

roots

Low-fi Prototyping & Pilot Usability Testing

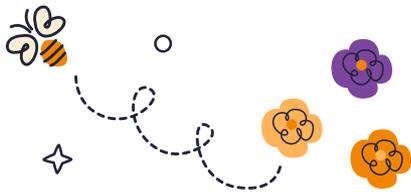


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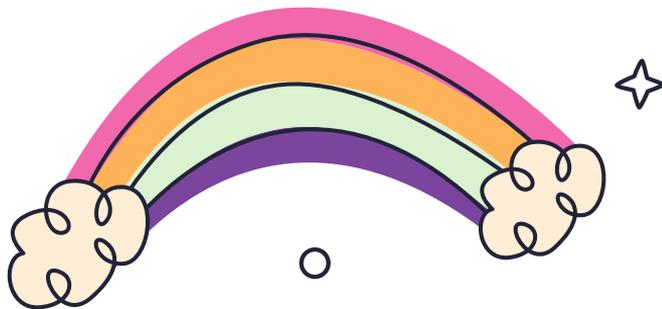
05

**results &
discussion**



01

intro





introducing the team



Naomi
'27



Junior
CS Major (HCI)
Morgan Hill, CA

Aimen
'27



Junior
CS (HCI)
Lahore, Pakistan

Mai
'25 + '26

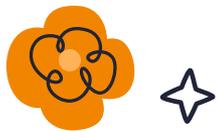


BS CS (AI)
MS CS (HCI)
San Diego, CA

Angela
'25

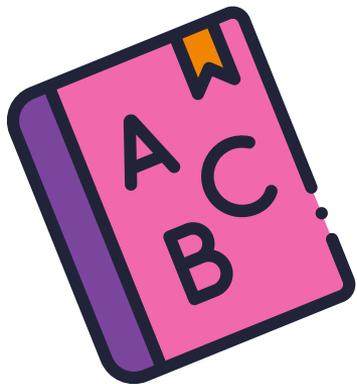


HCI co-term,
English major
Palo Alto, CA



value proposition

○



one line value proposition:
connecting for us





problem & solution

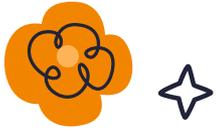


Problem: Immigrant parents and children often struggle to connect across cultural and generational gaps. Conversations about identity, heritage, and emotion can feel awkward or easily avoided.

Solution: Roots provides guided prompts, storytelling activities, and shared reflection spaces that make it easy and natural for families to talk, preserve heritage, and strengthen their bond.



updated tasks



○



simple

user *learns*
empathy skills



moderate

user *practices*
vulnerability



complex

user *reflects* on their
memories

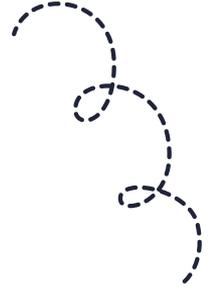




simple

user *learns*
empathy skills

This task is simple because it only requires passive engagement: users can watch short videos and complete quick quizzes at their own pace. It's low effort, on-the-go quick learning. We expect all users to complete this since it is the foundation of our solution.

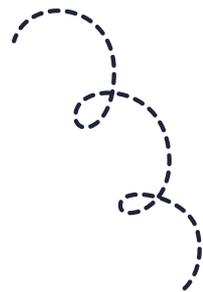




moderate

user *practices*
vulnerability

This task requires more participation and vulnerability: users must interact with their parent/child and share small pieces of themselves through gameplay. From interviews, we learned that opening up feels easier in playful, structured settings, so we expect occasional (but not too frequent because of busy schedules) participation here.

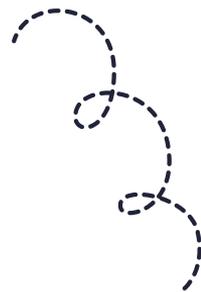




complex

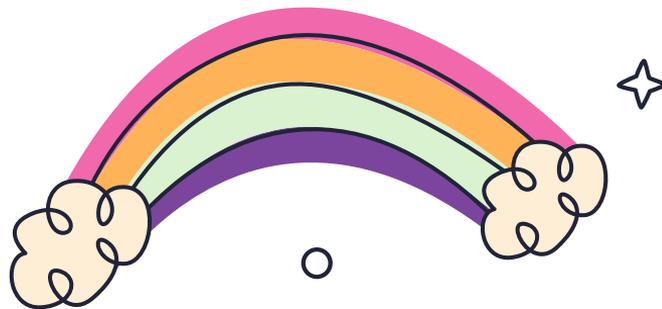
user *reflects* on their
learnings /
memories

Reflection takes the most emotional energy. It requires users to process what they learned, and articulate their thoughts and feelings, something that not all users will be able to/ would want to do.

