Moodie Tales

A story-based app that helps children understand emotions and grow through personalized bedtime tales

Personal Project

#EdTech #Interactive Design

Role: UX Researcher & Designer

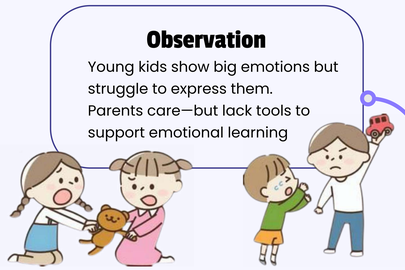
Duration: 3 months

Tools: Figma & Miro



INSPIRATION

While spending time with young children, I noticed that their emotions are intense but often underexpressed—tantrums, silence, and sudden mood shifts reveal a rich inner world they're still learning to navigate.



Observation

Young kids show big emotions but struggle to express them.
Parents care—but lack tools to support emotional learning

Insight

Emotions in early childhood are strong but unspoken.
Bedtime is a key moment of connection



Exploration

LLMs could bridge the gap between feelings and communication



Conceptualisation

I envisioned a tool that helps children understand their emotions, turns those feelings into personalized, value-driven stories, and offers parents meaningful emotional insights.

RESEARCH

Theoretical Framework

Social–Emotional Learning (SEL) [1] in Early Childhood



"Students who participated in SEL programs demonstrated improved social-emotional skills, attitudes, behavior, and academic performance."

(Durlak, J. A., et al. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. Child Development, 82(1), 405–432.)

- *3–8* is a formative period for SEL development.
- *Bedtime routines* and *short stories* are natural, effective channels for strengthening emotional literacy.
- *Interactive* and *guided* storytelling reliably enhance emotional expression and regulation.

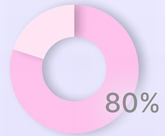
KEYWORDS

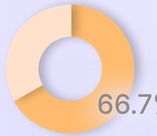
Early childhood *Bedtime routines* *storytelling* *Emotion Awareness* *Self- Regulation* *Social Emotional Learning (SEL)*

SURVEY INSIGHT

A user survey of 15 parents with children aged 3–8 revealed strong support for an emotionally intelligent, story-based educational tool. Parents of young children see strong value in a tool that combines emotion tracking with personalised storytelling.

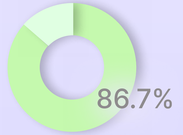
80% of parents regularly follow children's emotional development topics





66.7% agree that daily emotion tracking helps children understand and express feelings.

86.7% are interested in an app that generates bedtime stories based on emotional keywords.



[1] O'Conner, R. et al. (2017) A Review of the Literature on Social and Emotional Learning for Students Ages 3-8: Characteristics of Effective Social and Emotional Learning Programs (Part 1 of 4). REL 2017-245. Regional Educational Laboratory Mid-Atlantic.

PERSONA

The project focuses on two key users:

- **Parents:** simple, time-saving tools that allow them to support their child's emotional growth without adding extra stress to their busy routines.
- **Children:** playful, story-driven ways to express and understand their emotions, making abstract feelings easier to recognize and reflect upon.



Zoe

FULL-TIME WORKING MOM

Ages: 32

- Values her 5-year-old daughter's emotional growth
- Struggles to find time for structured emotional education

"I want to help Mia grow emotionally, but after a long day, I just need something simple that works."

Overloaded | Connected | Guided | Intentional | Open-minded



Mia

DEPENDENT EXPLORER

Ages: 5

- Expressive but has difficulty managing frustration and sadness

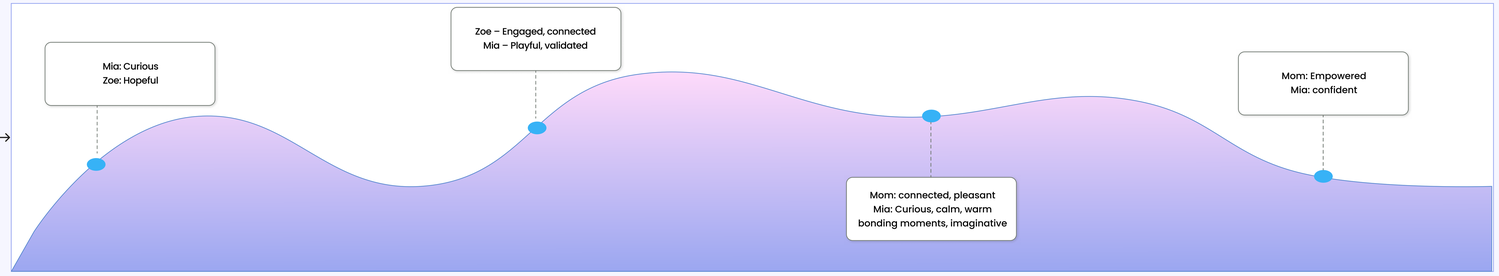
"I don't know why I feel this way… can we just tell a story?"

Sensitive | Curious | Playful | Connected | Imaginative

JOURNEYMAP

I create a journey map to visualize the end-to-end experience of parents and children using Moodie Tales, helping to identify goals, emotions, and pain points at each stage so that design opportunities could be uncovered and prioritized.

PHASE	Awareness and Onboarding	Daily Use	Story Generation	Reflection and Parent Insights
GOALS	Find a tool to help her child express emotions and reinforce positive values during bedtime	Help Mia reflect on her day and capture her emotions	Use bedtime to teach emotional concepts and relax Mia	Track emotional patterns and progress over time
ACTIONS	Browse the app store and then download an app for emotion education Sign up and completes onboarding	Before dinner, Lily logs in to the app and asks Mia, "How did you feel today?" Mia taps an emoji and adds "I felt sad when I couldn't play outside "	The app generates a personalized story: "Mia the Brave Explorer Learns to Share." Parent reads aloud or plays narration with soft background music	App shows Lily a weekly summary and provides parenting tips
FEELINGS	😃 🙂 😐 ☹️ 😠			
PAINPOINTS	Excessive setup questions may create friction	Parent may forget to open app on busy days Child too young to type or unwilling to cooperate	AI stories feel robotic Content mismatch	Too much data overwhelms the parent Tips feel too generic or not tailored to family
OPPORTUNITIES	simplifying the onboarding process	simple/child-friendly UI playful feature/character audio/voice input function	existed label/suggestion/hint; prediction input textbox allows personalization	A visually intuitive insight system that surfaces emotion trends and delivers personalized, actionable tips



HMW

HMW help young children *express emotions naturally* through daily interactions?



By designing playful, age-appropriate rituals that turn emotions into stories, not lessons.

HMW turn everyday emotions into *personalized, emotionally resonant stories*?

By using AI to craft warm, human-feeling narratives that reflect the child's real emotional world.



HMW support parents in emotional learning *without adding cognitive load*?

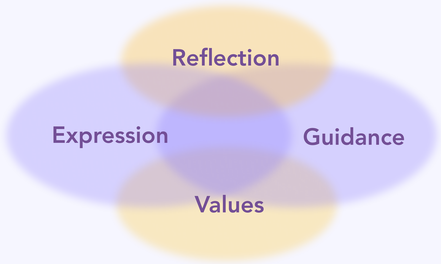


By offering co-creation tools and automated insights that feel intuitive, not instructional.

HMW empower families to *reinforce shared values* through storytelling?

By embedding universal themes like kindness or bravery naturally into personalized stories, so families can reflect on values together without needing explicit tagging.





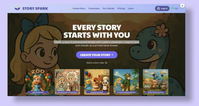
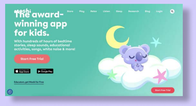
- Emotional Expression
- Story as Reflection
- Light-touch Parenting
- Values & Connection

FURTHER RESEARCH

AI Storytelling & Early Learning

A 2024 systematic review[2] concluded that *AI-driven storytelling tools* significantly improve early childhood language acquisition, literacy, and cognitive-emotional development. Features like *Interactivity*, *Personalization*, and *Adaptability* were identified as key educational enhancers across diverse learning environments.

COMPETITIVE ANALYSIS

	Story Spark	Moshi Kids	StoryTime AI
Interface			
Usability	Create unique & personalized stories with custom characters, magical plots	A sleep-focused app that uses calming audio stories and meditations to help children relax	a personalized literacy platform, inspires a love of reading by bringing your child's unique stories to life
Pros	Emphasizes imagination and creativity for children, supporting co-creation	Large content library: 400+ audio tracks	Supports multiple languages, increasing accessibility
Cons	Focuses mainly on creative storytelling, less on emotional development or SEL	Doesn't capture the child's daily emotional experience	Doesn't provide feedback, progress tracking, or emotional reflection
Design Opportunity	***Create an emotionally intelligent storytelling app that helps children aged 3–8 recognize and reflect on their daily feelings—while empowering parents with insights and reinforcing shared values through personalized bedtime stories***		

DESIGN GOALS

Primary User:
Children aged 3-8

Goal: Help children recognize, express, and reflect on emotions through imaginative, age-appropriate storytelling rituals.

Objective	Description	Theoretical Support
Emotion Recognition	Enable children to identify and label basic emotions using visual, audio, or character-based input	Social Emotional Learning (SEL) & Vygotsky's Sociocultural Theory (learning through storytelling, pretend play)
Imaginative Learning	Use narrative as a medium for children to understand emotional experiences and values	

Secondary User:
Parents/Caregivers

Goal: Support caregivers in understanding and guiding their child's emotional development—without increasing cognitive or emotional burden.

