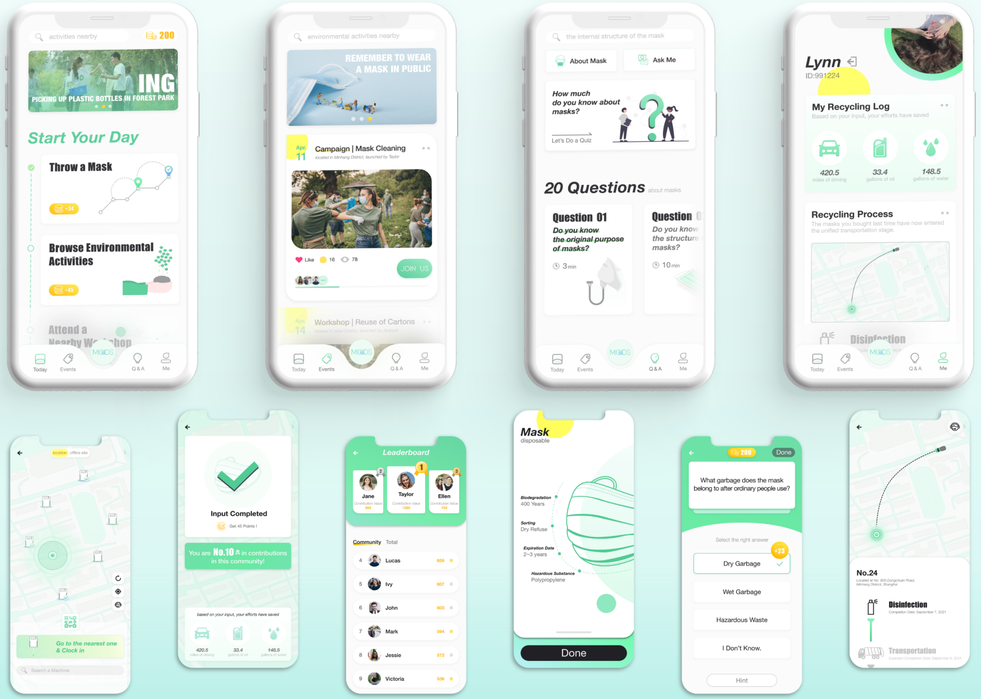
#5Fa2E5

#5F7Ee4

FONT

Heading	***Emphasis Text***	Main Text
Impact | 26 | Regular	Helvetica | 14 | Bold Italic	Helvetica | 12 | Light

HI-FI PROTOTYPE



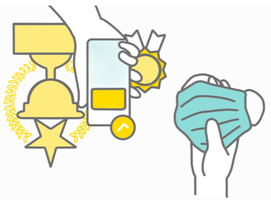
User Storyboard

1 Confused about discarded masks.

2 Advertise on social media platforms.

3 Download MOOS from the App Store.

4 Search for nearby devices and navigate.



5 Put the mask into the device and get the points.

6 Share the experience of throwing masks.

7 Masks are self-processed to prevent illegal circulation.

8 Alarm when device capacity reaches storage capacity.

9 Monitor the backend debris recovery process.

Service Blueprint

TIME	2-3 min	5-8 min	12-20 min		5-8 min	1-2 min
EVIDENCE	Promotion Interface	Application Mask Related Description Machine Location	Recycling Machine	App Interface	App Interface	App Interface Redemption Notification
CUSTOMER JOURNEY	Browse Multi-platform Promotion Information	Download the App Search for Nearby Recycling Machines	Visit the Machine Put the Waste Masks into the Machine	Earn Points Check the Ranking of Contributions in Community	View the Mask Recycling Stage	Redeem Gifts
			Line of Interaction			
FRONTSTAGE	Promotional Information Appearing on Multi-platform	App Available for Download in App Store Nearby Machine Location	Attractive & Available Re-Cycling Machine	Points Settlement	Monitoring the Destination of Masks	Sending Messages of Accumulated Points Redeemable for Prizes
			Line of Visibility			
BACKSTAGE ACTIONS	Publish Promotion Information in Multi-platform	Publish App in App Store Identify User and Machine Location	Launch Machines	Run the Machine Record the Points in the System	Track the Position, Stage & Duration of Masks in the Recycling System	Points Settlement & Redemption System Verify Personal Information
			Line of Internal Interaction			
SUPPORT PROCESSES	Formulate Promotion Plan Design Promotion Information Third-party Platform	Analysis of User Location Flow & Aggregation Third-Party Location & Navigation Company	Third-party Machine Distributors	Machine Supplier	Contact and Hand Over to Government or Environmental Organizations for Professional Mask Disposal	Third-party Product Manufacturers Delivery Companies

Business Canvas

KEY PARTNERS

- Government
- Environmental Groups
- Community Garbage Sorting Site
- Machine Supplier
- Multimedia Platform
- Navigation Company

KEY ACTIVITIES

- Platform Optimization
- Advertising Cooperation
- Government Cooperation
- Platform Operation
- Content Operation
- Identification of Discarded Masks

KEY RESOURCES

- Community Maintain Multimedia Platforms and Form Self-Propagation
- Platform's Users: Mostly Environmentalists
- Content Value of Mask Related Knowledge