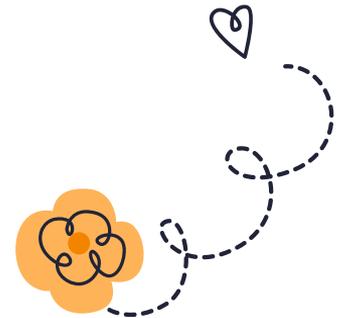
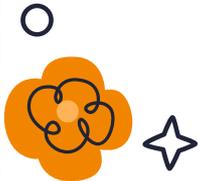
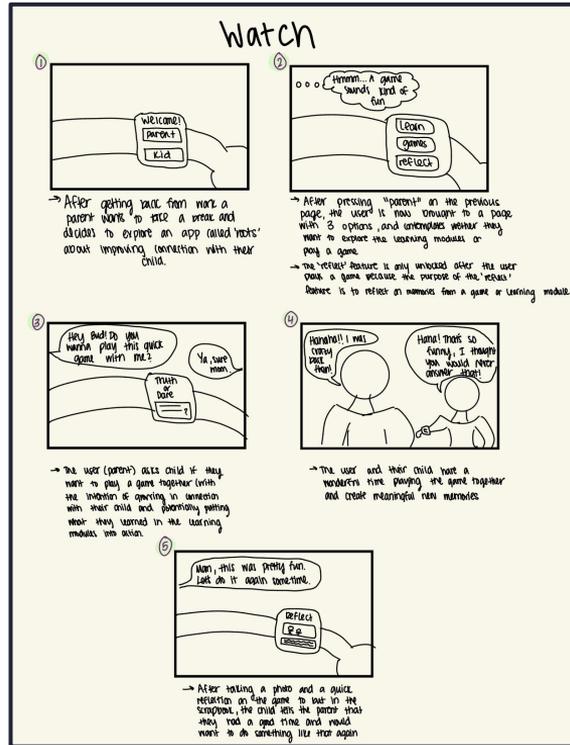


02

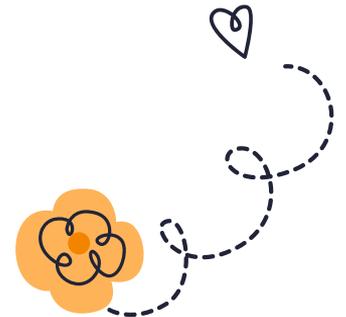
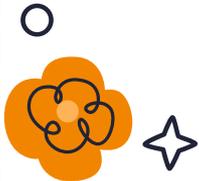
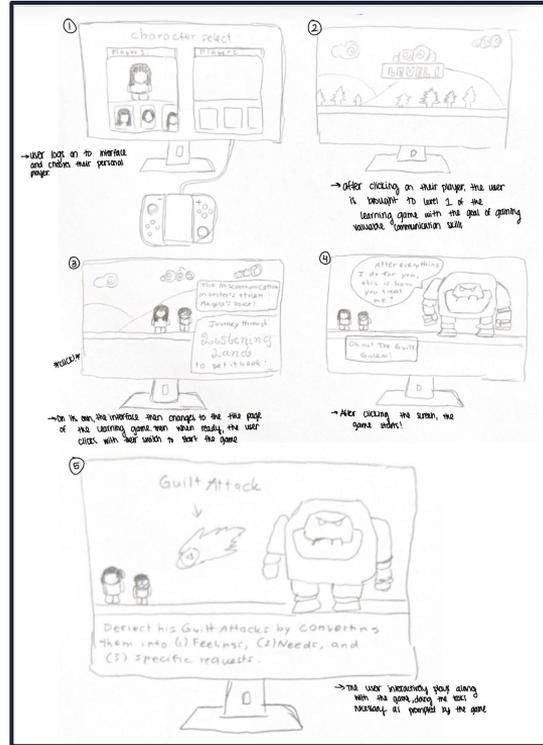
sketching
explorations



