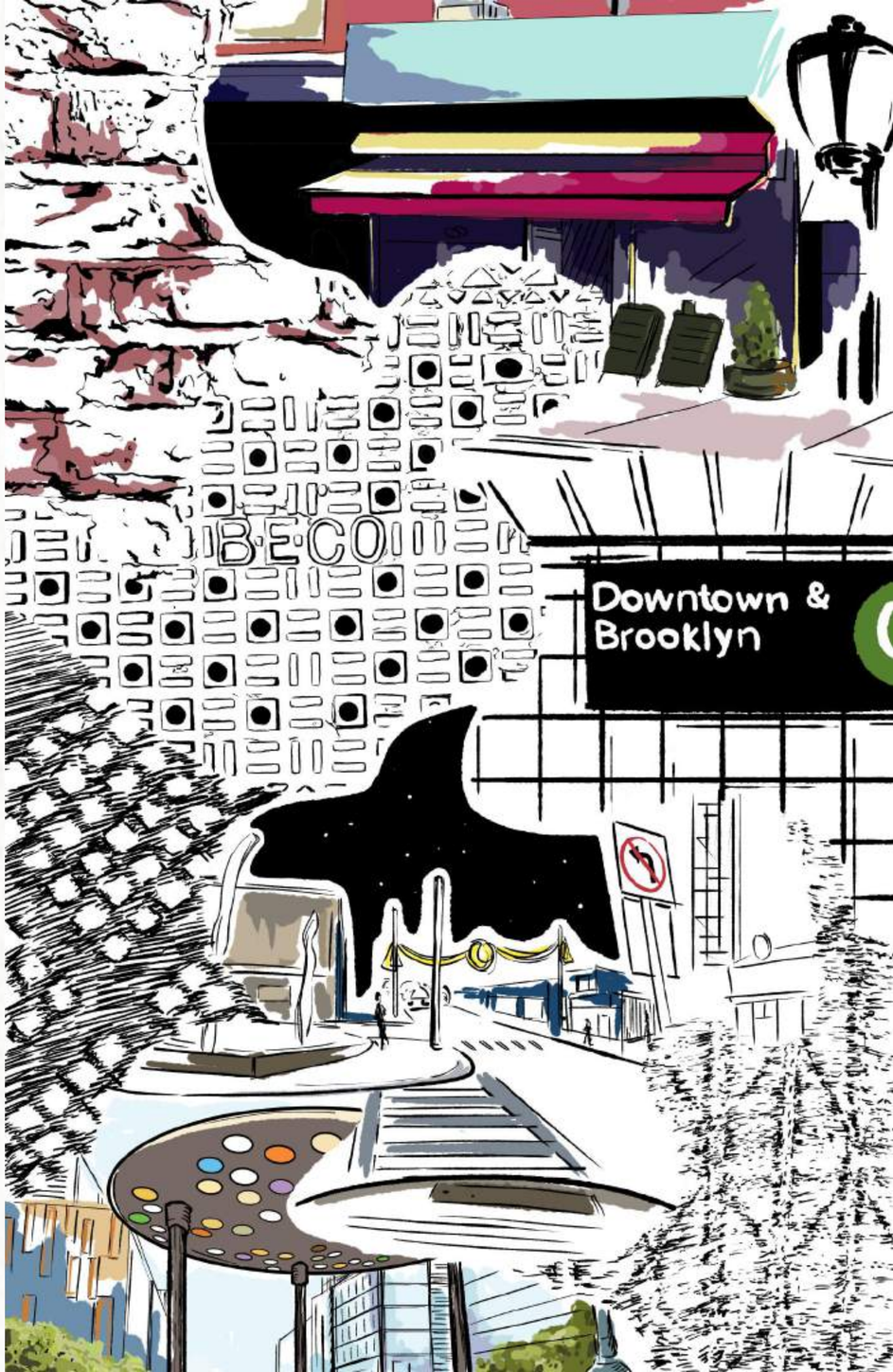
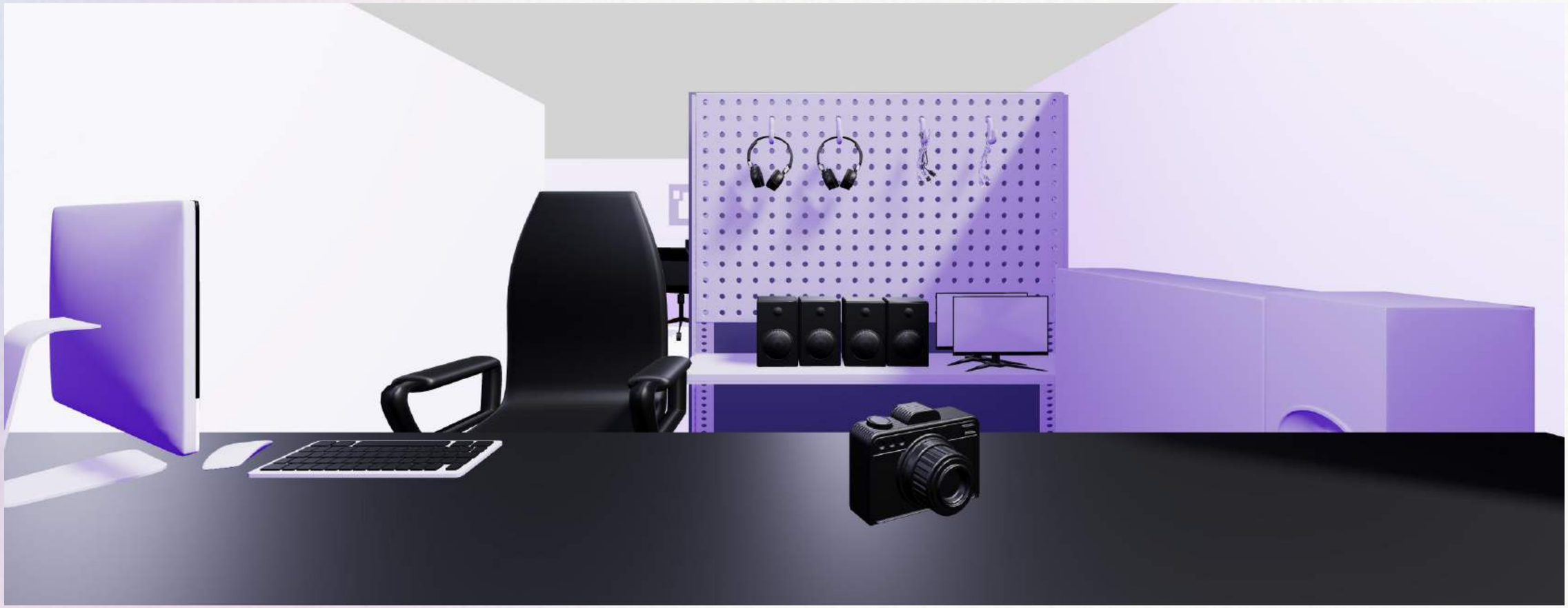
Portfolio

Kefan Lyu

https://www.kefanlyu.com/



Check It Out: ITP Historical Stories Untold



Role: Scene Modeling, UX Design | Tools: Blender, Excel, React, Vite | Team: 2

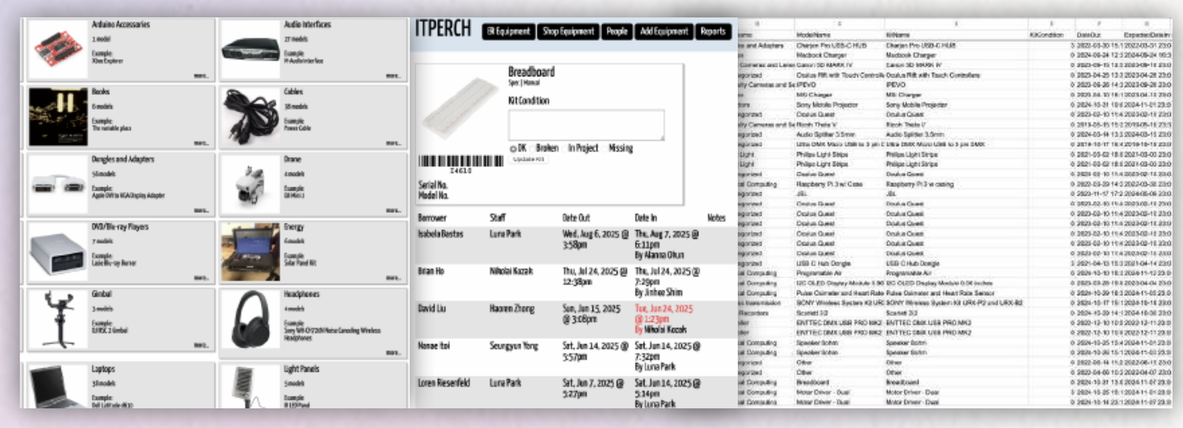
Overview

NYU's Interactive Telecommunications Program (ITP) relies on its Equipment Room (ER) and Fabrication Lab as the backbone of student projects. Every checkout record represents an idea in motion, yet more than 200,000 records (2011–2024) remain fragmented and difficult to interpret.

Challenge

How might we turn raw checkout logs into an engaging, accessible story for the ITP community?

By approaching this dataset as a design problem, the goal was to move beyond static charts and uncover the evolving patterns of creative practice within the ITP community.



Research

Quantitative Analysis

Qualitative Analysis

Curriculum-driven spikes: Borrowing of specific items (e.g., VR kits, audio recorders) showed sharp increases during certain semesters.

These spikes corresponded to required courses scheduled in Fall, where assignments mandated the use of **specific equipment**.

High-value items (e.g., laptops) appeared with unusually high checkout counts due to same-day return policies.

ER policy required **daily return** of expensive items, inflating the recorded volume compared to other equipment.

Borrowing follows **semester** peaks (highest around midterms & finals).