VALUE PROPOSITIONS

- Convey The Values of Circular Economy and Mask Environmental Protection
- **Online:**
  Establish a Mask Recycling Community for Users, and Monitor the Mask Recycling Process
- **Offline:**
  Help Relevant Departments & Groups Gather Discarded Masks

CUSTOMER RELATIONSHIPS

- Establish a Community Related to Environmental Protection of Masks
- Introducing Merchants to Provide Rewards and Gift Certificates
- Advertising Position
- Technology, Process and Policy Support

CHANNELS

- Applications, Wechat and Other Multimedia
- Offline Machine

CUSTOMER SEGMENTS

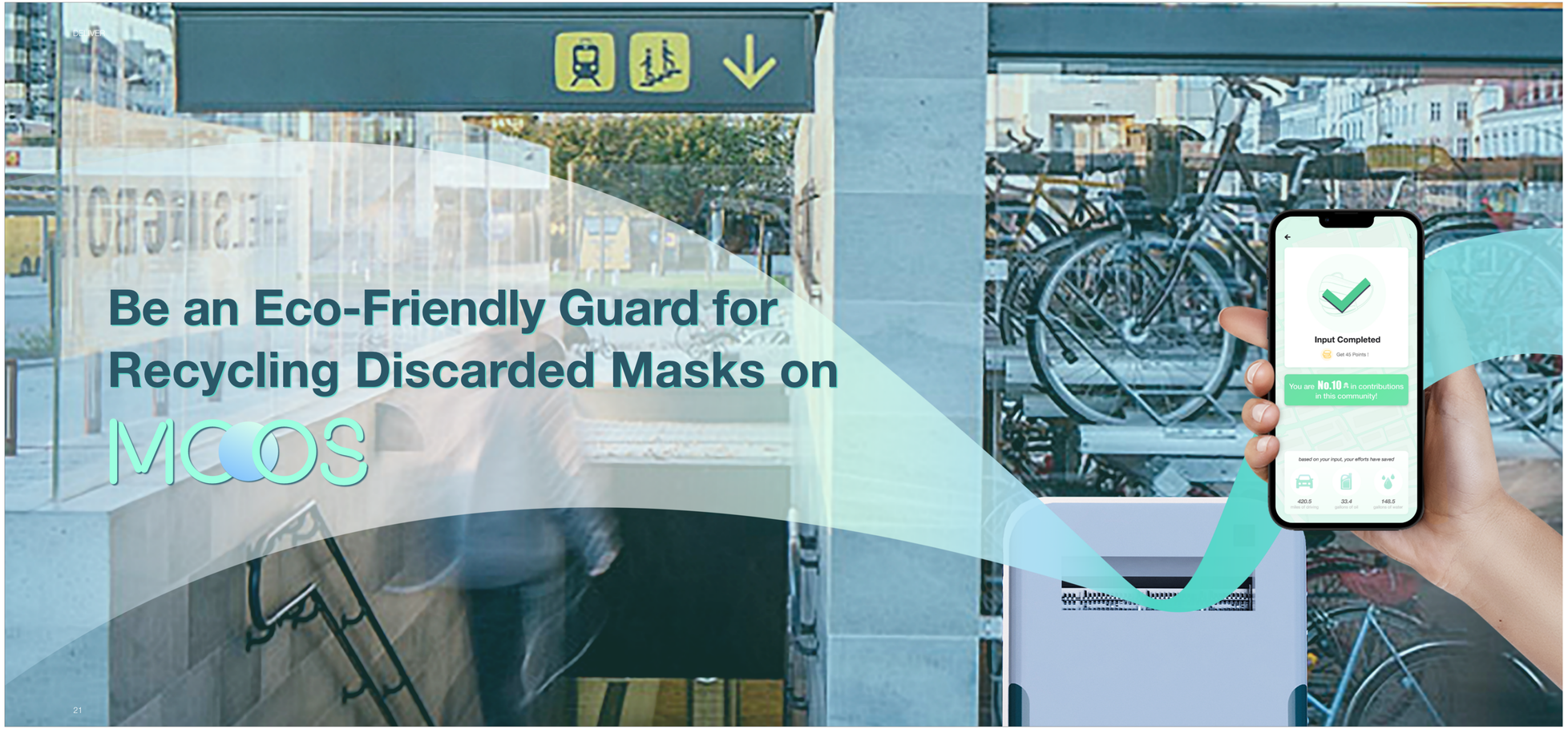
- a Public-Spirited Public Willing to do its Bit for the Environment
- Advertiser Placement
- Environmental Groups or Governments
- Enterprises with Environmental Protection & Social Responsibility

COST STRUCTURE

- Product Research & Development, Platform Optimization
- Advertising Promotion
- Personnel Costs

REVENUE STREAMS

- Government Financial Support
- Advertising



Future Prospects

Technical Innovation

Innovations in hardware technology, material adaptation and incentives will be focused on.

Business Strategy

More offline devices will be launched to ensure that they are accessible to users.

Multi-Cooperation

Government and environmental organizations will be associated to get more authoritative support and interaction.