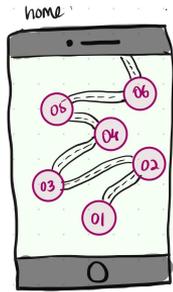
concept sketches: watch



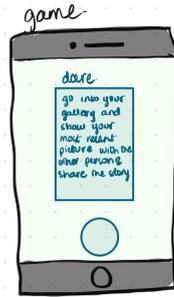
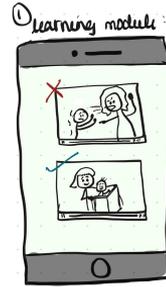
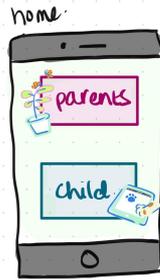
concept sketches: nintendo switch



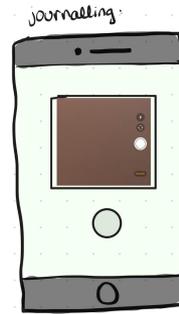
top 2 realizations: phone



levels
with each level unlocked, "vulnerability" level of questions increases.



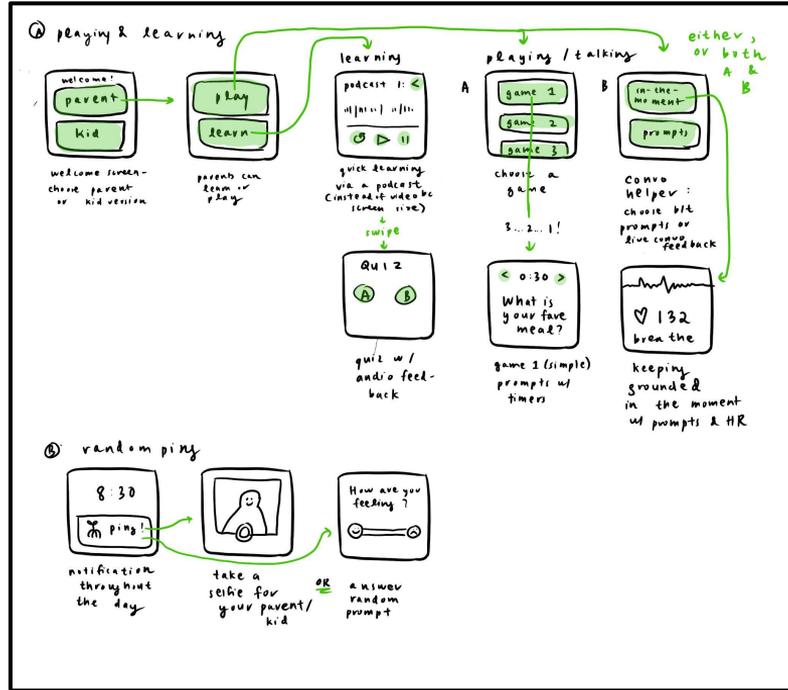
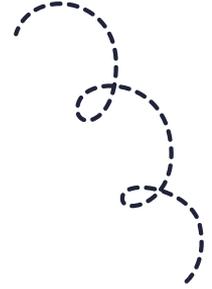
when done playing, take a selfie:



picture goes into digital journal.



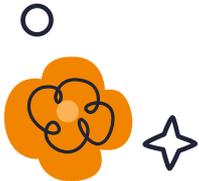
top 2 realizations: watch



interface pros/cons: phone

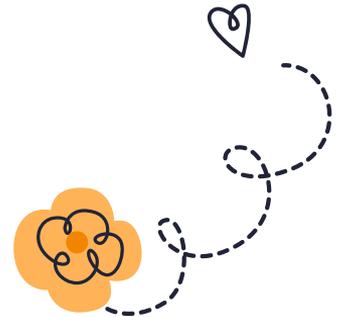
Pros:

- Adaptable for diverse language and accessibility needs
- Opportunity for well sized visual aids (embedded visuals/videos for lessons)



Cons:

- Mobile app fatigue
- Trust & Security concerns with storing photos feature



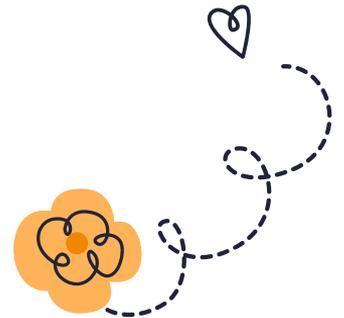
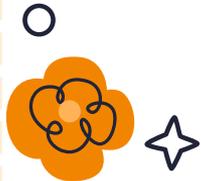
interface pros/cons: watch