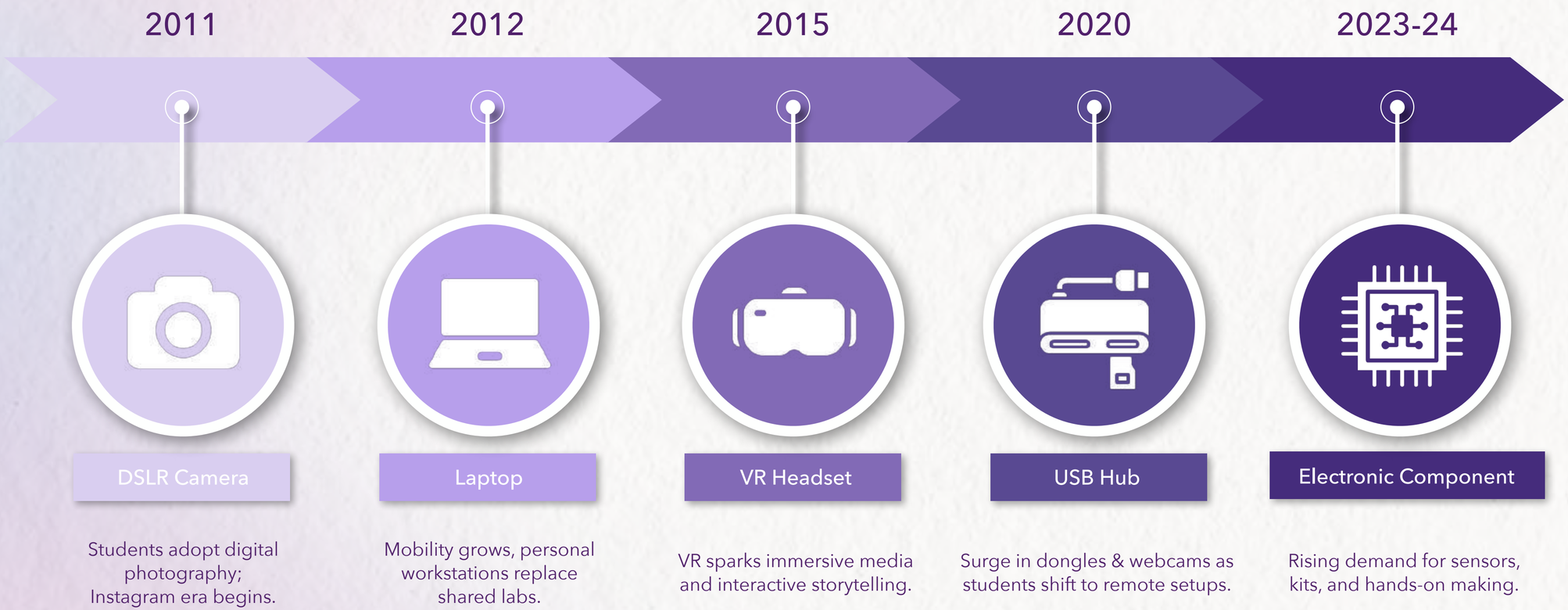
Faculty confirmed that borrowing patterns align with **project deadlines** and curriculum cycles.

Fall semester consistently higher than Spring due to heavier production **course load**.

Interviews revealed that many **core production classes** are only offered in Fall, explaining the higher demand.

Insights

Milestones in ITP's Evolution

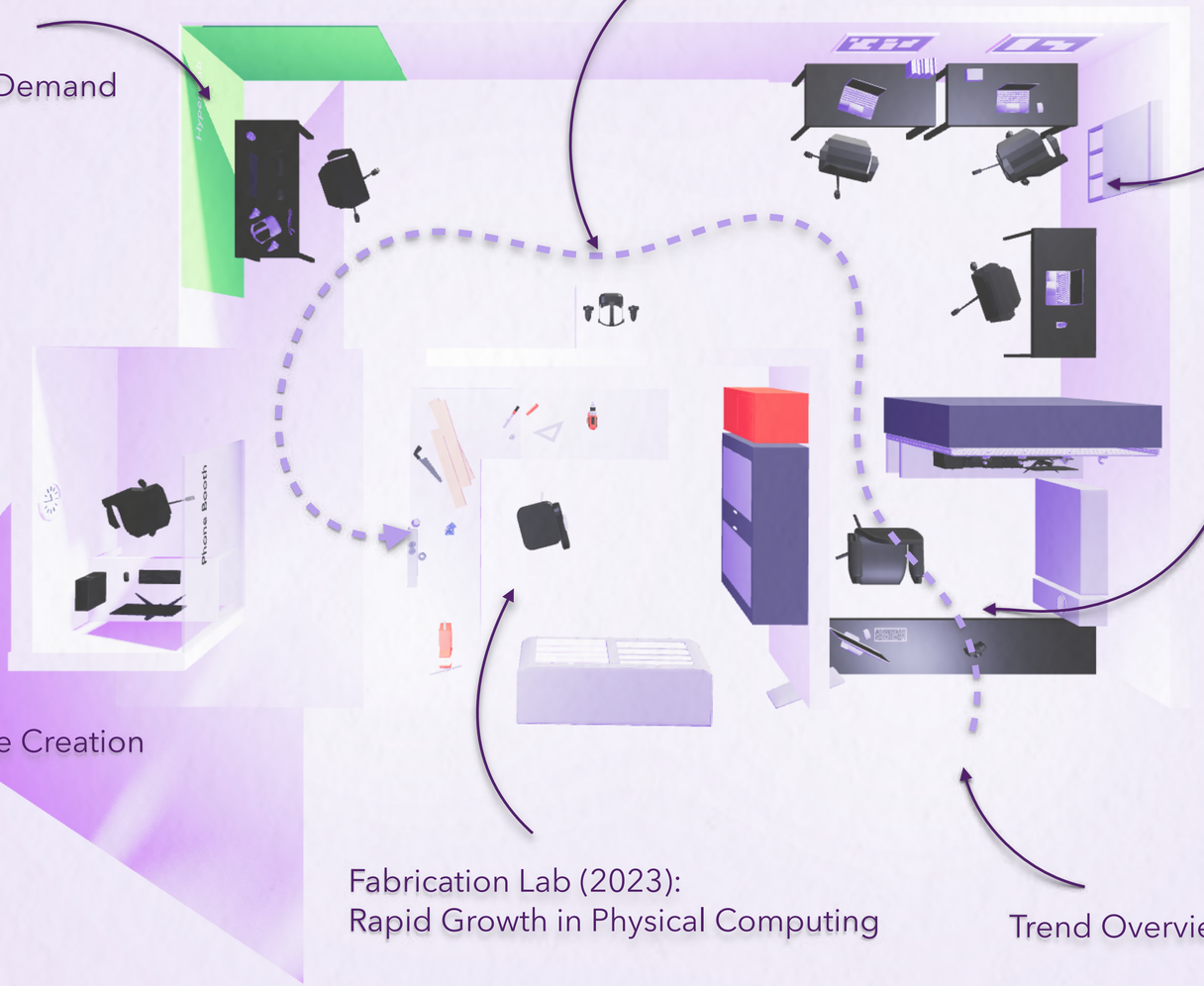


Narrative Flow

Hyper Lab (2017):
The Golden Age of Equipment Demand

Oculus Headset (2015):
Enter Virtual Reality and Immersive Technology

Production Area (2012):
The Shift to Portability

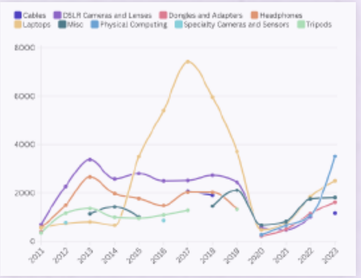


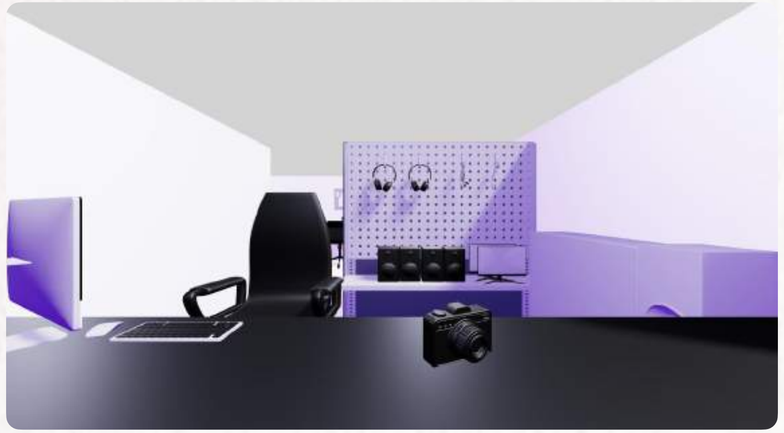
Equipment room (2011) :
Foundations in DSLR
Photography and Digital Media

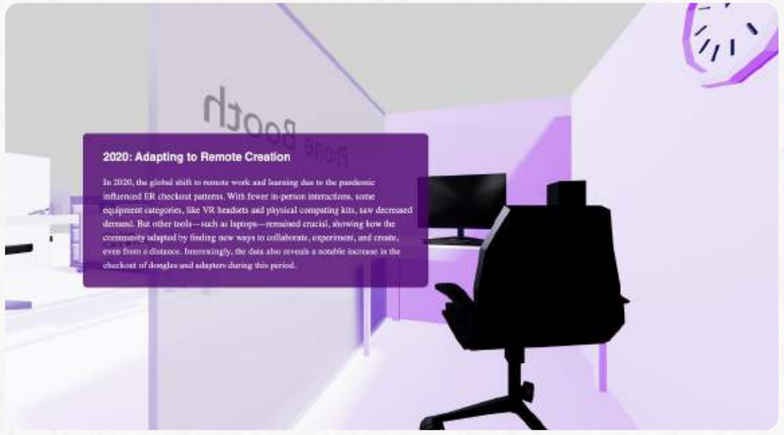
Phone Booth (2020):
Adapting to a World of Remote Creation

Fabrication Lab (2023):
Rapid Growth in Physical Computing

Trend Overview

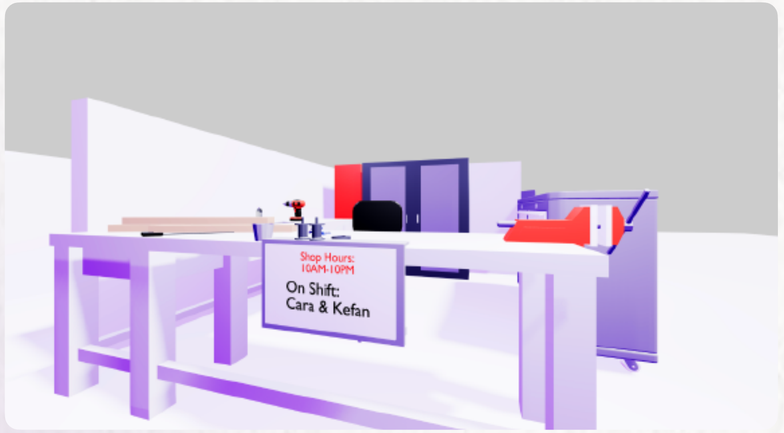






Final Design Features

- Immersive 3D scenes – checkout data embedded in Blender environments
- Scroll-based storytelling – smooth transitions guide users through eras and ITP area
- Camera movement – focus shifts highlight meaningful data points
- Minimal UI – neutral design lets data & visuals take center stage



PHANTASIS

Dream APP

The Meaning of Dreams in Different Cultures

Ancient Eastern

Dream incubation was a widespread practice across the Near Eastern civilizations. Their texts all refer to some form of inviting the other world to send **prophetic dreams**.