Objective	Description	Theoretical Support
Emotional Trend Awareness	Visualize mood trends and emotional "spikes" over time through a clear dashboard	Parental Scaffolding & Reflective Parenting Models

Key Features

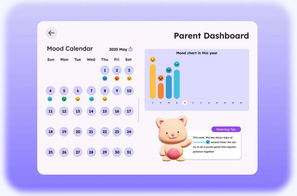
- Emotion Input System
- LLM-generated bedtime stories
- Parent Dashboard

[2]Chen, G. (2024). The impacts of AI-driven storytelling applications on language acquisition and literacy development in early childhood education: A systematic review. Asian Journal of Advanced Research and Reports, 18(11), 1–12. https://doi.org/10.9734/ajarr/2024/v18i11770

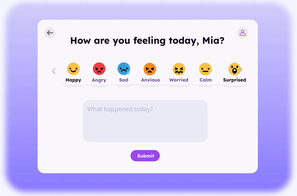
DESIGN ITERATION

This is an emotional learning app for children aged 3–8. Through daily mood check-ins, personalized bedtime stories, and parenting tips, it helps families support children's emotional growth and shared values.

Highlight Functionality



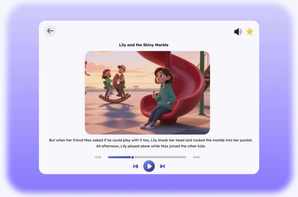
The Parent Dashboard gives parents a clear view of their child's emotional journey by turning daily moods and story interactions into easy-to-understand insights.



The Feeling screen allows children to record how they feel each day through simple emoji choices and short notes, making emotional expression easy and age-appropriate.



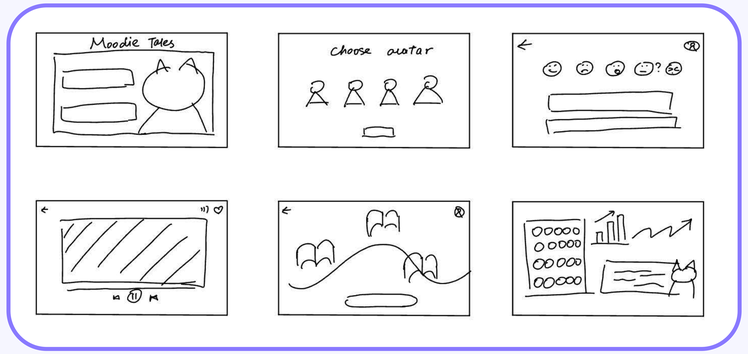
The Story Library organizes past stories along a playful journey map, helping families revisit previous experiences and track the child's emotional growth over time.



The Story Time screen transforms daily moods into engaging, illustrated narratives with narration, giving children a safe space to reflect and learn through storytelling.

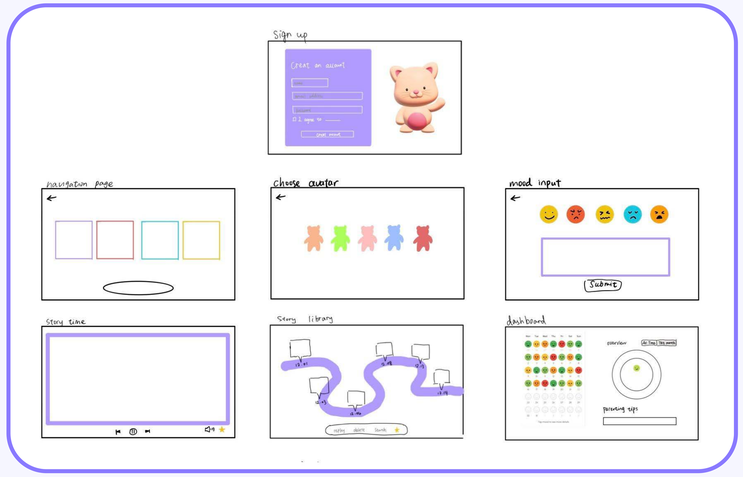
Sketches

Early sketches explored different layouts and flows for mood check-ins, character selection, story reading, and parent insights



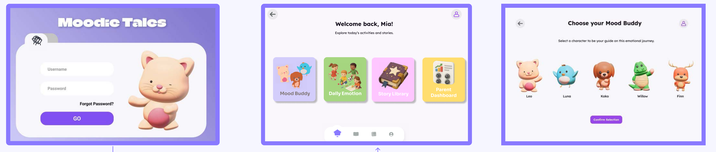
Wireframes

Wireframes translated these ideas into low-fidelity screens, defining navigation, interaction patterns, and key functions before visual design



First design

I translated initial wireframes into high-fidelity designs, focusing on child-friendly visuals, intuitive flows, and a balanced experience for both children and parents.



Parents create an account and set up a child profile, leading to a personalized home screen where children can access all key features



Children begin by selecting their mood of the day through emojis and short notes, making emotional expression simple and age-appropriate

After logging their emotions, the AI generates a personalized story, showing how today's feelings will shape the narrative journey

Each completed story is saved into a journey-style library, allowing families to revisit past experiences and reflect on emotional growth over time



Parents can then review mood logs and story history in the dashboard, where trends are visualized and personalized tips are provided for supporting their child

USABILITY TEST

Usability testing with parents and children was conducted to evaluate how easily they could navigate Moodie Tales and to gather insights for improving clarity, engagement, and overall user experience.

What worked

- Cute and easy-to-read mood calendar design
- Engaging story flow with illustrations and narration
- Parents appreciated the clear structure of onboarding and navigation
- Children enjoyed interacting with Mood Buddy and selecting emotions

Need to improve

- Story timeline felt disconnected because nodes used generic drawings
- Parent dashboard felt overloaded with data, making it harder to spot trends quickly
- Younger children occasionally found it unclear what to do after mood selection
- Parents wanted a more practical way to share data

Questions

- Can stories be saved or shared with teachers/family in an easy way?
- How can children be guided if they don't recognize a complex emotion?
- Could parents adjust how much data/ insight they see on the dashboard?

Ideas

- Replace generic icons in story progress map with real story thumbnails for clarity
- Provide monthly exportable reports (PDF) for parents to share with educators
- Simplify dashboard with clearer hierarchy and optional detail toggles







FEEDBACK

Parents

"The mood calendar is cute and easy to read, but I'd like a monthly PDF summary I can save or share with a teacher."



Children

"I like the drawings, but I wish the story timeline showed the real stories I've read, so it feels more connected to my days."



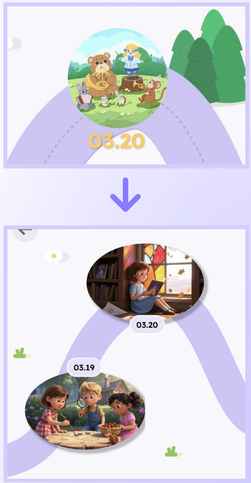
Parents value exportable data for broader emotional tracking

Using recognizable story thumbnails for clarity and relevance

FEATURE UPDATE

Before & After

Case 1: Story Progress Map



- **What:** Progress nodes updated to display thumbnails from the real stories.
- **How:** Each checkpoint now uses the first illustration of the corresponding story, with simplified path visuals and lighter background bubbles.
- **Why:** Helps children and parents easily recognize "which story was read on which day," while reducing visual clutter and improving usability.

Case 2: Parent Dashboard



- **What:** Layout adjusted for clearer separation of mood calendar, mood chart, and parenting tips.
- **How:** Increased spacing and hierarchy, with chart emphasized visually; parenting tip card anchored in the bottom-right corner.
- **Why:** Makes emotional trends easier to interpret at a glance, lowers cognitive load, and helps parents focus on key insights without feeling overwhelmed.