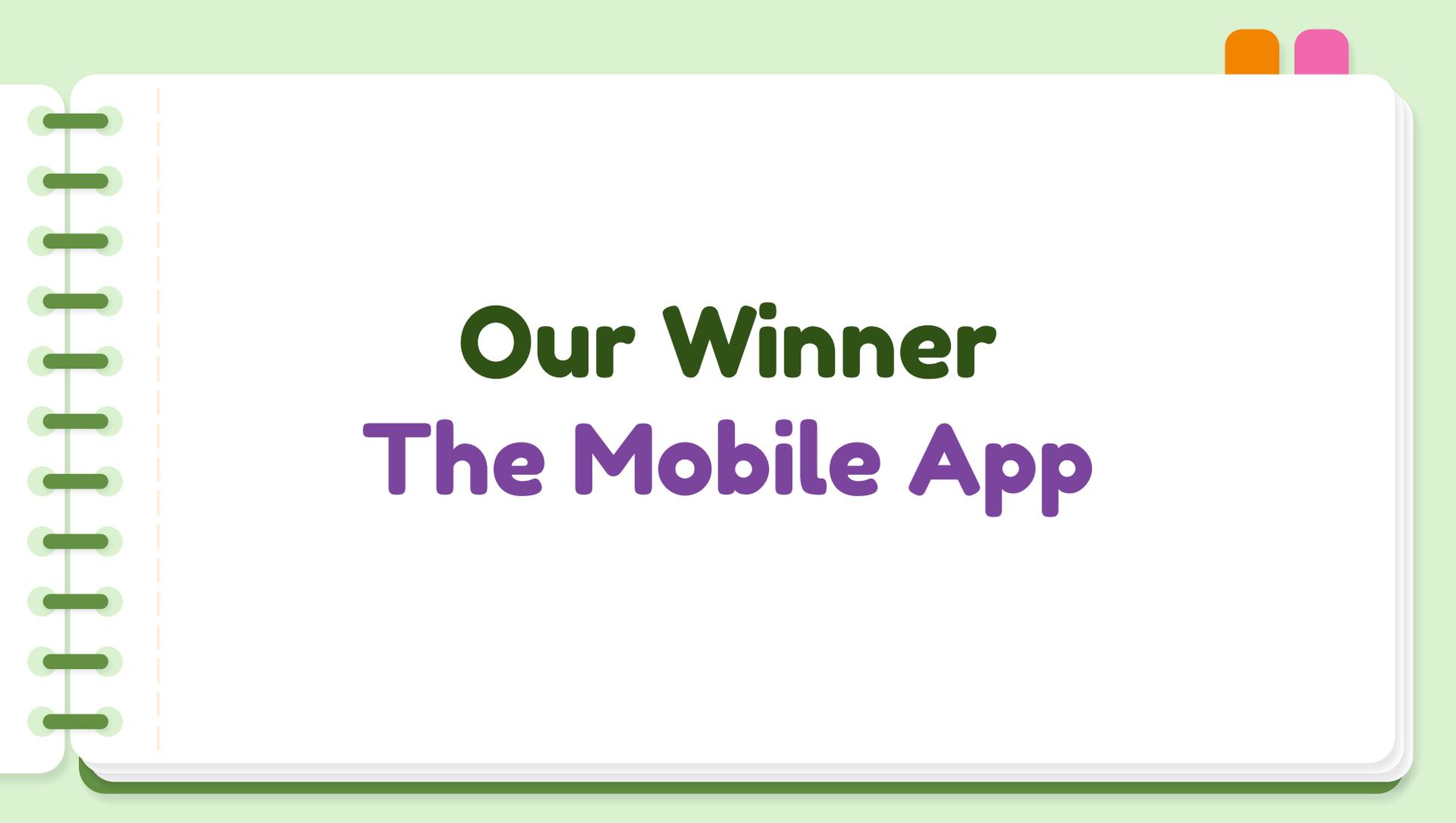
Pros:

- App activity and involvement without pulling phone out
- Lightweight UI

Cons:

- Small surface area
- Limited input opportunities

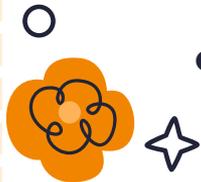


A graphic of a spiral-bound notebook with a white page and a green cover. The spiral binding is on the left side. There are two colorful tabs (orange and pink) at the top right. The text is centered on the page.