Old Testament

The ancient Hebrews believed that sleep thinned the veil between the living world and **the world of demons, angels and spirits**.

Native American

They viewed the dream space as a sacred place, one where a person could step outside the bonds of mundane existence and connect with a more **universal consciousness**.

Ancient China

Ancient Chinese people thought that dreams can imply **auspicious and inauspicious** things. And traditional Chinese medical science stated that dreams are related to the health condition of human's bodies.

Relevant Artists: Dali / René Magritte

Common Dreams

Researchers have found that the seven most common dreams involve being attacked or chased, being late, loved ones dying, falling, flying, school, and sex.

While the specifics vary from culture to culture, many ancient cultures shared the belief that dreams are important, that they occupy a space outside our everyday life and offer a window into a deeper understanding of ourselves and our connection to the world and everything in it.

BACKGROUND

PARTICIPATION

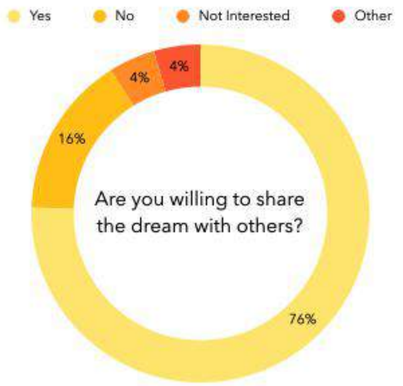
76% of the respondents said they were willing to share their dreams with others. About 1/5 of them want to disclose their dream content anonymously because of some private content. In terms of recording methods, most people still like the traditional text narration, and some keywords can help them quickly recall the details of dreams. Some impressive dreams are allowed to be processed for a longer time, such as collage, painting, and composing.

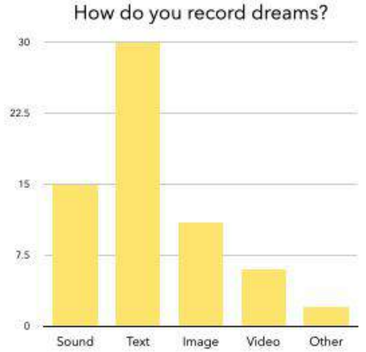
ARTICULATION

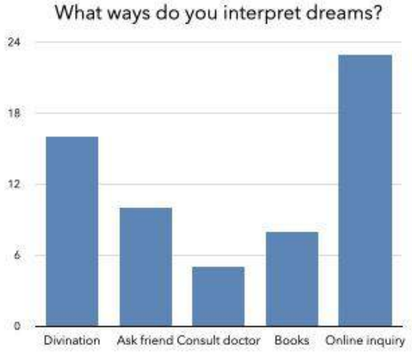
In the investigation of dream details, we find that most of the respondents have stable daily dream frequency with continuous dream production in sleep. Most of the them were able to memorize the recent dream content consciously, but some details would be ignored and completely forgotten after a period of time because they triggered instantaneous memory when they woke up.

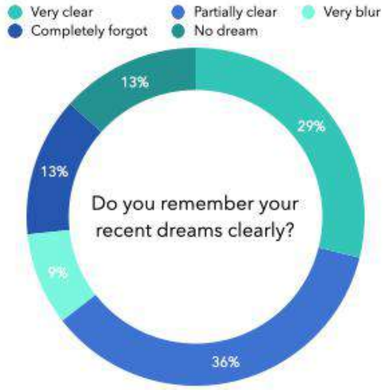
INTERPRETATION

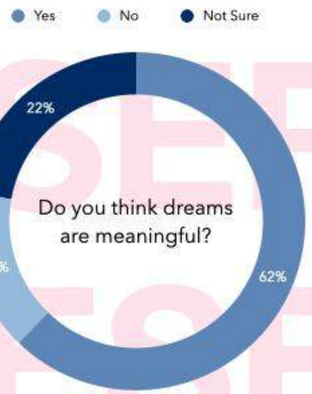
Most of the respondents believed that dreams were meaningful and had experienced dream interpretation. Many of them have tried online divination, such as using tarot cards to explain the information conveyed by dreams. Communicating dreams with people around has also become an interesting social topic. However, when asked about people's views on paid dream interpretation, they are more concerned about the price than the dream itself.