FINAL DESIGN

UI Elements

Color Palette



Primary Buttons

Active

Inactive

Secondary Buttons

Submit

Confirm Selection

Typography

H1, Climate Crisis, 150px regular

H2, Climate Crisis, 100px regular

H3, Lexend, 74px bold

H4, Lexend, 70px bold

H5, Lexend, 52px medium

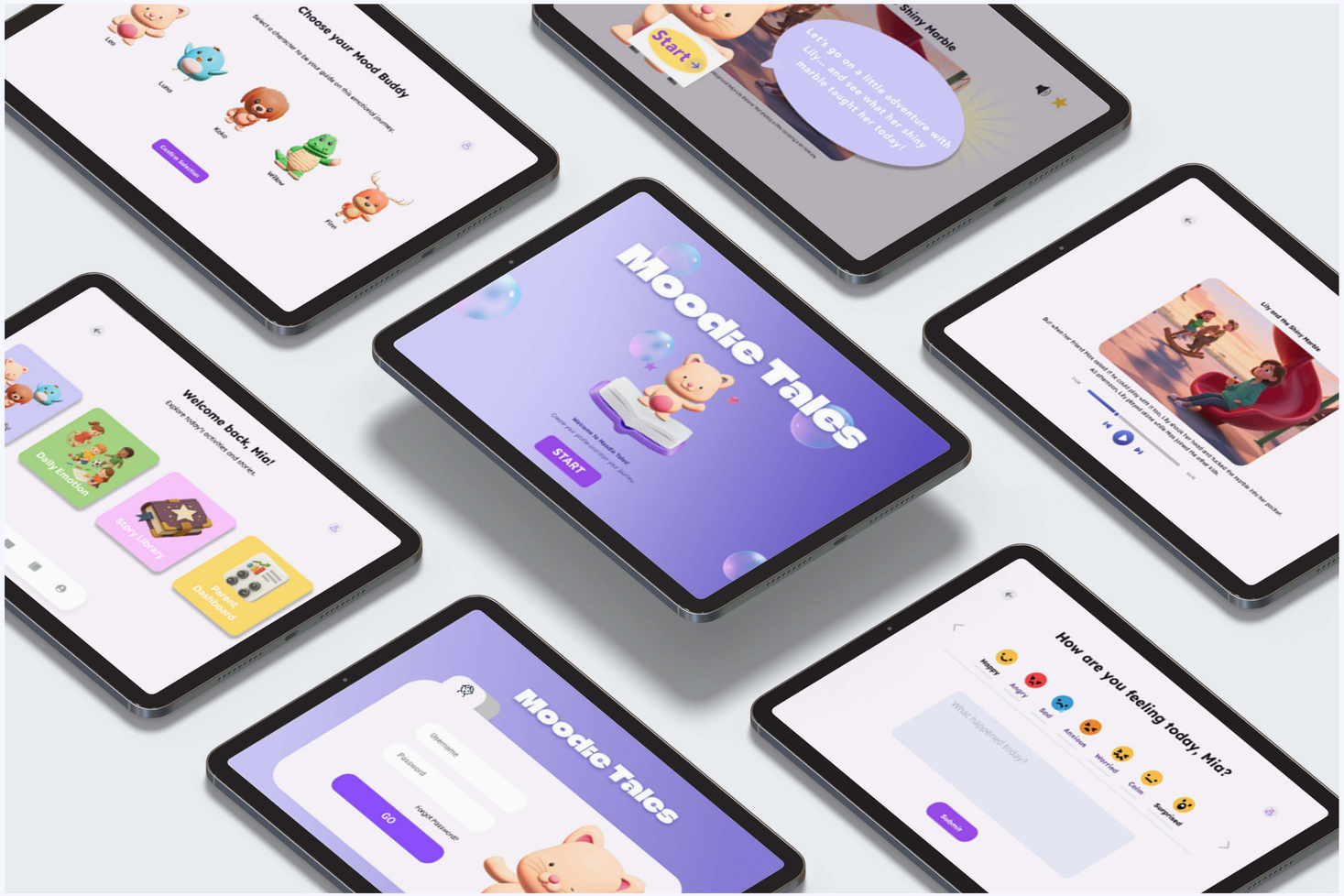
Body, Lexend, 30px regular

Main Characters



Friendly mood buddies designed to guide children through emotional learning with warmth, playfulness, and trust





REFLECTION

Designing Moodie Tales highlighted the need to balance playful engagement for children with simplicity and clarity for parents. A key challenge was delivering meaningful emotional insights without overwhelming users, which shaped iterations in visual hierarchy and interaction design. Future improvements could include more interactive storytelling, a more adaptable parent dashboard, and potential integration with educators.



Quantum Adventure

— Gamifying Quantum Concepts for High School Learners

This project translates five core quantum concepts—qubit, quantum state, superposition, entanglement, and measurement—into a board game format. By combining familiar mechanics with educational design, the game aims to enable high school students to intuitively grasp abstract phenomena through play, strategy, and interaction.

#EdTech #Interactive Design #SeriousGame **Duration: 3 months** **Role: Game Designer & UX Researcher**

Q-JAM SUMMER CAMP

TIME: 2025.5-2025.8

A quantum-themed interdisciplinary summer camp: bridging science, design, and education.

I participated in the Q-JAM Camp as a content contributor, responsible for organizing quantum knowledge, summarizing core concepts (superposition, measurement, entanglement), and developing a structured mind map to support idea generation for quantum game design.

Category
Education Program

Role
Content Contributor
Mind Map Designer

Project Status
Completed and Documented



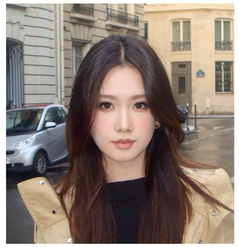
Milestones

Phase 1: Define Focus
Identified key quantum concepts to teach. Teams met weekly by module; biweekly full check-ins ensured alignment.

Phase 2: Research & Mapping
Conducted desktop research and built mind maps to organize content and learner flow.

Phase 3: Design Activities
Drafted interactive modules (games, storytelling, media) mapped to learning goals.

Phase 4: Finalize Plan
Confirmed activity structure, materials, and team roles for the on-site camp.



Yuying (Sofie) Wang

Undergraduate Student in BSc Psychology with Education at University College London (UCL)

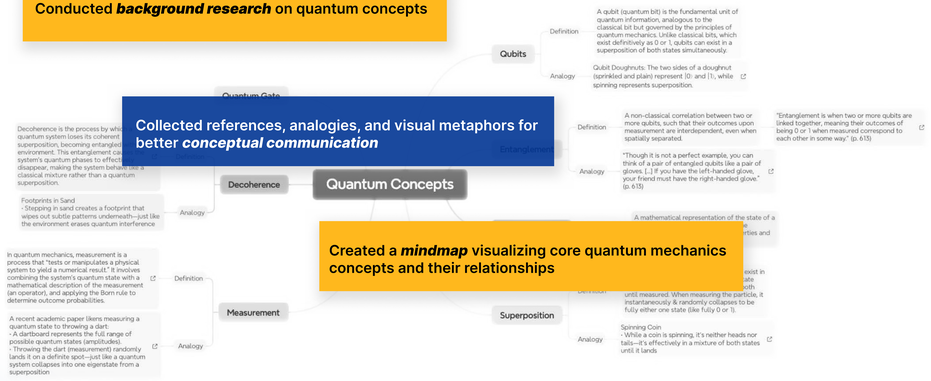
Content Contributor at Q-JAM Summer Program

Preparation

Conducted ***background research*** on quantum concepts

Collected references, analogies, and visual metaphors for better ***conceptual communication***

Created a ***mindmap*** visualizing core quantum mechanics concepts and their relationships



Personal Reflection

How to make quantum concepts tangible through play?

- *Analysis*
- *Challenge*
- *Design*

Analyzed quantum concepts and created structured mind maps during Q-JAM

Identified the challenge: key ideas like superposition and entanglement remain abstract for learners

Decided to design a gamified learning tool to help high-schooler intuitively grasp quantum mechanics

RESEARCH

Understanding the Learner: What Quantum Concepts Are Teachable to Teens?

While quantum physics is often seen as advanced science, many foundational concepts—like superposition, entanglement, and measurement—can be introduced to high school students without math. These ideas are not only intellectually exciting, but also challenge students to think in new ways about uncertainty, information, and reality.

Why Games? The Pedagogical Value of Playful Learning

Quantum physics is abstract and invisible. Through game rules and mechanics, players experience core ideas like uncertainty and measurement. Learning becomes active, intuitive, and memorable—rather than passive or purely symbolic.

Constructivism

Learners build understanding through interaction—games provide a space to explore complex ideas like superposition or entanglement.

Experiential Learning

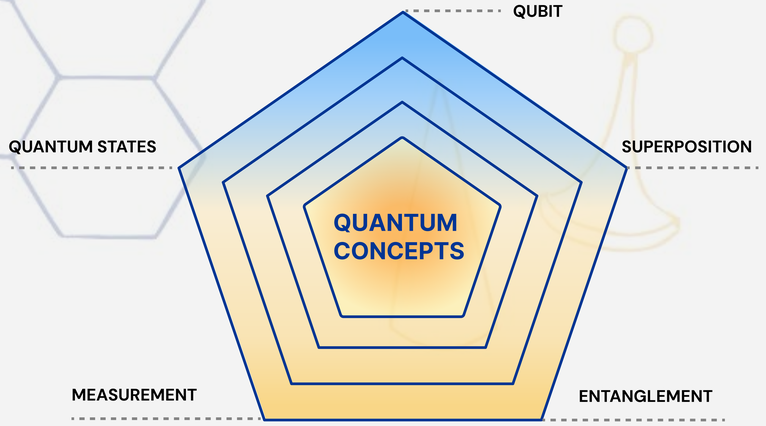
Games naturally follow a cycle of doing, reflecting, and adjusting, making abstract concepts feel real.

Situated Learning

Board games create a structured context where learners apply knowledge, not just receive it.

Theoretical Support

Five Core Quantum Concepts



QUBIT is the basic unit of quantum information, like a bit in a regular (classical) computer, but it can be in a state of 0, 1, or both at the same time.

QUANTUM STATE describes everything we know about a quantum system, like the exact way a qubit behaves. It can include being in multiple possible states at once.

SUPERPOSITION means a qubit can be in a mix of both 0 and 1 at the same time, instead of just one or the other.

ENTANGLEMENT is a connection between two or more qubits where the state of one instantly affects the state of the other, no matter how far apart they are.

MEASUREMENT is when you check a qubit's state, and it "chooses" one definite value—either 0 or 1. Before measurement, the qubit can be in a mix of both, but measurement forces a single outcome.

INTERVIEW

To understand how teens perceive quantum physics, I conducted interviews with high school students to explore their acceptability with quantum concepts and their interest in learning them through games.

Key Questions

- Have you heard of quantum physics before?
- Can you describe what superposition, entanglement, or measurement means to you?
- Do these topics seem interesting or too difficult?
- Would you enjoy learning quantum ideas through games?
- What type of games do you usually play?



Leo Zhang

Age 17 **STEM Student**

Familiar with basic quantum ideas | Likes logic-based games

"Superposition sounds cool, I get the 'multiple state' idea."
"Games could make this stuff way less scary."

Interested
Confident

Emily Chen

Visual Art Student **Age 15**



Finds science class hard to follow | Likes board games

"Measurement collapse feels like rolling a die in a strategy game."
"If the game is fun, I'd give it a try."

Curious
Needs Accessibility

Jason Lee

Age 16 **Robotics Club Member**



Enjoys puzzle game (e.g. The Witness, Minecraft Redstone)

"Entanglement as a rule between players could be super fun."
"It sounds like a game mechanic already!"