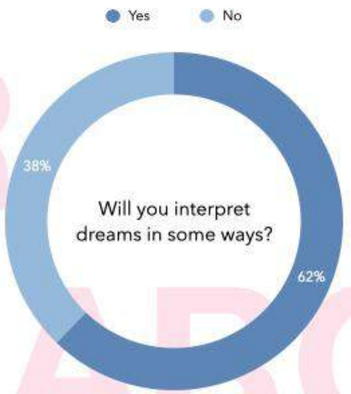








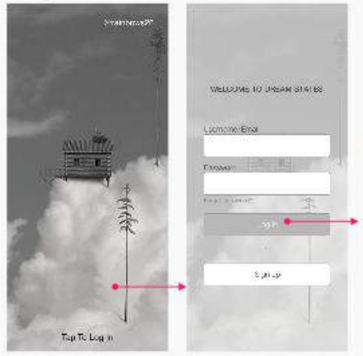




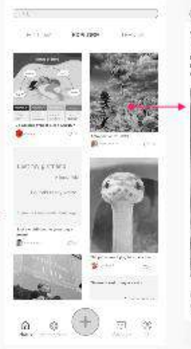
USER RESEARCH

Register / Login

Login



Main Page



Content

Interpretate

User Review

Specialist

Interpretate

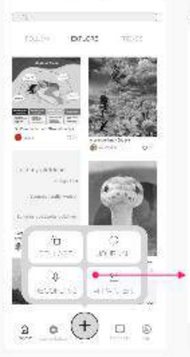
Personal Page

My Post

Message

Post

Mainpage



Recording

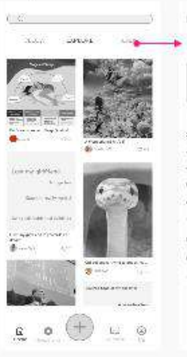
Collage

Journal

AI Paint

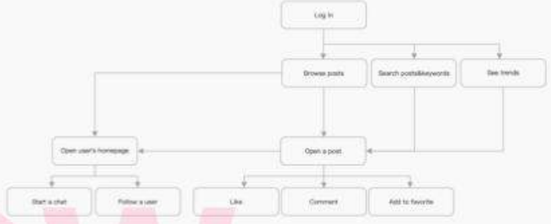
Explore / Follow

Explore

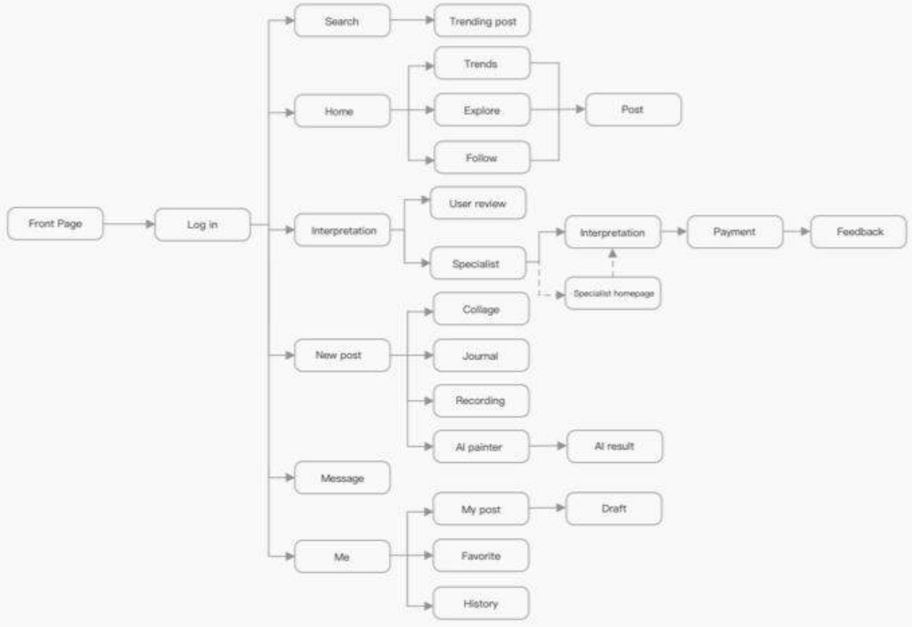


Trends

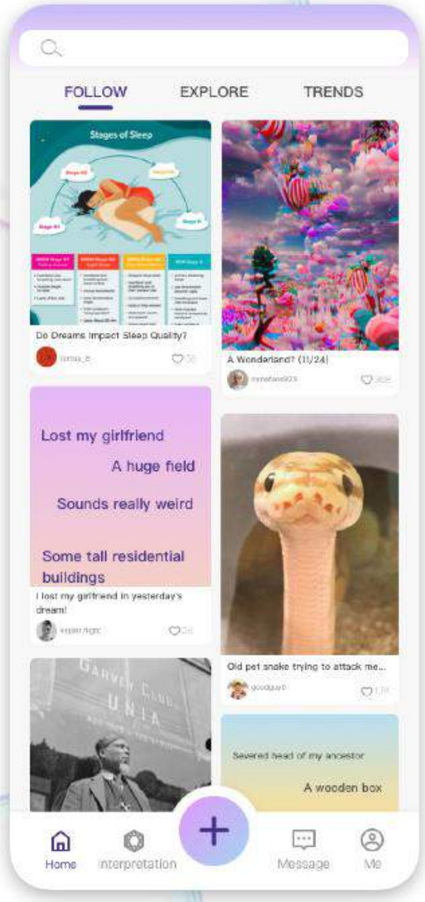
Content

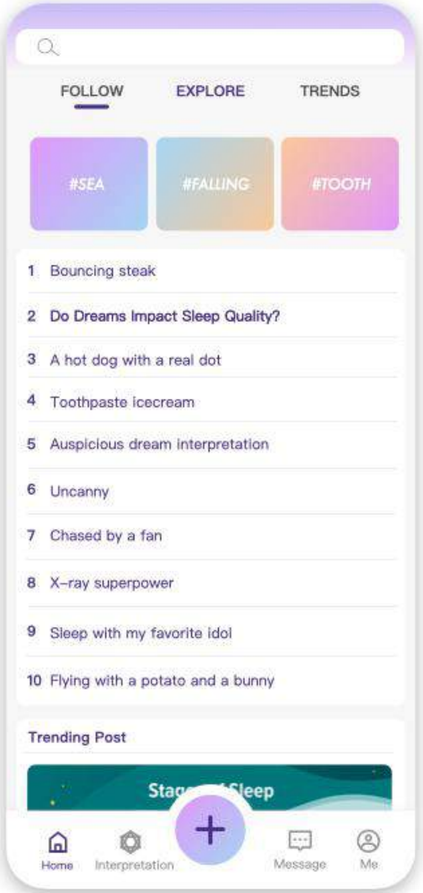


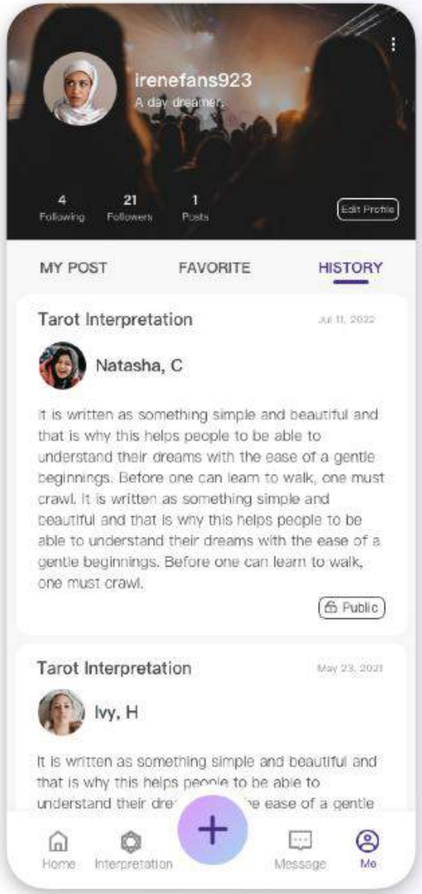
Information Architecture



USER FLOW

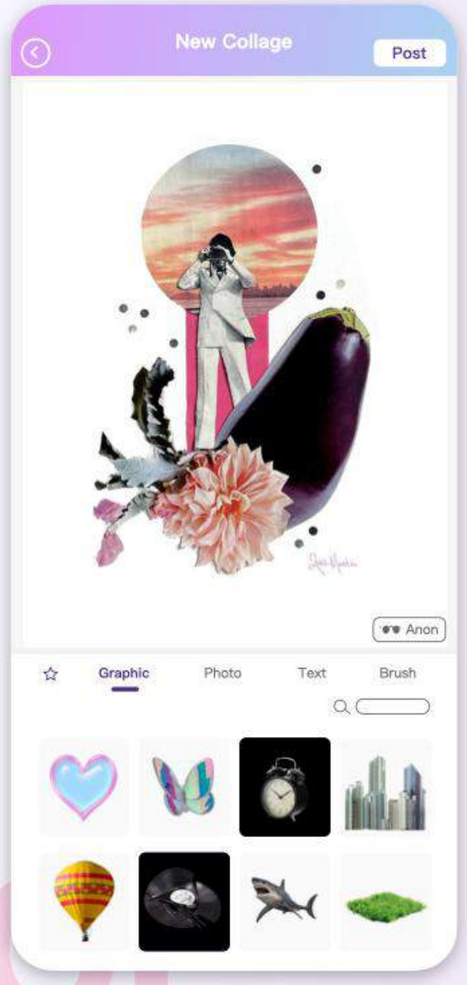


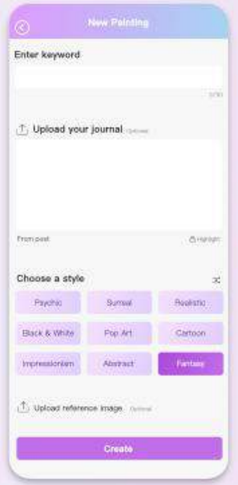




Users can document their dreams through four distinct methods: collage, audio recording, journaling, and AI-generated paintings. These methods can be also integrated, enhancing the richness and intricacy of dream documentation.

The eye icon enables users to control the visibility of their posts. It's particularly useful when dreams include personal details (like names of acquaintances, locations, or sensitive phrases). The visibility tool can conceal this information. Thus, even in publicly shared posts, the obscured content remains accessible solely to the user.

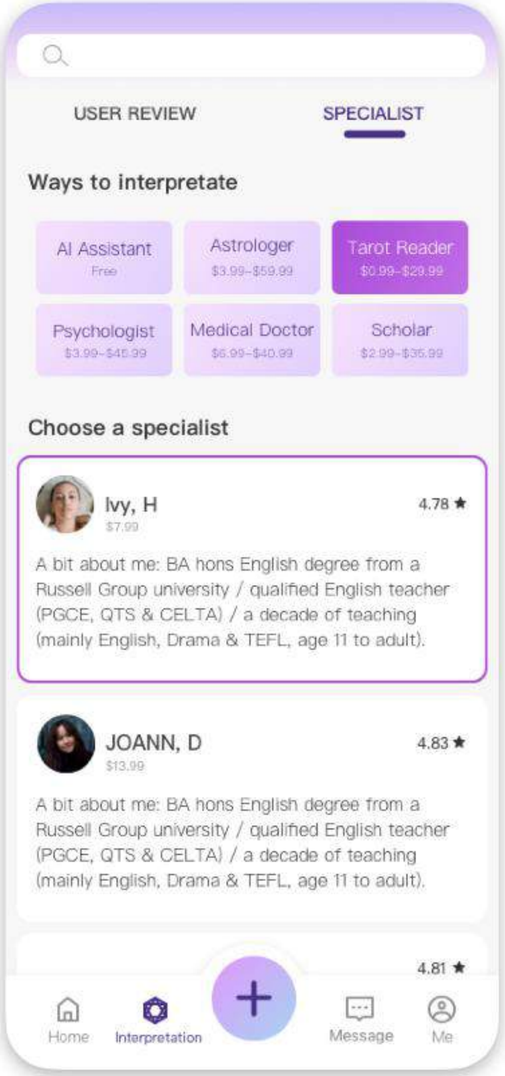


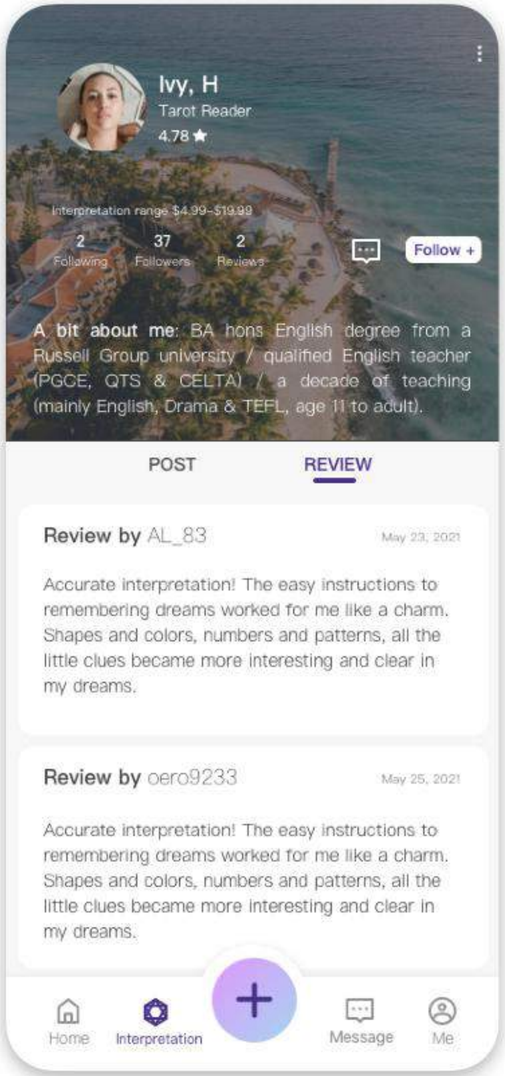


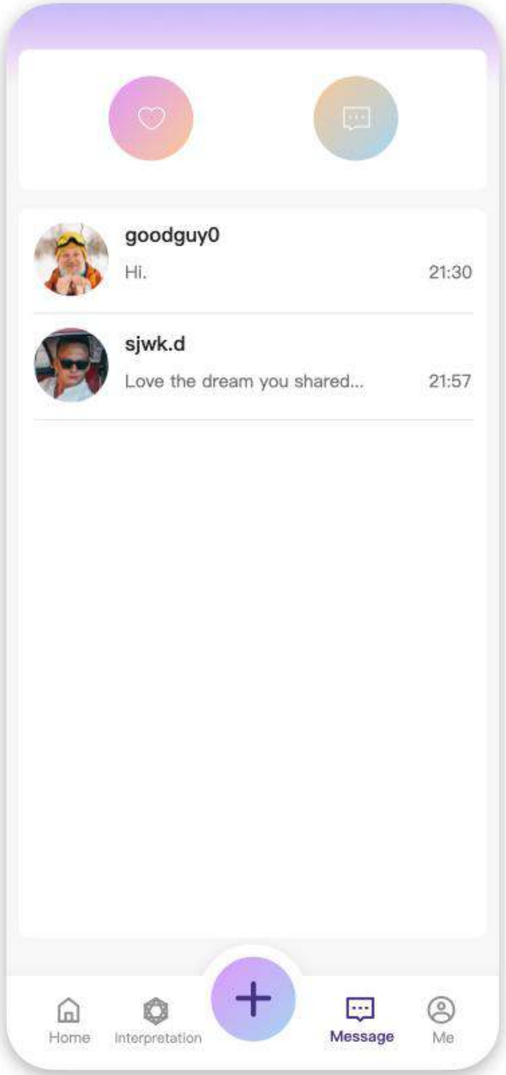
Trends enable users to stay informed about the most current and popular dream subjects, discover similar sleep experiences, and encounter intriguing narratives.

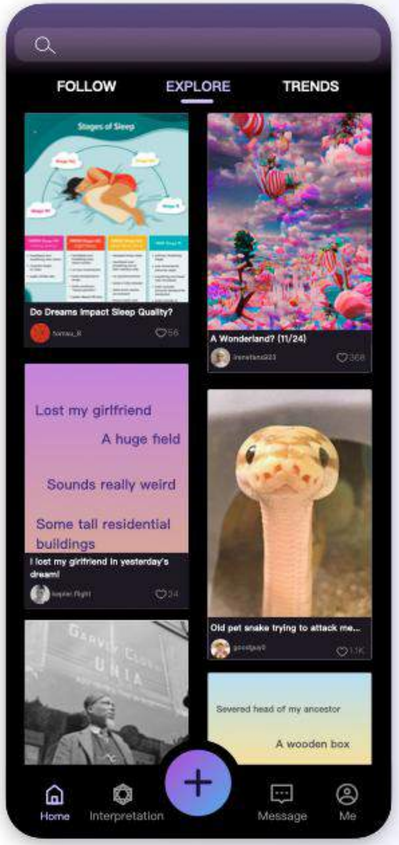
Dream Post

USER INTERFACE









Dark Mode

The message page facilitates users' engagement in dream discussions, introducing a new social interaction form. When a work is shared in public, the publisher receives prompt feedback from other users.

Users can access essential details and user reviews for each dream specialist, aiding in the selection of a dream interpretation method that best fits their needs based on theme and cost.

Dream Interpretation

USER INTERFACE

WHEELIO

Exercise Device for People with Dementia

DEMENTIA: LIFE OF POST-DIAGNOSIS

35%
Frequent exercise will help lower the risk of dementia.

80% people are willing to use apps and wearables to understand risk and be trained.

22% people become less mentally active because of the influnce by dementia.

66 171
More hours received by caregivers monthly for adults ages over 70 with dementia.

WHY

Dementia is currently one of the major causes of disability and dependency among older people with nearly 10 million new cases every year globally. It has physical, psychological, social and economic impacts, not only for people living with dementia, but also for their caregivers, families and society at large. People with dementia lack daily physical activity and they are sometimes un able to do so because of the dependency to caregivers and safety issues.

Visual display + Incentive system + Memory training + Tai Chi

HOW

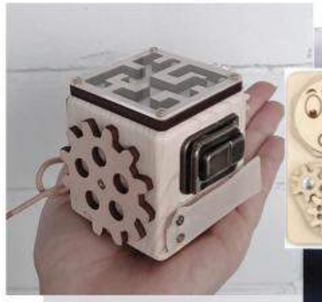
People with dementia are able to engage in a certain amount of daily physical exercise for limb and achieve purpose with a simple instruction in the absence of caregivers. The design will optimize physical memory and activity to people with dementia, and provide information and long-term support to caregivers.

MARKETING RESEARCH

S&S Activity Pillow

Communication board

Photobook



Comfort/busy board

ID Bracelet /GPS watch/Alarm

Motion-tracking device

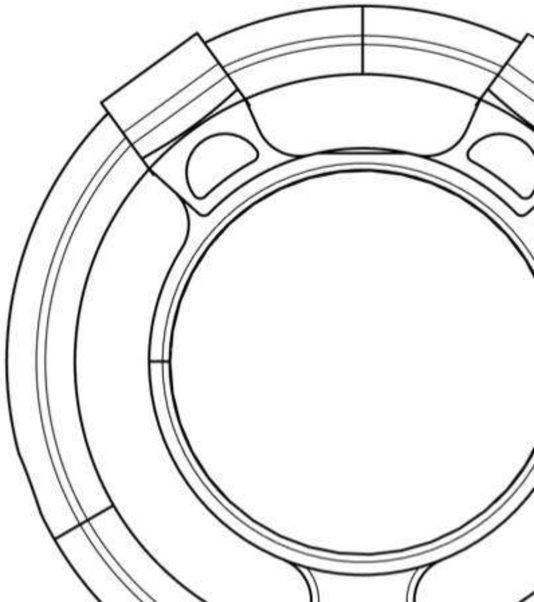
Light therapy

Loopholes

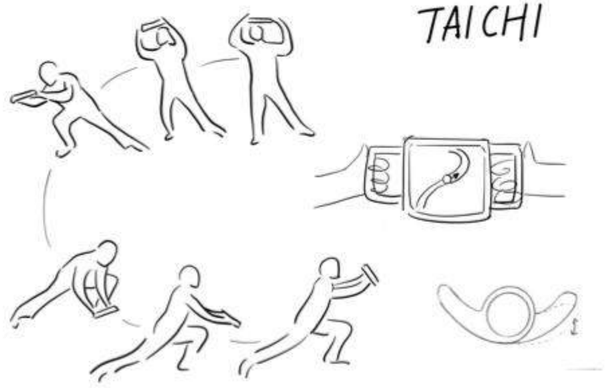
Does not include personalized function and theme	Focus on memory training only	Incorporate small-scale movement only	Childish features impairs dignity
		Lacks of Incentive system	Single user group

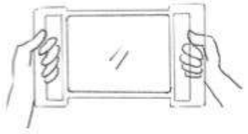
List of Quantifiable Metrics

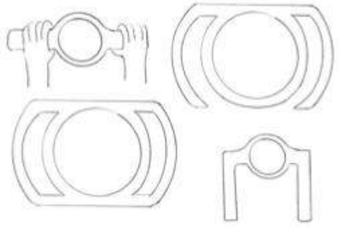
- **Decrease the amount of time giving cares to the patient**
- **Devoid of childlike features**
- **Enhance limb-eye coordination**
- **Perform physical activity 15-20 minutes per day**
- **Prevent complicated instructional system**
- **Reinforce memory of body movements**
- **Provides feedback of patient's activity data to caregivers every day**

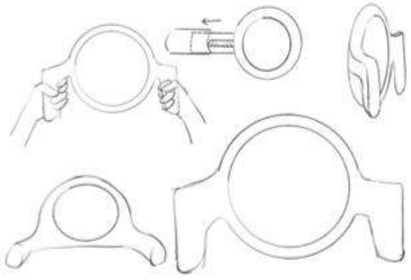


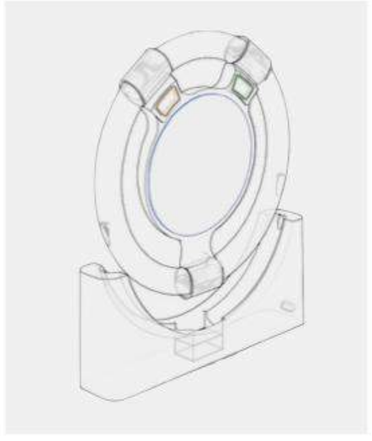
IDEATION THROUGH SKETCHES

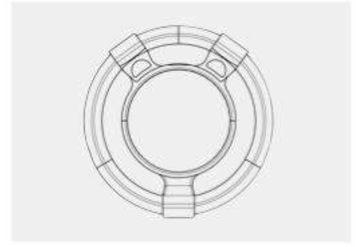


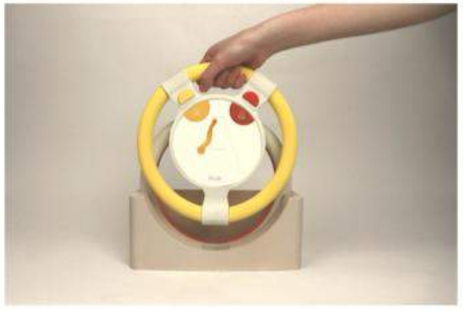


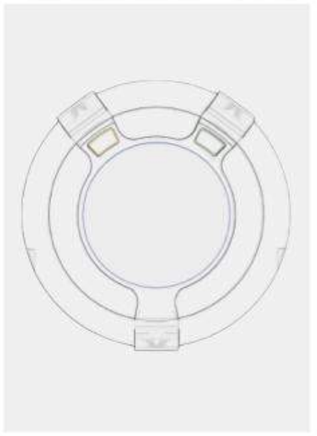


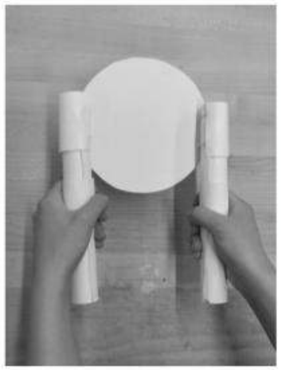


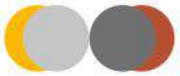




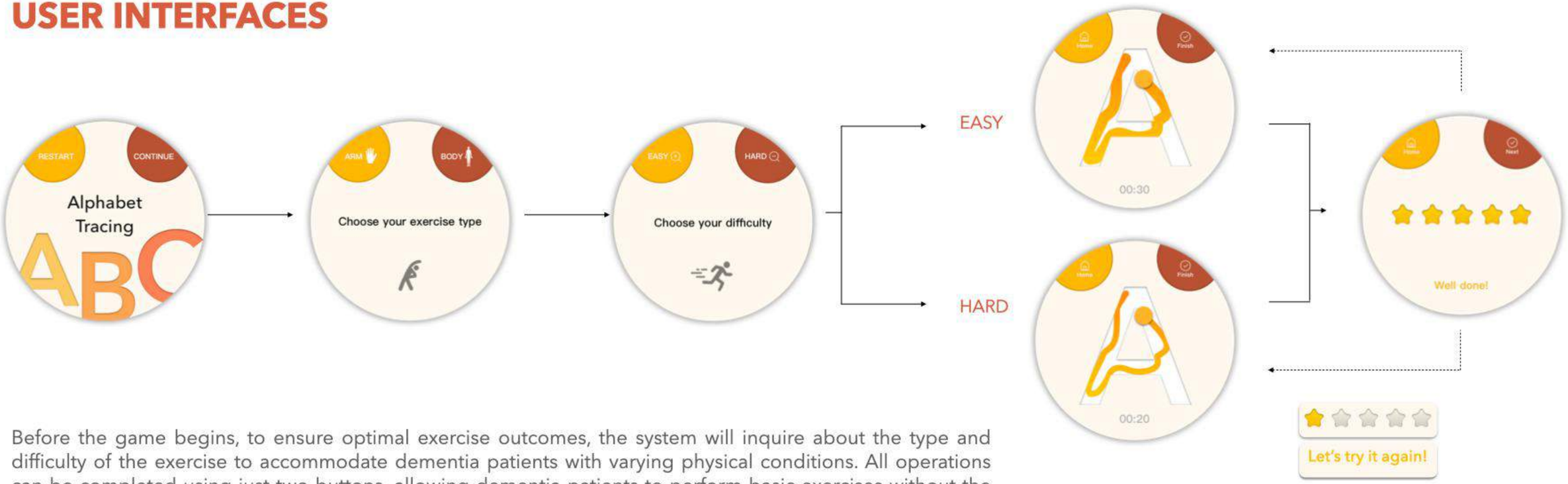






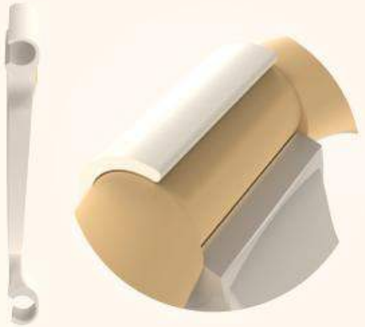


USER INTERFACES



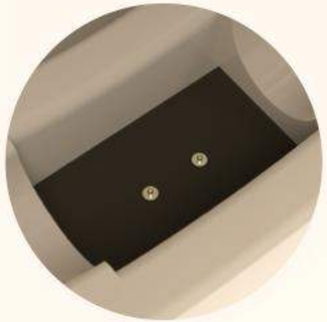
Before the game begins, to ensure optimal exercise outcomes, the system will inquire about the type and difficulty of the exercise to accommodate dementia patients with varying physical conditions. All operations can be completed using just two buttons, allowing dementia patients to perform basic exercises without the need for caregiver assistance. The alphabet tracing game not only enhances the coordination between the patient's limbs and eyes but also increases their familiarity with everyday letters and motivates them to complete tasks independently, without caregiver support.