Enthusiastic
Concept-Driven

Sara Kim

Science Club Member **Age 15**



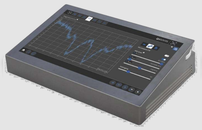
Confused by physics jargon | Enjoys educational puzzles

"I don't know how it works, but I'd play if it explains stuff."
"Can we win or lose based on the quantum stuff?"

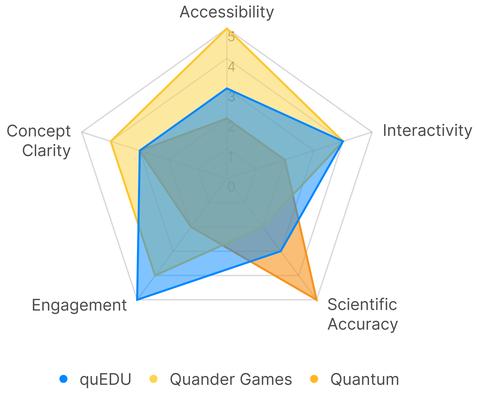
Open
Confused

COMPETITIVE ANALYSIS

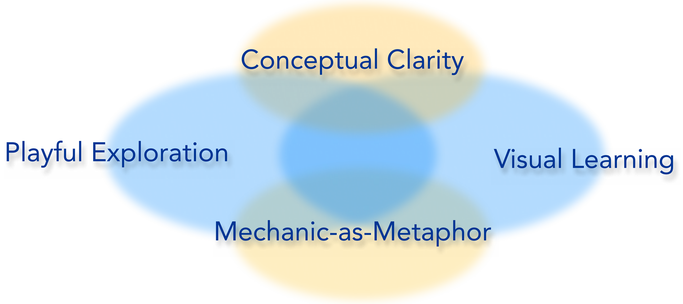
To identify design gaps and opportunities, existing quantum educational tools and games are analyzed.

	quEDU	Quander Games	Quantum
Interface			
Features	Typically teacher-led, limited student interaction	Visual, symbolic, drag-and-drop interface; no math required	A fast-paced strategy game where dice represent ships with variable powers depending on their value
Pros	Offers real experimental results, not just simulation	Highly visual and metaphor-driven; reduces abstractness	Strong graphic design, good physical components, well-balanced rules
Cons	High cost and complexity, limited accessibility	Very metaphorical—limited direct connection to scientific terms or formalism	May be overwhelming for students under 13 or unfamiliar with modern board games

Conclusion



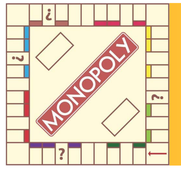
Design Opportunity



Integrating familiar board game structures with core quantum ideas opens up a playful, hands-on way to explore abstract quantum concepts through visible, interactive game mechanics.

IDEATION

To make complex quantum concepts approachable, the game adopts a grid-based progression system inspired by ***Monopoly***.

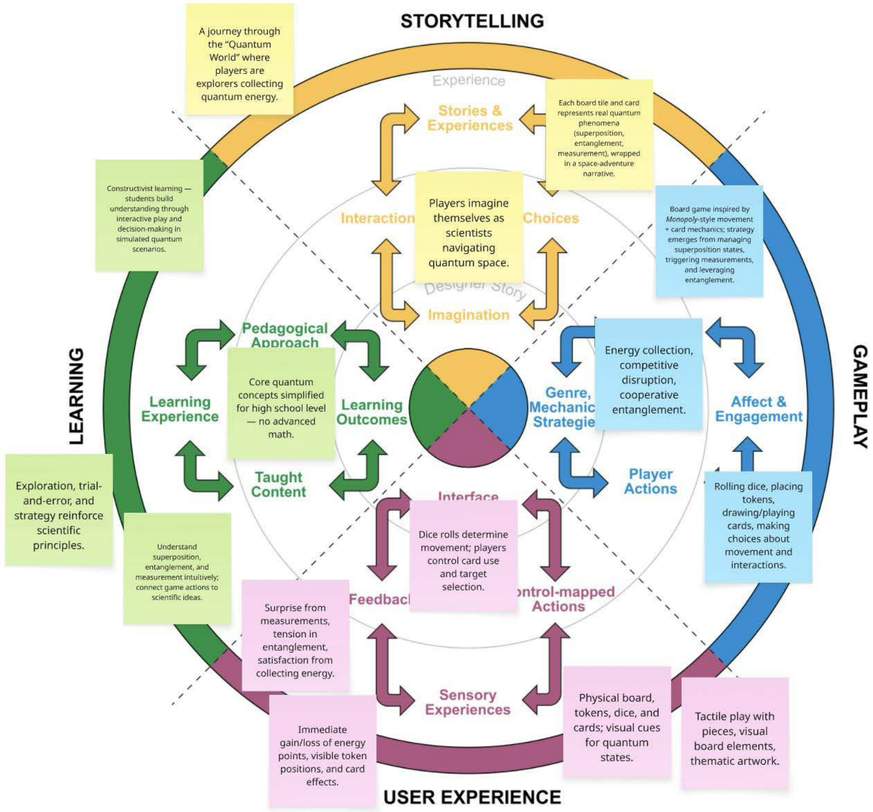


Why Monopoly?

Turn-based mechanics that allow time to reflect on quantum concepts

A familiar structure that reduces the learning curve for players

Strategic decision-making that mirrors the uncertainty and probability in quantum physics



Brainstorming By Serious Game Design Methodology

CONCEPT

An Educational Board Game Designed To Help High School Students Explore Quantum Concepts

Brainstorming Conclusion

Game Type

A strategy-based serious game that merges classic board game mechanics with quantum physics concepts for playful STEM learning.

Game Aims

Help high school students *intuitively grasp five core quantum concepts* through interactive play, fostering curiosity and confidence in science.

Scenarios

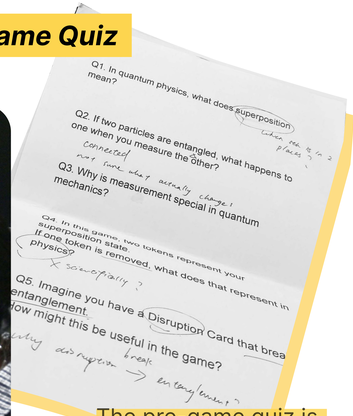
Set in a *fictional "Quantum World"* where players *explore, collect energy, and interact with quantum phenomena* represented by board spaces and cards.

Target User

High school students aged 15–18 with an interest in science, games, and problem-solving, but no prior physics background.

Prototype Test

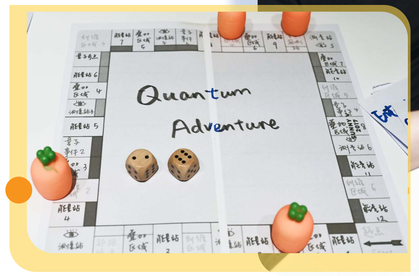
1 Pre-Game Quiz



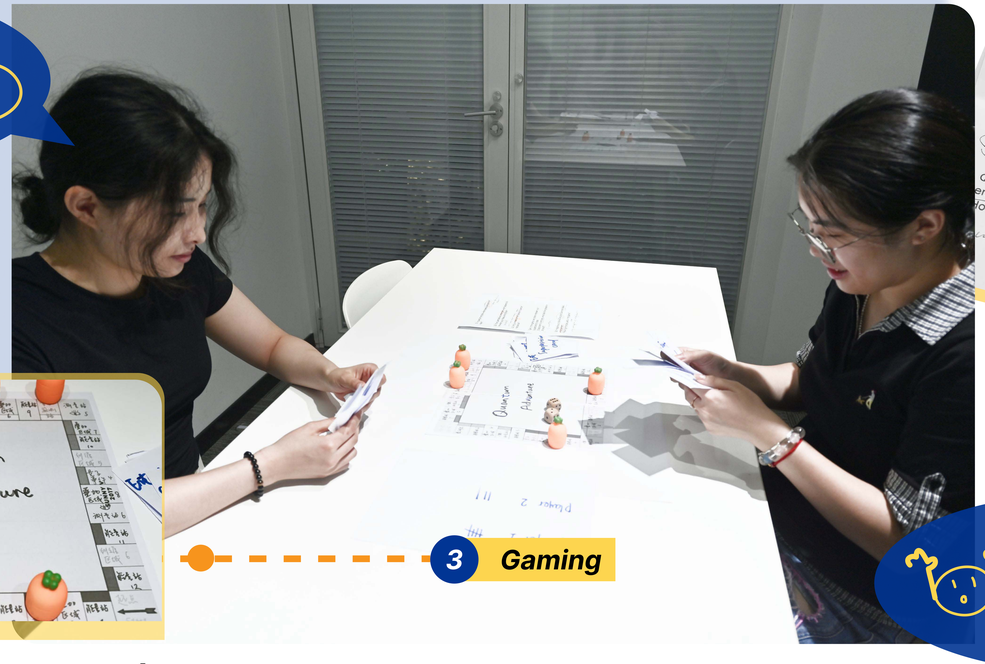
The pre-game quiz is used to compare with the learning outcomes after the game.

The cards contain too much text and are hard to read quickly.

2 Pre-Game Test



3 Gaming



I keep forgetting how much energy I already collected!