If the star earned is ≤ two, the system will ask the participant to retry the level.

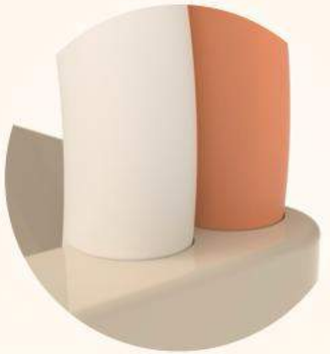


7° tilted panel with an interlock structure, for a better view.

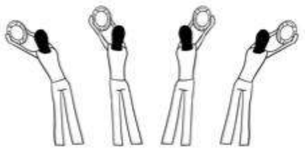
Only two buttons are installed in Wheelio, with clear and simple instructions.



Stable dock with a wireless charger, helping it set securely.



Comfortable matte finish increases friction when holding and replacing the rings.



0.4 kg

0.6 kg

0.8 kg

The ring's weight can be adjusted by replacing it with one of a different weight; darker colors indicate heavier weights. This feature caters to individuals with varying physical exercise strategies and muscle strength levels, allowing for personalized adjustments to meet their needs. Additionally, the product will continuously introduce new games to to meet the diverse requirements of users with dementia, thereby augmenting its efficacy.

YUME

Interactive Piggy Bank

MARKET RESEARCH

CLASSIC

PROS - Gives kids a straight-forward and simple way to collect money.

CONS - Only few products exaggerates the process of accumulation.

- When kids grow older, the piggy bank may not be very “useful" since it only has one purpose.

MULTI-PURPOSE

PROS - Multiple intelligent functions offer kids more opportunity and possibility to play around.

CONS - Multifunction may distract kid. Some functions become unnecessary.

- Some piggy banks are gender-specific. Products which include electronic components are sometimes labeled as boy’s toys.

PLAYFUL

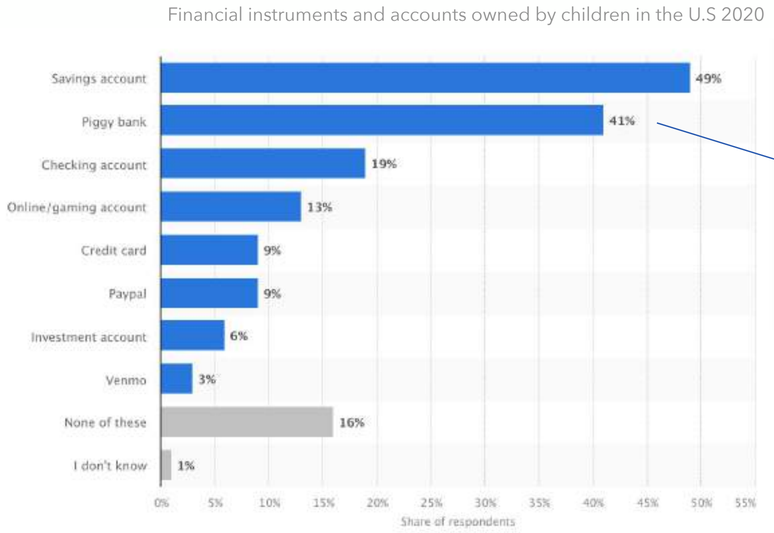
PROS - It activates children’s curiosity and inspire them to collect money when playing with the toys.

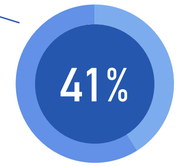
CONS

- Toys will cause distraction when kids are studying.

- When kids grow older, these “toys” cannot compatible with their table settings.

SCIENTIFIC RESEARCH





Piggy Bank

3-5 Make the concept of money and its uses

5-7 Understand the value of money and cost of goods

7-10 Learn the difference between “wants” and “needs”

10-12 Give an idea on comparison shopping and being a savvy consumer

Research from the Consumer Financial Protection Bureau suggests that children are ***“developmentally capable”*** of saving at age 5, and the money habit can be formed from the age of 7. Therefore, educating children on financial savings from a young age is crucial, as it cultivates a foundational habit that fosters prudent decision-making and instills an appreciation for the significance of diligence.

USER RESEARCH

Anne
7-year-old girl

- ✓ Piggy bank
- ✓ Pocket-money

Interested in feeding pets, watching comic cartoons

"I love watching Peppa Pig. I love all kinds of animals but snake."

Rui
4-year-old boy

- ✓ Piggy bank
- ✗ Pocket-money

Interested in playing with Lego, watching comic cartoons

"I don't want to share my piggy bank with my sister."

Irene
10-year-old girl

- ✓ Piggy bank
- ✓ Pocket-money

Interested in reading historical book, watching films

"I think my piggy bank is too boring, and too big. Ceramic is very fragile."

Joe
9-year-old boy

- ✓ Digital wallet
- ✗ Pocket-money

Interested in playing video games, reading fictions

"I like cool things, such as robots and video games."

FINDINGS

"Stage of enlightenment education"

According to the questionnaire survey, children aged 3 to 10 are in the stage of enlightenment education, and they don't have a strong concept of the value of numbers, in which the piggy bank usually plays the role of educational equipment.

"Money comes from card"

Nowadays, most parents pay by card or mobile phone, so children are sometimes unaware of the value of money and the denomination of coins. Therefore, they think that as long as they own a card, they can get everything they want, which is an unfavorable thing for cognition.

"A surprising blind box of mine"

With the opaque appearance, children can not see the coins inside, in which their expectation and curiosity will increase. Every time the piggy bank is opened, children will be surprised to realize that they have saved a lot of coins. Now, numbers are no longer "boring" since children fall in love with the fun of counting coins.

"Save vs. Spend "

It is easy to overlook that money is not for the purpose of saving, however, its ultimate purpose is to use. Therefore, children should not only learn to save money, but also learn to spend money. Parents should give their children more opportunities to spend money in life.