Feedback & Improvement

Card Layout: Text-heavy design reduced readability	Simplify with larger icons and concise keywords
Energy Tracking: Players often lost track of collected energy	Introduce energy tokens on a personal tracker board
Token Design: Tokens were perceived as plain and lacking appeal	Redesign with custom pieces reflecting quantum superposition

ITERATION

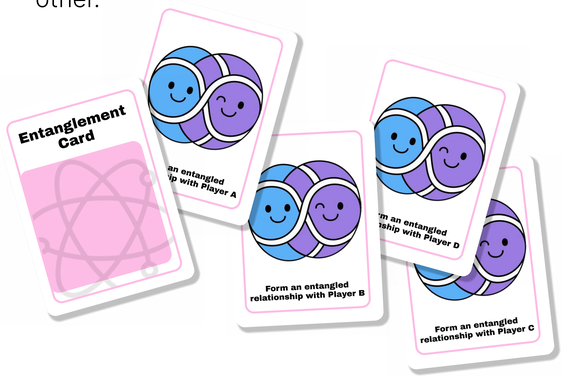
the game evolved from concept sketches to a playable system that links quantum ideas with strategy

Thinking Process

Mapped ***core quantum ideas*** onto ***concrete board actions***.

Focused on ***balancing scientific*** meaning with ***strategic gameplay value***.
Simplified card text into icons + keywords while keeping ***conceptual clarity***.
Refined board layout to maintain rhythm and variety across 40 spaces.
Unified visual language across tokens, cards, and tiles for accessibility.

Used ***playtesting as feedback*** loops, observing both confusion and excitement.
Iteration shaped a system where ***learning goals*** and ***fun mechanics*** reinforce each other.



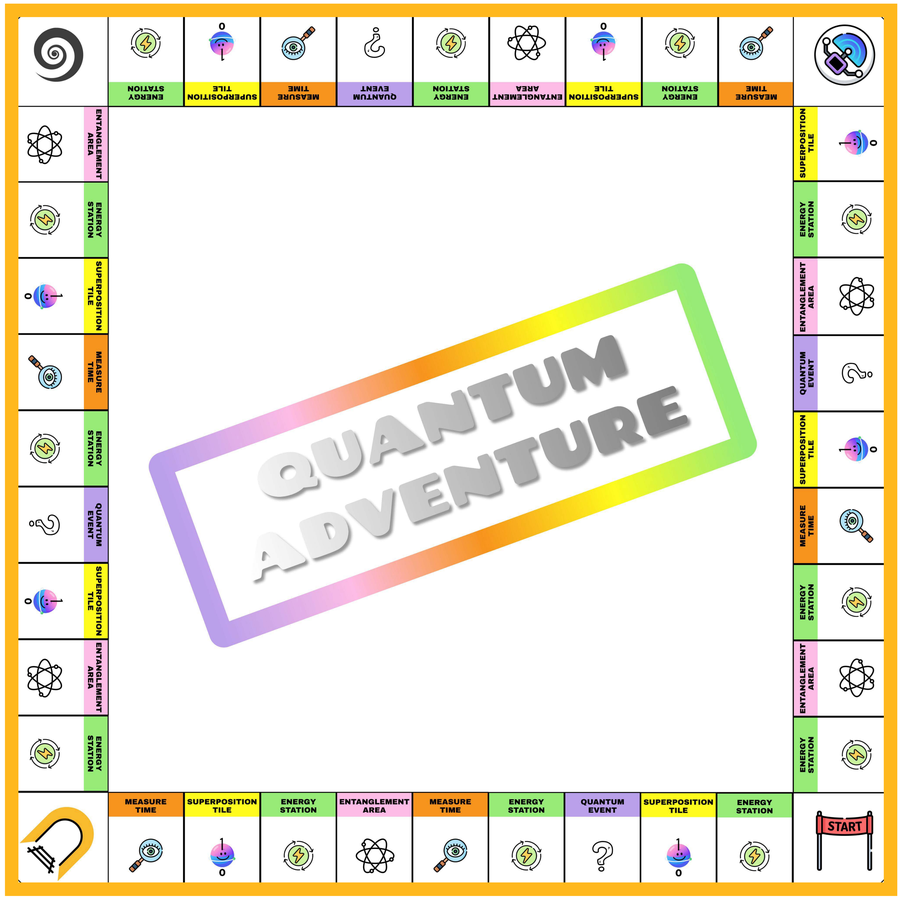


Card System

6 types of cards guide strategy and surprise.

Each card **connects directly to a quantum concept** (superposition, entanglement, measurement, etc.).

Designed with **icons + colors** for fast recognition.



Game Board

40 squares combining energy, superposition, entanglement, and measurement spaces.

Each tile **translates a quantum idea into gameplay mechanics**.

Balanced layout ensures progression, strategy, and unpredictability.

Comparison with Early Prototype

Prototype Issue

The concept of superposition was hard to visualize when using identical tokens

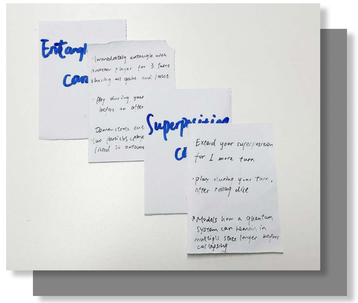
Players often forgot progress because there was no way to track loops



Implemented dual-piece tokens to visually convey two simultaneous states

Added a round counter, making the game easier to follow





The cards were word-heavy and slowed the game

Redesigned the cards with minimal text + clear icons, improving speed and accessibility

Reaction while testing the final version



- "Rolling two dice and placing two tokens felt unique — I instantly got the idea of ***being in two states at once***."
- "The collapse mechanic was tense and exciting; every measurement felt like a dramatic moment."

- "Entanglement added a fun twist — I liked how I sometimes benefited from another player's move, but also had to deal with their risks."

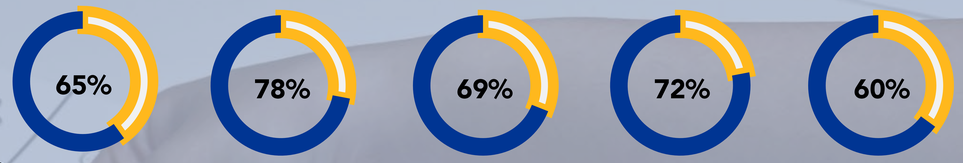




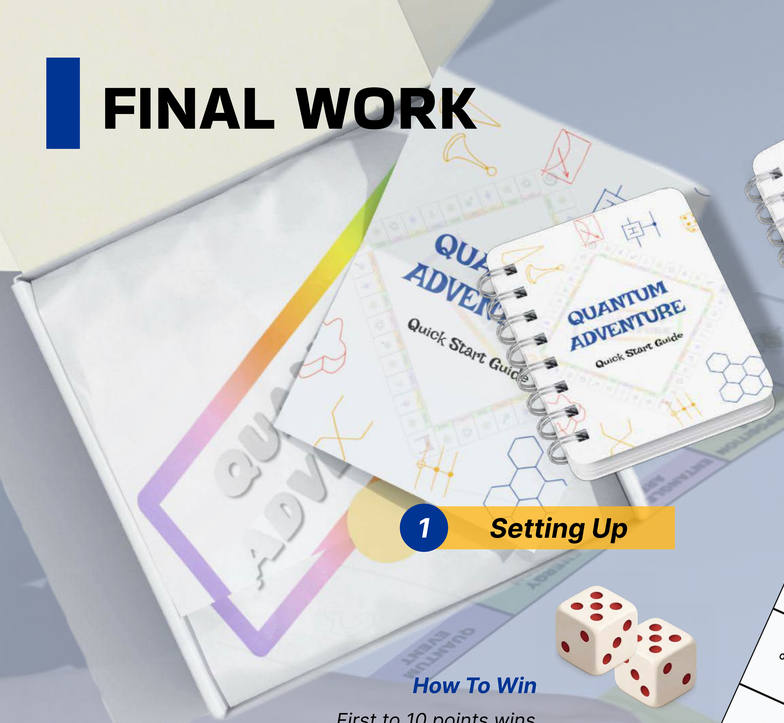
- "The Quantum Event cards were my favorite part — unpredictable but still balanced, like real quantum uncertainty."
- "The combination of cards and board effects gave me multiple ways to play — I felt in control even with randomness involved."

FINAL WORK

During the final game test, participants find it easier to connect terms to quantum logic and strategic gameplay, indicating better understanding towards each 5 quantum concepts



1 Setting Up



How To Win

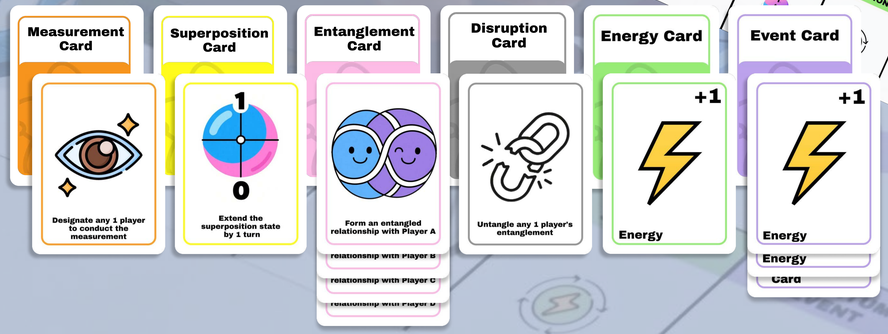
First to 10 points wins



How To Start

1. *Place the 40-tile board in the center*
2. *Each player gets 2 tokens and starts with 0 energy*
3. *Shuffle all cards; deal 3 to each player*

2 Card Category





3 Board Spaces

Superposition Tile

- Grants a Superposition Shield (immune to one measurement) — modeling how a system can remain in superposition without collapsing until observed.

Entanglement Area

- Entangle with another player for 3 turns, sharing gains and losses — mirroring quantum entanglement where two particles' states are linked

Quantum Event

- Draw a random event card with boosts or penalties — reflecting quantum fluctuations and unpredictability in physical systems.