PRODUCT DEMAND

Emphasis on Collecting

Create Interaction

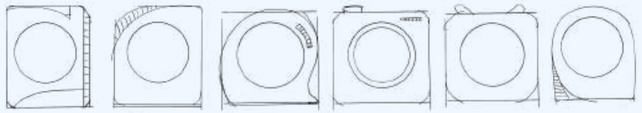
Durable

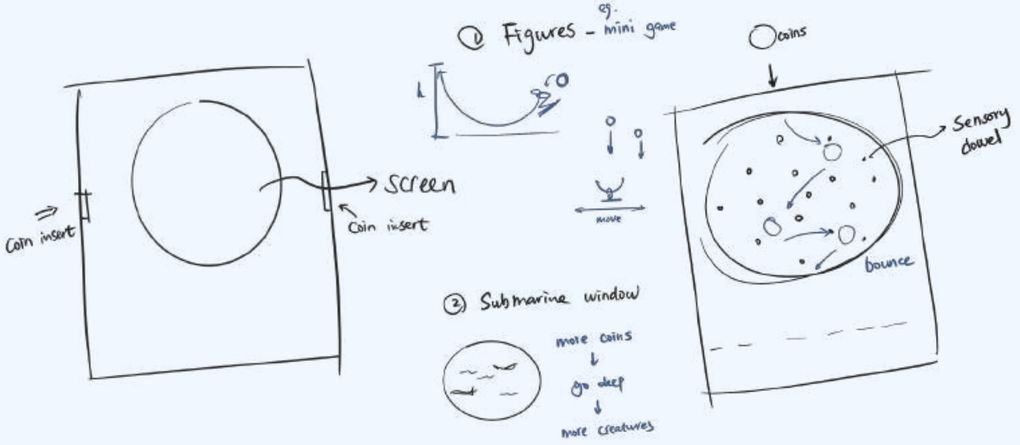
Instructive

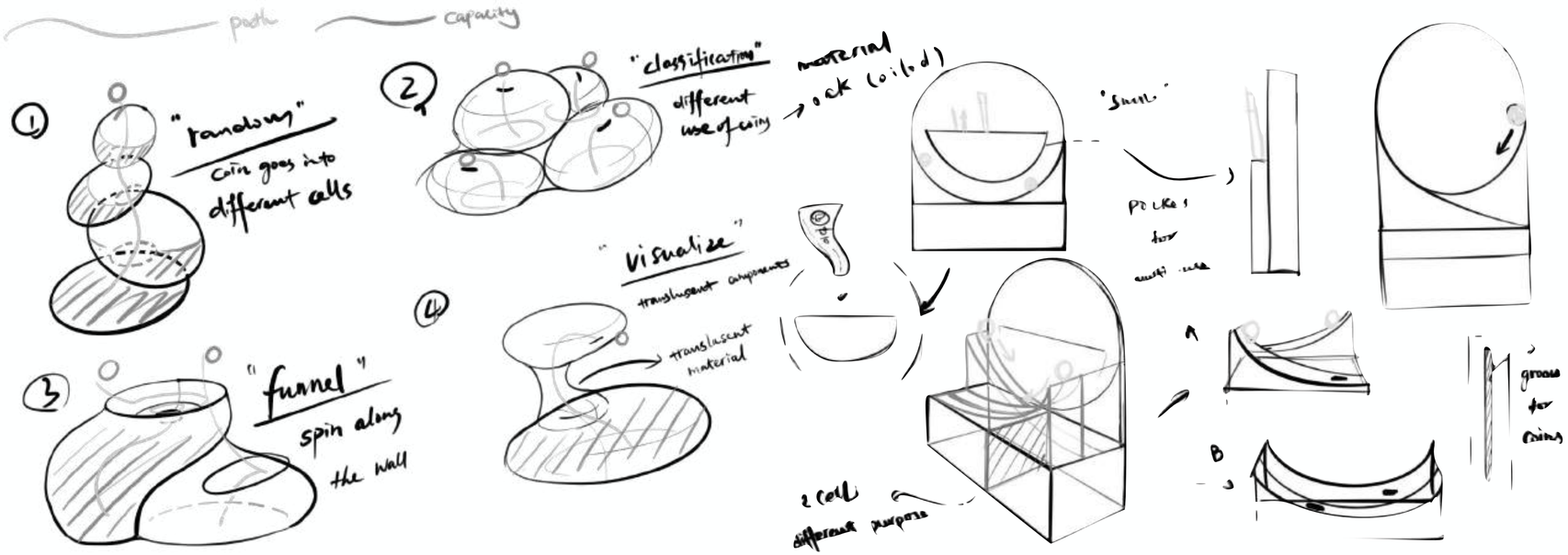
Gender Inclusive

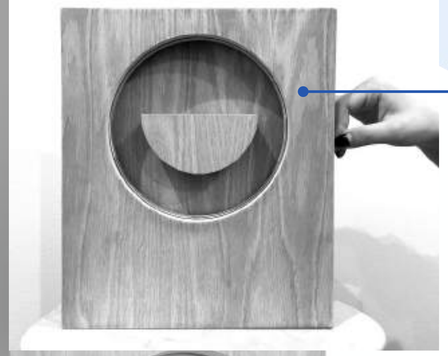
MECHANISM EXPERIMENT

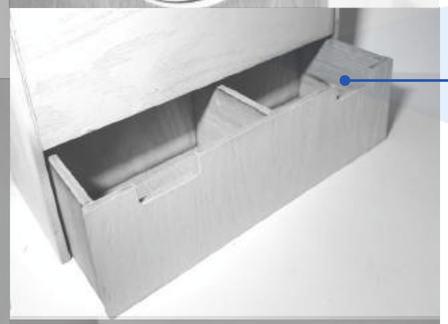
The results from the preliminary research were applied to both the shape and the trigger mechanism. The design is minimalist, embodying the idea of enabling creative activities freely at every step.

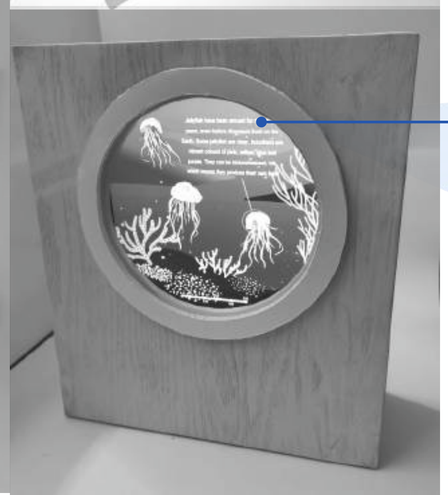






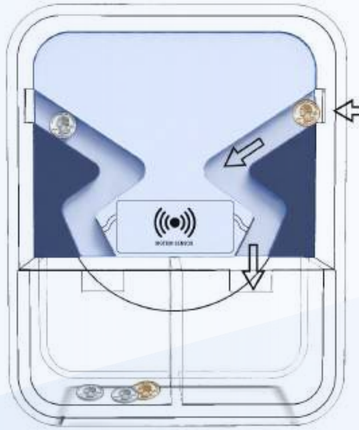






Interact with the Box

The design encourages children to focus on the sounds and movements produced by coins. By inserting more coins, children can literally hear the sound created as the coins swing back and forth with each savings contribution, motivating them to find ways to earn more money.

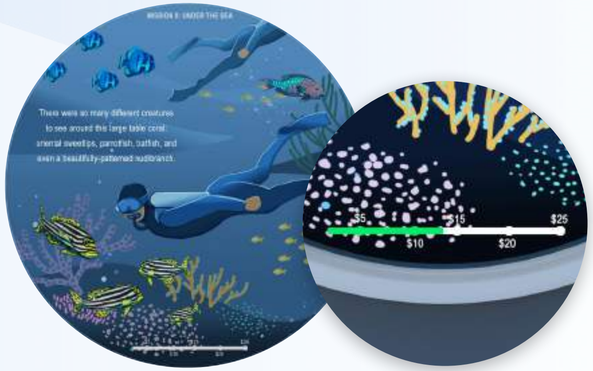


Collect Money

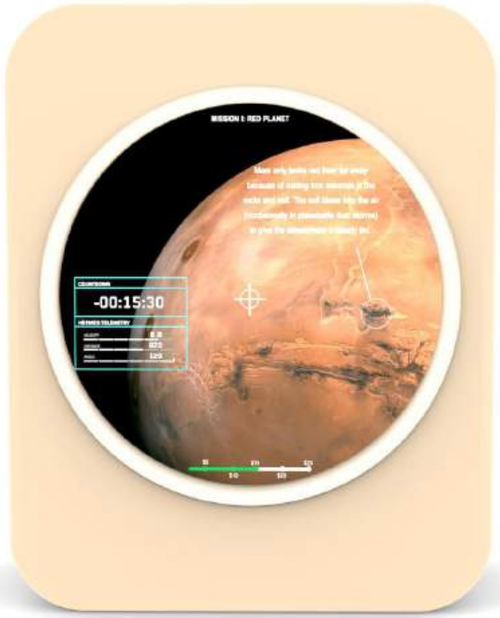
The drawer at the back serves two distinct purposes that related to coin collection, reinforcing the tangible aspect of saving.

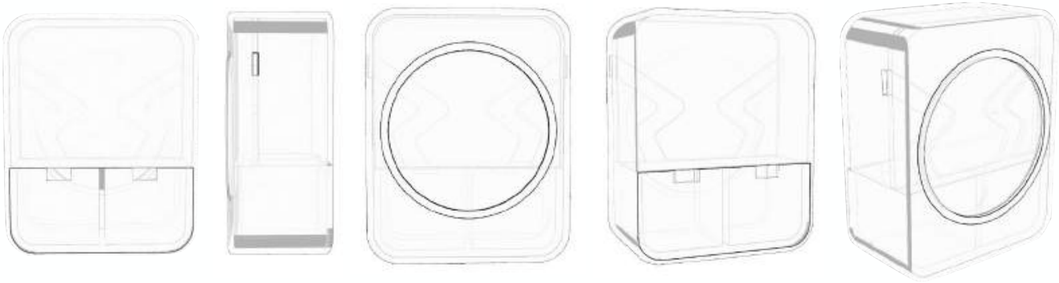
Tell the Story on the Screen

The real-time progress bar at the bottom displays the amount of money saved. Whenever a target amount is achieved, a new scene appears on the screen, accompanied with an updated text description.



The design features variable content and learning modules, with topics that change according to children's interests, fostering a love for knowledge. The interface is straightforward and user-friendly, and storytelling elements are incorporated to engage and educate effectively.





The design not only allows children to enjoy fun in their everyday lives but also supports their growth through a learning process. As children grow and adapt to their changing environment, this design aims to create an environment that nurtures them into becoming more astute pre-teens.

0-1km

$5

1-40km

$10

40-100km

$15

GESTURA

Gesture-based Wearables

Role: Concept Design,Sound Design | Tools: Max/MSP, Premier Pro | Team: 4

Design Brief

Artists with cerebral palsy and limited speech ability often face barriers in performance art, where expression is tied to physical mobility or verbal communication, while traditional performance tools (e.g., instruments, controllers) are not accessible to artists with limited mobility.

Expressive and stage-ready

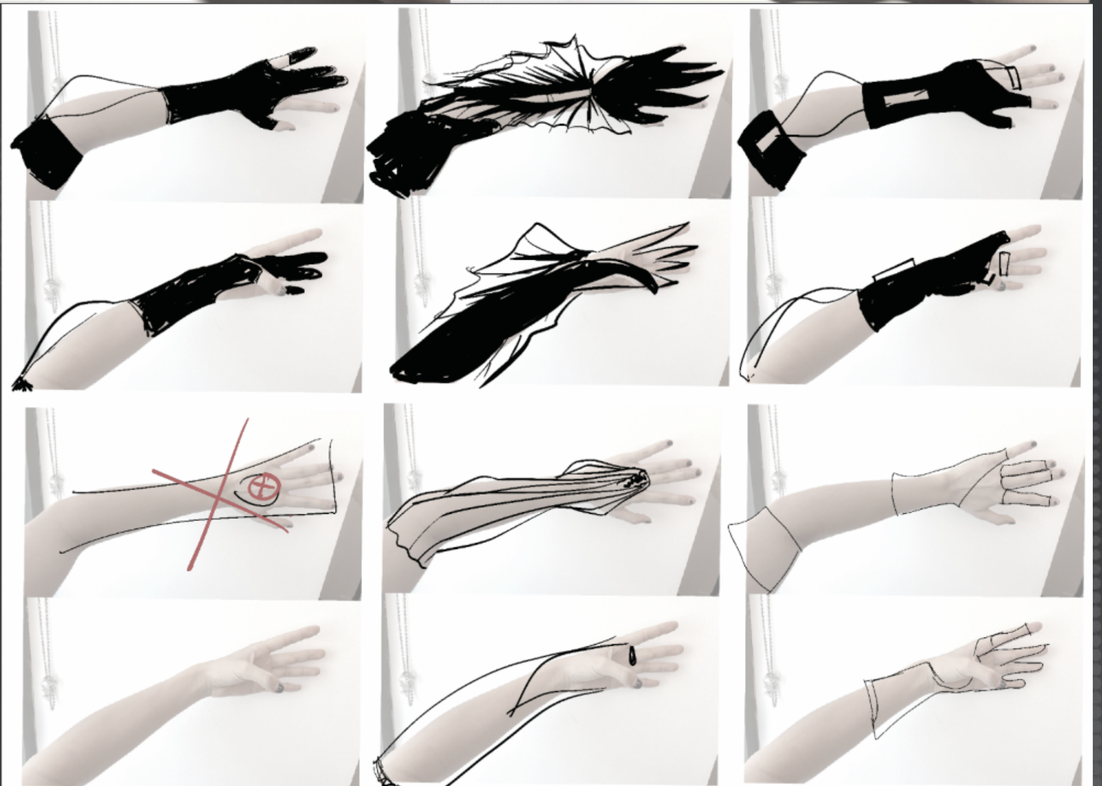
Real-time audio-visual integration

Accessible for diverse motion ranges

Design Goal

Gestura: Gesture-Based Performance for Inclusive Expression

How might we design an intuitive system that transforms simple gestures into sound and visuals, giving artists new ways to perform and express themselves?