Measure Time

- Roll 1 die to keep one token and remove the other — simulating wavefunction collapse, where measurement forces one definite outcome.

Energy Station

- Gain +1 energy point for each token — representing how particles store and exchange quantum energy in different states.

Silk World

A Smart + Playful Sericulture Learning System

Silk World reimagines traditional silkworm raising through a hybrid digital-physical experience. By combining a virtual silkworm-raising game with an intelligent silkworm house,the project makes sericulture easier to learn, observe, and pass on.

Group Project

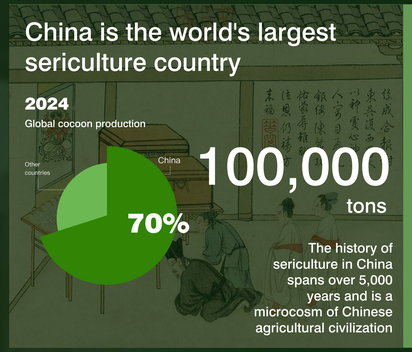
#EdTech #LearningSciences #UXDesign

Role: UX Researcher · Learning Designer · Interaction Designer

Duration: 3 months

BACKGROUND

FROM HANDS TO TOOLS, SERICULTURE PRESERVES CARE, CRAFT, AND CONTINUITY



Sericulture has been included in primary school textbooks in China as a practical teaching task, aiming to cultivate children's sense of responsibility, patience, and reverence for life

- Silkworm raising has shaped everyday life, craft traditions, and agricultural knowledge across East Asia for thousands of years.
- Its long-standing role in family education reflects how hands-on practices were used to cultivate patience, responsibility, and respect for life.
- Today, sericulture remains a valuable bridge between cultural heritage and modern experiential learning for children.



Stone-carved silkworm pupae

The Neolithic Age
(approximately 3000 BC - 2000 BC)

The discovery of stone cocoon and silkworm-pupa relics shows that silkworms played an important role in daily life over 6,000 years ago in the Yuncheng Basin, one of the origins of Chinese civilization.



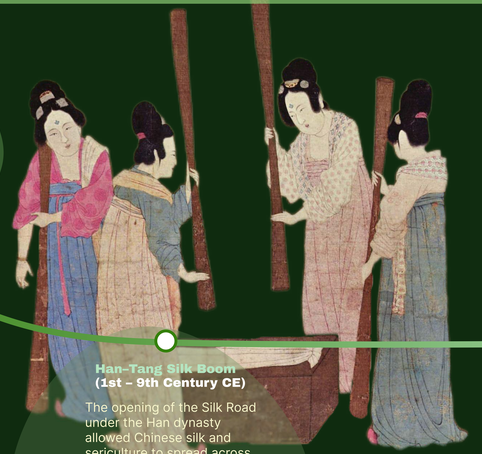
Leizu is the "silkworm Goddess" in Chinese legends and is revered as the "First Silkworm Lady".

In the oracle bone script of the Shang Dynasty, characters such as "蚕", "丝" and "桑" appeared

The Xia, Shang and Zhou periods
(approximately 2070 BC - 256 BC)



Oracle bone Script



Han–Tang Silk Boom
(1st – 9th Century CE)

The opening of the Silk Road under the Han dynasty allowed Chinese silk and sericulture to spread across Central Asia and Europe.

Song–Yuan–Ming–Qing Civil Sericulture Era
(10th – 19th Century)

Across ancient China, especially during the Song through Qing dynasties—silkworm raising served as a form of everyday education in both households and communities.

The New Silk Path:
Education, Technology & Culture
(20th Century – Today)



In the 21st century, silkworms have re-emerged in classrooms and homes as tools for life education and environmental awareness.

RESEARCH

Modern Silkworm-Raising Practices ——
People raise silkworms for interest and enjoyment using simple, everyday materials



Paper Roll

Commonly found in schools and small family farms
Low cost, easy to replace manure
Poor ventilation leads to manure accumulation, requiring frequent cleaning



Egg tray

Commonly used during the pupation stage of silkworms .
Its porous structure facilitates fixation.
Easy to clean, but the paper tray easily absorbs water and requires a dry environment.



Storage Box

Commonly used in schools, medium-scale silkworm rearing.
Controllable ventilation holes, large space, can accommodate more young silkworms.
Not easy to clean.



Plastic Lunch Box

The most common method for home farming:
The containers are lightweight, have lids, and are easy to observe.
Space is limited, making them unsuitable for large-scale farming.

Common Difficulties Faced in Home Silkworm Raising

Lack of standardized management in the breeding process

The mulberry leaves are not fresh.

Hard to determine the age of the silkworms.

Silkworms have a low survival rate

Improper feeding and age classification

Poor Environment

Lack of Guidance

Psychological Barriers

- Relying entirely on experience or fragmented information online.
- Don't know how to handle diseased silkworms.

Insufficient ventilation and difficulty in controlling humidity. Easily lead to dampness and constipation.

Have little time to take care of consistently. Afraid of moths, their droppings, and their molting.

QUESTIONNAIRE

Subsequently, our team conducted a questionnaire survey and user interviews to understand the local sericulture industry, user demands and pain points. A total of 125 questionnaires were collected.

Experience

We have found that many people have only raised silkworms 1-2 times, and some have never raised silkworms at all

1-2 times	52%
never raised	33.6%
3-5 times	9.6%
over 5 times	4.8%

Reason

People primarily raise silkworms out of interest , enjoying observing their growth; the second reason is fulfilling school-assigned tasks.

48.8%	Enjoy observing the growth of silkworms
37.6%	School homework/study tour tasks
31.2%	Want to experience nature

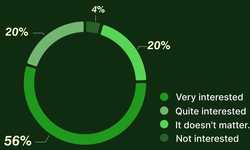
Educational significance

The vast majority of people believe that sericulture is educational

49.6%	43.2%	7.2%
Very suitable	Give it a try	Inappropriate

Preference

We have found that many people have a interest in smart silkworm houses



Users prefer modern and simple style silkworm houses

Users hope the silkworm house will have more intelligent functions to simplify silkworm raising.

- Real-time monitoring of the health status of silkworms
- Automatically dispense mulberry leaves to prevent forgetting to feed
- Real-time observation and remote control functions on the mobile App
- Automatically adjust temperature and humidity
- Remind to feed/clean up
- Growth progress records/logs are automatically generated

Difficulties

There are many troubles in raising silkworms at home

The supply of mulberry leaves is unstable → It is difficult to prevent and control silkworm diseases → The breeding environment is difficult to control → It's not convenient at home. → There is no time for management and care

Expectation

79.2%	The user hopes to visualize the growth of silkworms
40.8%	They hope that someone can explain the growth cycle of silkworms
46.4%	They hope to share the growth of silkworms
48.8%	They hope to record and observe the growth of silkworms

Goal

We hope that through this smart product, we can promote the integration of industry and education. By reflecting on the growth of silkworms, we can prompt users to think about life and, to a certain extent, drive local development

CURRENT SILKWORM RAISING JOURNEY MAP

Phase	Phase 1 Preparation period		Phase 2 Growth period		Phase 3 Silk spinning period	Phase 4	Harvest perido	Phase 5 Gap period
Stage	Silkworm seedling acquisition	Site and equipment preparation	Daily feeding and cleaning	Age-based assessment and molting identification	Preparation for coiling and spinning	Observation of cocoon withdrawal and adult moths	Harvesting and selling silkworm cocoons	Waiting and summarizing
Target	Obtain healthy silkworm seedlings of the appropriate age	Create a stable environment suitable for silkworm seedling growth	Ensure a clean environment for silkworm seedlings to feed.	Accurately determine age change and feeding rhythm	Ensure successful cocoon formation	Experience the complete life cycle, breeding and seed preservation.	Harvest high-quality cocoons, and gain commemorative value.	Summarize the experience and prepare for the next breeding session.

Actions

- Purchase silkworm seedlings online, sign for delivery, and inquire about seedling care precautions.
- Search online for key points on silkworm farming
- Lay out paper, set up the silkworm rearing area, and prepare mulberry leaves.
- Start raising silkworms and observe their feeding and growth.
- Feed the animals at regular times each day and clean up their feces; control the light and humidity.
- Repeatedly
- Observe the silkworm's condition to determine its age and when it will molt.
- Improper handling caused some silkworms to die.
- Making a cocoon frame in preparation for cocoon formation
- Improper handling prevents silkworms from spinning cocoons
- Observe and record the emergence of the cocoon; keep the species or release them.
- Successfully collected silkworm cocoons
- Sell the cocoon or keep it as a souvenir
- Summarize, record, and share experiences

Feeling

Expect → Anxiety → Tired → Curious → Dull → Bored → Puzzled → Frustrated → Expect → Nervous → Formal → Excited → Achievement → Moved → Satisfied → Sad → Miss → Yearn

Pain Points					
	Unable to determine silkworm age	The supply of mulberry leaves is unstable and cleaning is troublesome.	Silkworm fails to spin cocoons	Some people are afraid of moths and don't know how to deal with them.	Without systematic records, experience is difficult to pass on.
	Low survival rate of silkworm seedlings	The workload is too heavy to sustain and complete.	Lack of temperature and humidity regulation	Don't know how to process and utilize silkworm cocoons.	Interruption of emotional experience. Weak continuity
	Lacking equipment or space, the preparation process is cumbersome.	Highly dependent on experience, difficult to teach.	Improper cluster frame construction		
Opportunities	1. Launching "Silkworm Seedling Pre-order Transportation" Service 2. Develop intelligent silkworm house module	1. Mulberry leaf delivery system 2. Standardized automated feeding 3. Intelligent silkworm farming with task incentives	1. AI identifies age-related changes and sends reminders. 2. Environmental control module	1. Design interactive elements to guide users in understanding the uses of silkworm cocoons. 2. Establish a commemorative redemption system for "Silkworm Cocoons Returning to the Village".	1. Silkworm growth log system + user profile function

FIELD INVESTIGATION

Through a two-day field investigation, we identified the real challenges and needs surrounding local silkworm-raising practices.