Research

Insights from Jerron Herman on challenges for artists with physical disabilities. By analyzing his movement and themes, we gained deeper insight into how artists with disabilities communicate their vision.

Gesture & Mobility Research

- Chose 5 core gestures: open hand, fist, wave, upward lift, rotation.
- Each mapped to distinct sound or visual feedback
- Introduced gesture thresholds to minimize false triggers.

Criteria for Selecting Gestures

- Consistency: system must reliably detect the motion.
- Accessibility: achievable by users with different mobility ranges.
- Expressiveness: gestures that look and feel performative.
- Intuitive: eliminated subtle gestures (e.g., finger pinches) that were difficult to track, ensuring more reliable interaction.

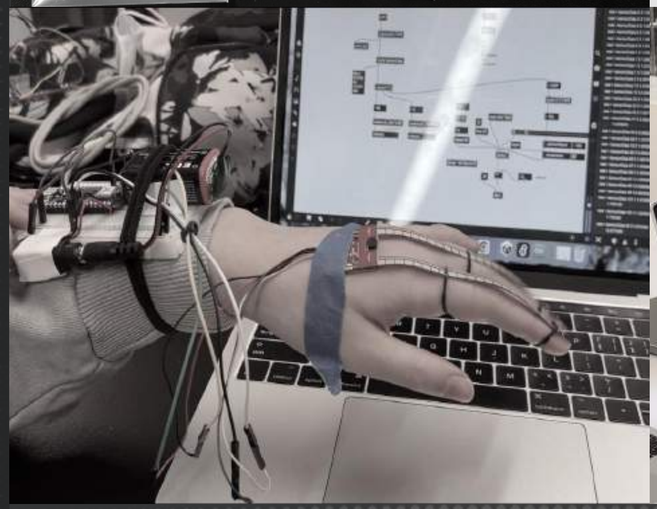
Consistant

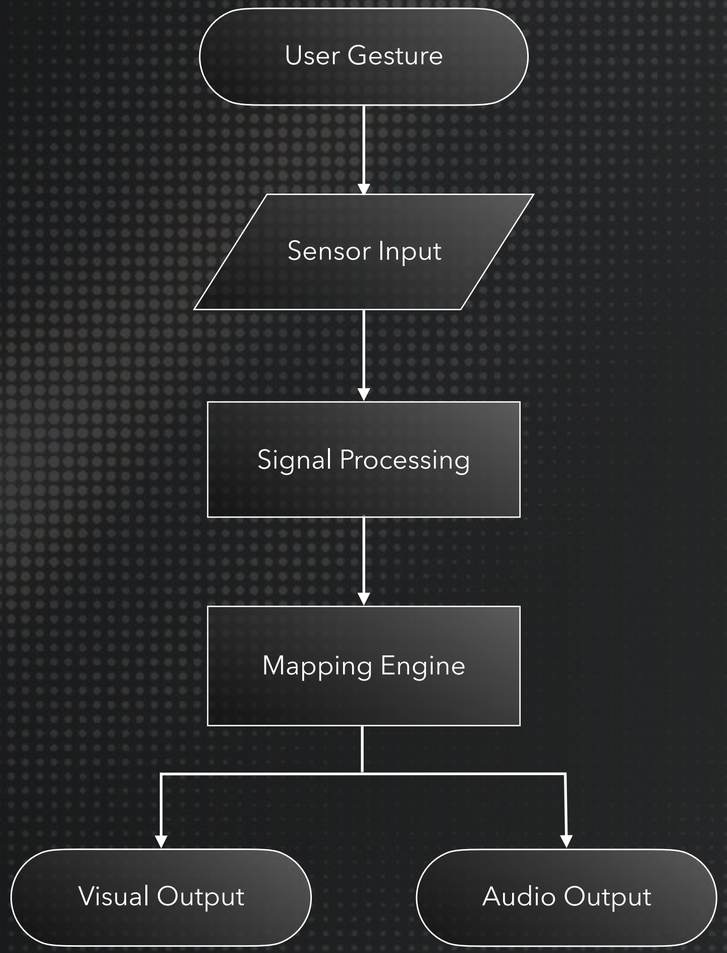
Accessible

Expressive

Intuitive

Design Process





Hardware Components

- Hand-made leather glove with arm strap
- Arduino Nano 33 IoT
- Flex Sensors (finger bend detection)
- Soft Potentiometer (pressure sensing)
- Accelerometer (pitch modulation)
- Gyroscope (stereo pan + visual direction)
- Wi-Fi module (real-time data transfer)
- 9V Battery (portable power supply)

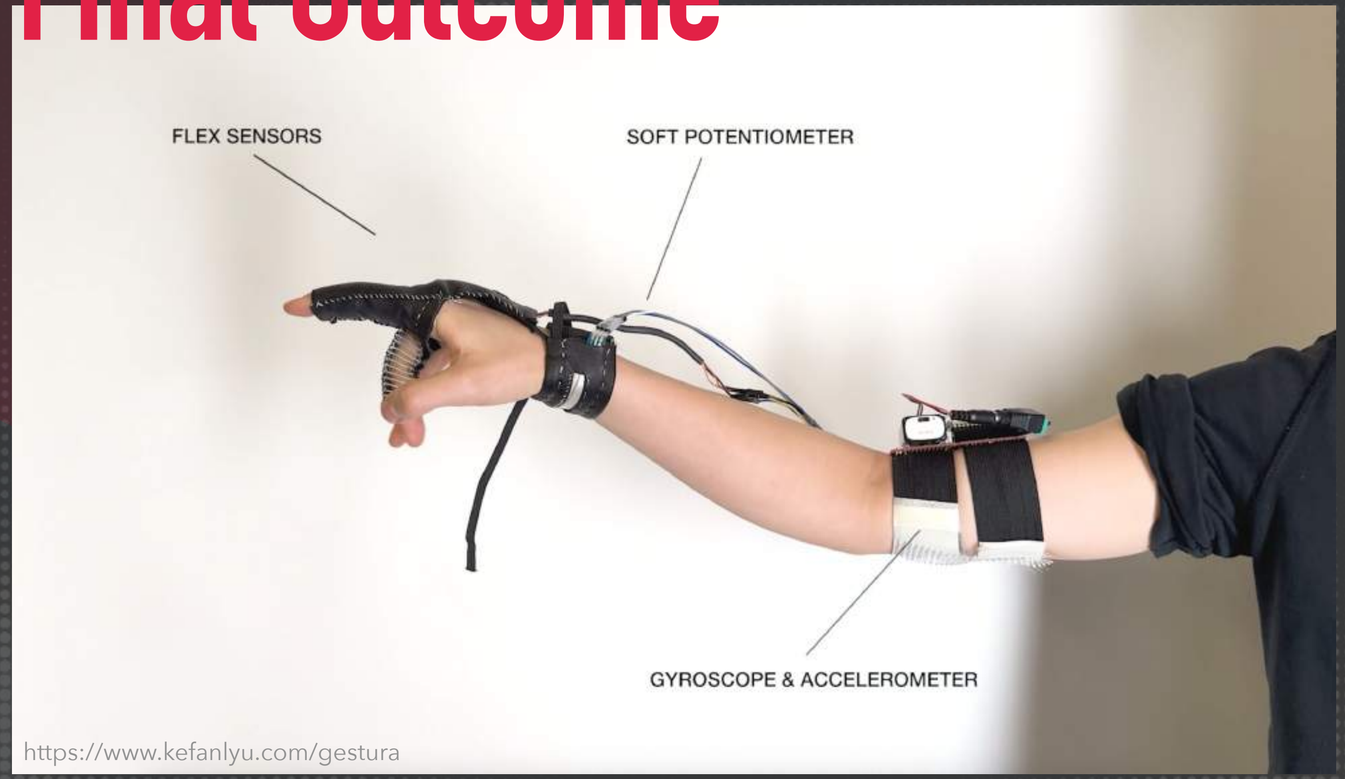
Software Environment

- Max/MSP: maps sensor data to sound synthesis & note triggers
- TouchDesigner: generates real-time visual effects (e.g., waterfall flow)

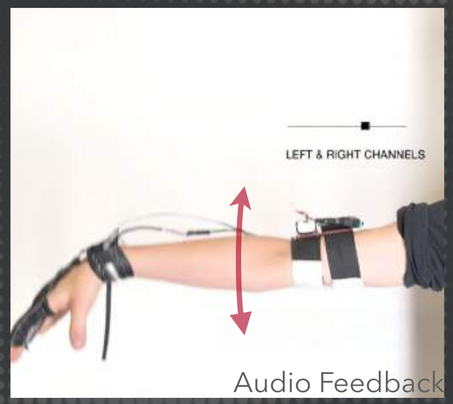
Design Insight

- Multi-sensor setup enables simultaneous audio & visual control.
- Custom wearable glove emphasizes stage-ready design.

Final Outcome

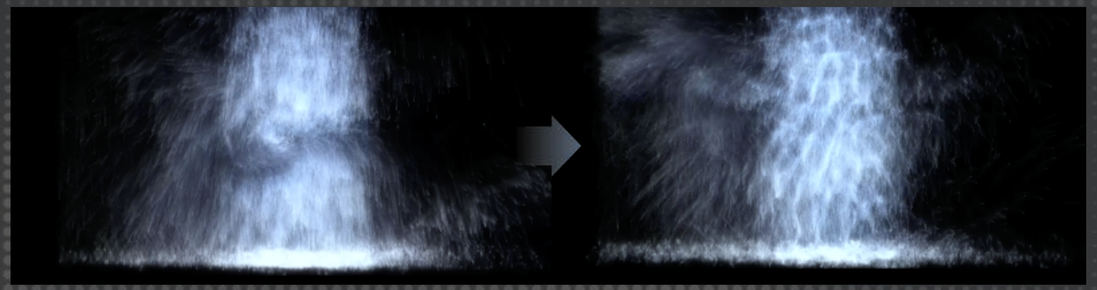


https://www.kefanlyu.com/gestura



Audio Feedback

Successfully showcased at the ITP Winter Show, Gestura received significant attention from artists and curators across New York, London, and beyond — highlighting its potential as both an assistive tool and a creative instrument.



Visual Feedback

Project Description

Gestura is a wearable device that empowers artists with cerebral palsy and limited speech to perform through gestures. By mapping hand and arm movements to sound and visuals, it transforms simple motions into a multi-sensory performance.

- Expands accessibility in the performing arts.
- Introduces a new language of real-time artistic expression.
- Each gesture becomes a brushstroke, blending sound and visuals.