The staff of Ma Village

Q: Do you think it is difficult to raise silkworms at home?

The failure rate of home breeding is high
- unstable air **humidity/temperature**
- The odors in the urban air are **complex**
- Silkworms need to be fed mulberry leaves **frequently**

Q: What do you think is the biggest problem of Machun Village at present?

- The tourists **can't be retained**
- The characteristic industry has **no reputation**
- The industries related to the integration of **industry and education** are not doing well

Q: How much time is spent raising silkworms approximately?

- The failure rate of home breeding is high unstable air **humidity/temperature**
- The odors in the urban air are **complex**
- Silkworms need to be fed mulberry leaves **frequently**

Q: Do you know what should be noted when raising silkworms?

- Pay attention to common **diseases**, such as "empty body disease" and "silkworm pupae"
- **Pesticide pollution** can enter silkworms through mulberry leaves, causing poisoning and reduced yields, especially in autumn when the situation is severe.



Villagers of Ma Village



Silkworm farmers

Q: Do you think it is difficult to raise silkworms at home?

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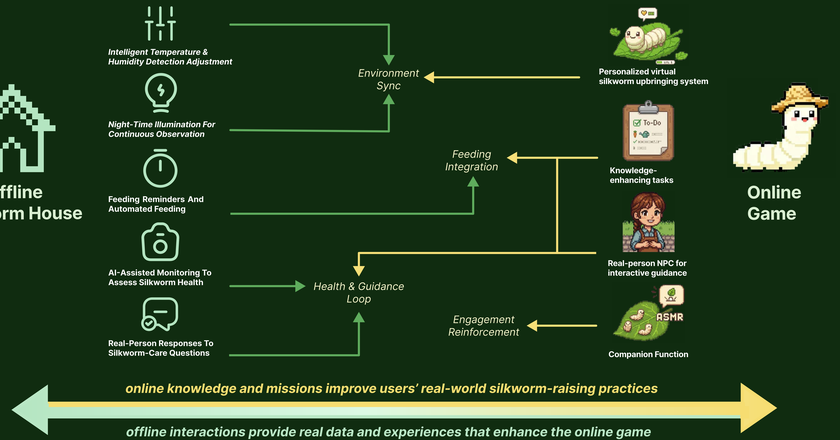
DESIGN DEFINITION & PRODUCT MODEL

Research Insights



Concept Map

Our project integrates both online and offline modes to create a richer, more immersive silkworm-raising experience.



Game Psychology

After analysing the research findings and user needs, we aimed to design a game that transforms silkworm care into an engaging and psychologically grounded learning experience.

Self-Determination Theory

A motivation framework explaining why users stay engaged, enjoy the experience, and return to the game.

Keyword	Design Principle	Player Experience
Autonomy	Users can freely explore and choose their silkworm-raising methods.	Players feel motivated when they can customise their silkworm house, choose feeding modes, decide how to raise their silkworm.
Competence	Make users realize, "I have learned more about silkworm raising."	Clear growth feedback and successful task completion give players a sense of mastery and improvement.
Relatedness	Make users feel a sense of companionship and human touch.	Players feel connected by interacting with real Ma Village sericulture experts (NPCs) and other players.

Related Feature

- Customizable Silkworm House Interface
- Manual / Auto Feeding Mode Switch
- Silkworm Rearing Task Interface
- Health Monitoring & Growth Curve
- Real-Person NPC
- User-To-User Interaction & Chat

Cognitive Load Theory

A learning framework explaining why the interface helps users understand silkworm care without being overwhelmed.

Keyword	Design Principle	Player Experience
Intrinsic Load	Complex biological content becomes digestible through guided missions.	Visualize the key knowledge of silkworm growth so that even novice users can understand it.
Extraneous Load	Remove cluttered, complex, and repetitive information.	Clean visual grouping and unified icons reduce unnecessary processing demands on the user.
Germane Load	Through cause-and-effect feedback, players can truly understand "why they should do this".	Players form deeper understanding through results-based feedback.

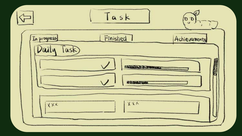
Related Feature

- Knowledge Missions
- Stage-based Guidance
- Unified Status Indicators
- Smart Reminders
- Minimalist UI Layout
- Cause-Effect Visualisations
- AR Silkworm Learning

Low-Fidelity

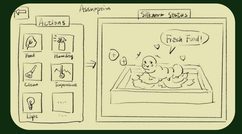
We discussed some game interfaces and hand-drew designs for them.



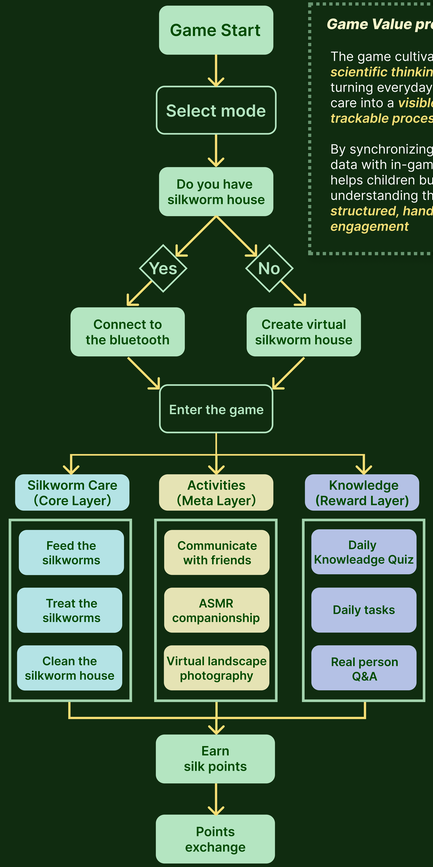








Game flow



Game Value proposition

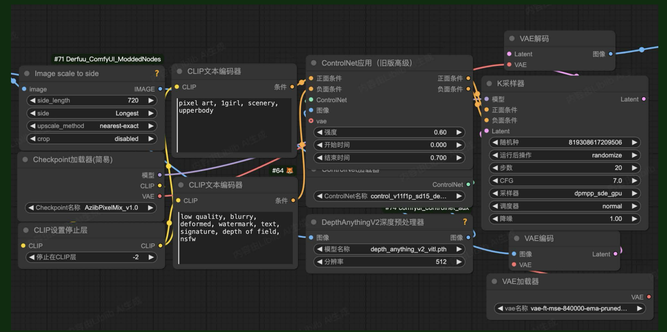
The game cultivates ***scientific thinking*** by turning everyday silkworm care into a *visible, trackable process*

By synchronizing offline data with in-game tasks, it helps children build understanding through ***structured, hands-on engagement***

Stable Diffusion (ComfyUI) — Image Generation Workflow

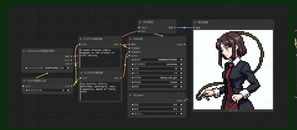
We are not major in game art, so we used AI to generate some game graphics and have built a Stable Diffusion workflow in ComfyUI, which is specifically designed to generate pixel-style illustrations that are concise and suitable for game interfaces.

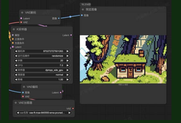
This workflow integrates LoRA models for mosaic style and sticker drawing, and can generate coherent visual effects for each scene input.



Workflow

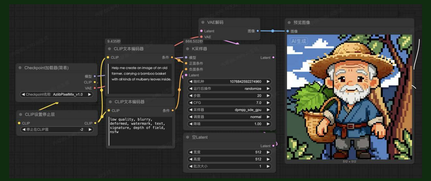
Checkpoint Loader → LoRA (*2) → CLIP Text Encoder → Sampler (KSampler) → VAE Decode → Image Output





During workflow debugging, we observed that differences between modules and step counts (with ~20 steps being optimal) have a substantial impact on the resulting image quality.





FINAL UI

Main Character

We designed some of the main characters in the game based on the history and traditions of Ma Village.



Horse-headed Goddess



Q-version silkworm baby



Silkworm Grandpa



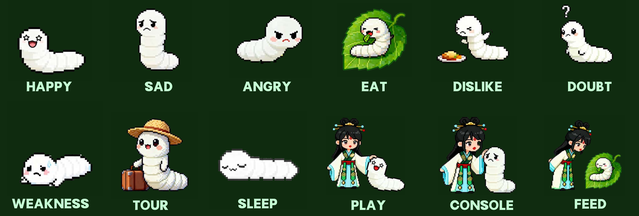
Silkworm Grandma

Icon

Some main icons in the game.



Reactions



High-Fidelity Interface

Our high-fidelity interface are inspired by the landscape and cultural heritage of Ma Village. By adopting a warm pixel-art aesthetic reminiscent, the interface creates an approachable visual atmosphere that supports learning and emotional connection.



Silkworm Care



Activities



Knowledge



PHYSICAL DEVICE | Build an intelligent silkworm house using Arduino

Coding

Arduino-based intelligent feeding and monitoring for silkworms, covering automatic feeding, temperature & humidity monitoring, and camera recording. Additionally, the monitoring device uploads silkworm status to app in real time.

```
#include <Adafruit_SSD1306.h>
#include <DHT.h>
#define DHTPIN 7// #define DHTTYPE DHT11; #define TEMP_LIMIT
28.0;
Adafruit_SSD1306 display(128, 64, &Wire, -1);
DHT dht(DHTPIN, DHTTYPE);


void loop() {
  if (millis() - lastRead < 2000) return;
  float h = dht.readHumidity();
  float t = dht.readTemperature();

  if (isnan(h) || isnan(t)) { display.println("DHT read error"); return; }

  bool tooHot = (t > TEMP_LIMIT);
  digitalWrite(LED_BUILTIN, tooHot ? HIGH : LOW);


  display.clearDisplay();
  display.print(t, 1); display.print("°C");
  display.print((int)round(h)); display.print("%");
  drawFace(tooHot); // 表情反馈
  display.print(tooHot ? "LED: ON  (HOT)" : "LED: OFF (OK)");
  display.display();


  SerialPrint("T="); SerialPrint(t,1); SerialPrint("C  H=");
  SerialPrint(h,0);
  SerialPrintln(tooHot ? "%  HOT" : "%  OK");
}
```

```
#include <TM1637Display.h>
#include <Servo.h>
#define CLK 5; #define DIO 6; #define BUTTON_START 2; #define
BUTTON_PLUS 3; #define BUTTON_MINUS 4;
#define SERVO_PIN 9; #define BUZZER_PIN 10; #define LED_PIN 11;
#define LDR_PIN A0;
TM1637Display display(CLK, DIO);
Servo servo;
int feedTime = 60;
bool counting = false;
unsigned long lastCount = 0;

void setup() {
  pinMode(BUTTON_START, INPUT_PULLUP);
  pinMode(BUTTON_PLUS, INPUT_PULLUP);
  pinMode(BUTTON_MINUS, INPUT_PULLUP);
  pinMode(BUZZER_PIN, OUTPUT);
  pinMode(LED_PIN, OUTPUT);
  servo.attach(SERVO_PIN);
  servo.write(0);
  display.setBrightness(0x0f);
  display.showNumberDec(feedTime, true);
}

void loop() {
  int light = analogRead(LDR_PIN);
  digitalWrite(LED_PIN, light < 500 ? HIGH : LOW);

  if (!counting) {
    if (digitalRead(BUTTON_PLUS) == LOW) { feedTime =
min(feedTime + 10, 9999); display.showNumberDec(feedTime, true);
delay(200); }
    if (digitalRead(BUTTON_MINUS) == LOW) { feedTime =
max(feedTime - 10, 0); display.showNumberDec(feedTime, true);
delay(200); }
    if (digitalRead(BUTTON_START) == LOW && feedTime > 0) {
counting = true; tone(BUZZER_PIN, 1000, 300); lastCount = millis(); }
  } else {

    if (millis() - lastCount >= 1000) {
      feedTime--;
      display.showNumberDec(feedTime, true);
      lastCount = millis();
      if (feedTime <= 0) {
        tone(BUZZER_PIN, 1500, 500);
        servo.write(90);
        delay(1000);
        servo.write(0);
        counting = false;
        feedTime = 60;
        display.showNumberDec(feedTime, true);
      }
    }
  }
}
```

Senser Set Up

Set Logics Of Temperature Display

Logics Of Temperature Display

- Temperature 20-30℃ 😊
- Temperature <20℃ >30℃ 😨

System Modules

We can set the feeding time automatically through a timer, accompanied by a feeding reminder sound. During the night feeding, the light will also turn on.

With the Bluetooth module installed, real-time feeding can be carried out on the APP

This design significantly reduces the difficulty of feeding, and enables quick feeding even without direct contact.

Major Components



Arduino UNO R3



Buzzer



Micro Servo



Button



Fan



ESP32-CAM



DHT11 Temperature and Humidity Sensor



OLED display screen



Photoresistor



Digital display

Build Process



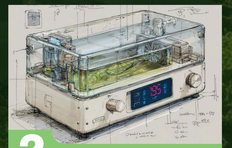
1 Brainstorming



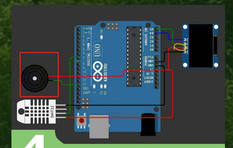
3 Programming



5 Assembling



2 Designing



4 Developing

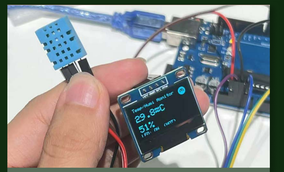
Intelligent Silkworm House Function Design



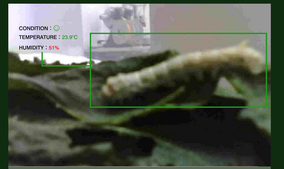
6 Finished Product Intelligent Silkworm House

We have built an intelligent silkworm house using Arduino, which includes functions such as growth record keeping, temperature and humidity monitoring, and automatic feeding. In order to embody the concept of nature, we chose to use moss and green plants for scene arrangement in landscaping.

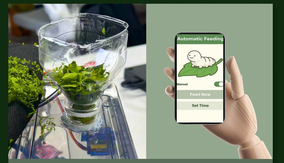
- The Smart Silkworm House is designed as an ***interactive educational device*** that blends biological observation with IoT-based automation.
- Inspired by the rich sericulture heritage of Ma Village and modern STEAM pedagogy, the product aims to enhance children's ***experiential learning*** through real-time interaction with silkworms.



Temperature And Humidity Monitoring System



System Of Intelligent Monitor



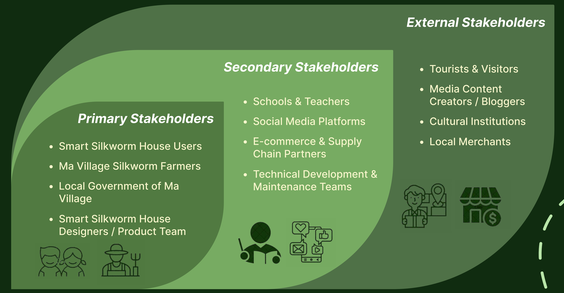
Automatic Feeding System

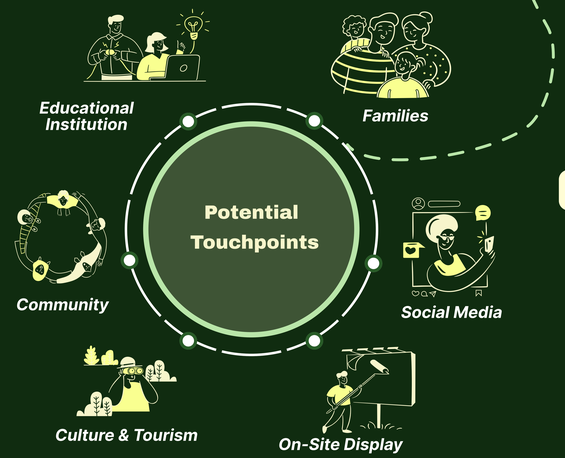
A motorized feeder releases mulberry leaves at set times or via app control, ensuring regular feeding and reducing manual work.

MARKETING SOLUTION

Beyond building the system, we mapped how different stakeholders could engage with the product—revealing its real-world pathways, touchpoints, and long-term growth potential.

Stakeholders Map





AISAS Model —— *Understanding user motivations across every stage*

Attention
Smartization & Emotional Appeal

Users are first drawn in by the smart, therapeutic, and family-friendly positioning of silkworm raising—amplified by trending topics such as intelligent monitoring, homework-related parenting discussions, and culturally nostalgic content around traditional sericulture on social platforms.

A

Interest
Novel Hobby & Educational Value

The smart silkworm house transforms the farming task into a light, playful, and educational hobby, offering automated functions, stage recognition, STEAM value, and strong emotional resonance similar to digital pets and travel journaling.

I

Search
Online Information Exploration

Users actively search for product details across platforms—comparing brands, reading reviews and user stories, checking certifications, and evaluating reliability before making decisions.

S

Action
Online–Offline Experience System

Users engage in a dual-phase system: online they download the app, adopt a virtual silkworm, complete feeding and environment-regulation tasks; offline they purchase and connect the smart house, perform real feeding, adjust humidity, buy mulberry leaves, and even participate in village research activities.

A

Share
High-Engagement UGC Loop

Users naturally share their silkworm-raising journey, from cute daily updates and AR photos to NPC interactions and village visits, creating authentic user-generated content that strengthens trust, emotional bonding, and community spread.

S

Project Promotion



- Creative Advertising
- Farmer Q&A Livestreams
- First-Person Silkworm Life Streams

Online Strategy

Content

Creates visibility and curiosity through creative social media content and livestreamable storytelling.

Uses physical materials and curated narratives to reinforce learning and cultural value.

Experiences

Uses digital channels to convert interest into engagement via apps like Red Book and short-video platforms like Tiktok.

- Create a RedNote account and share smart silkworm house content
- Post nature-education facts and device-making clips to boost visibility
- Grow reach using tags for healing, nature, and STEAM learning



Engages users through real-world interactions such as tourism, STEAM workshops, and exhibitions.



- Posters & Print Materials
- Effect Display Boards
- Character Merchandise

- Ma Village Tourism Services
- Cultural Markets & Event Booths
- Smart Silkworm House Demonstrations



Offline Marketing

REFLECTION

Working on this project deepened my understanding of how EdTech can cultivate community-based learning ecosystems that merge real-world practices with accessible digital environments.

1

Learned that effective educational systems must balance user learning motivations, cultural context, and stakeholder economic goals through fieldwork research on Ma Village

2

Reflected on how technology can translate traditional agricultural knowledge into interactive learning without losing authenticity.

3

Recognized the importance of designing EdTech that supports experiential learning, where digital tools enhance hands-on understanding.