Our Winner
The Mobile App

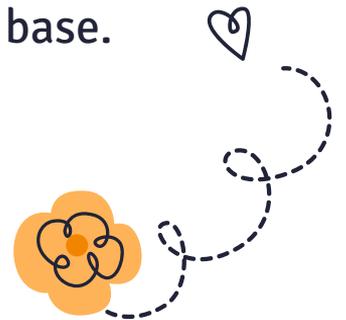
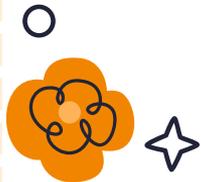
Why the Mobile App?

- Larger surface area for UI will be more beneficial for our primary user base (immigrant parents) who may not be as tech savvy
- Many individuals in our user base are already familiar with mobile apps (for calls, messages, and photos)
 - Smaller learning curve for new gestures required by app
- Sufficient screen space for interactive visuals and videos that help the users to have a positive experience
- Allows for more features of the app to be displayed compared to the UI that would be on a watch



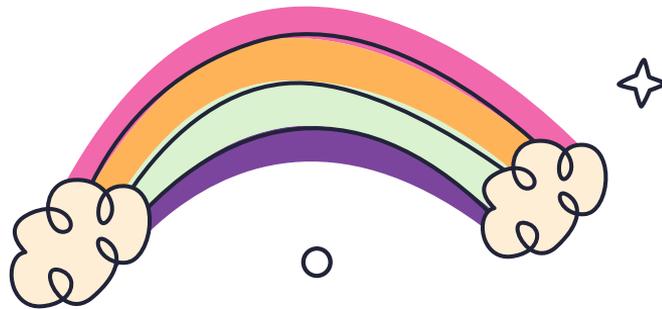
Why the Mobile App?

As a result of the highly visual component of **roots**, which involves learning videos and quizzes, interactive games, a reflection scrapbook, and more that is central to our mission to facilitate meaningful connection between immigrant parents and children, the mobile app provides the necessary tools for the needs of our primary user base.



03

lo-fi prototype

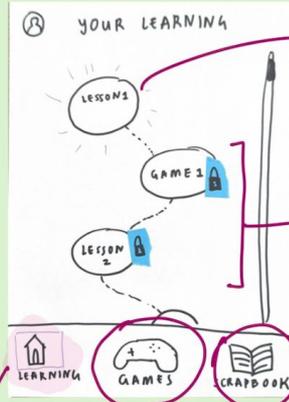


main screens



tap!

user is home right now

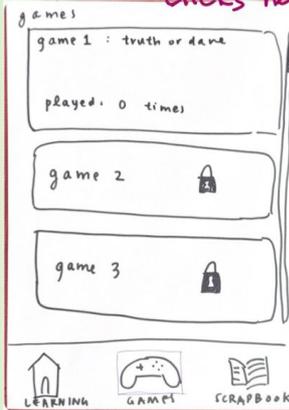


learning module!

rest of the games/lessons are locked!

if user clicks here

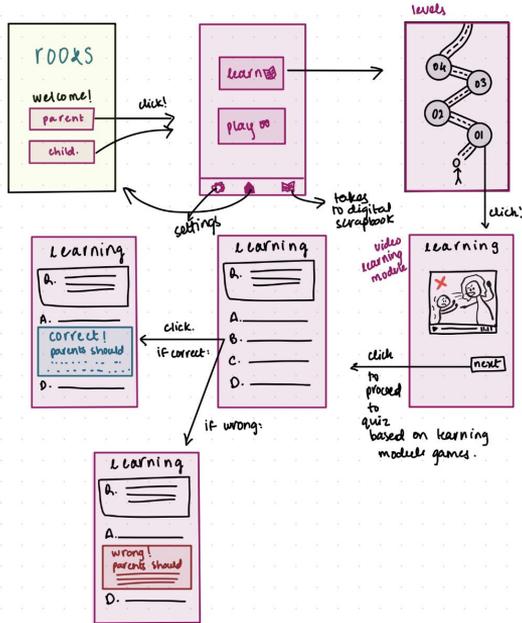
if user clicks scrapbook!



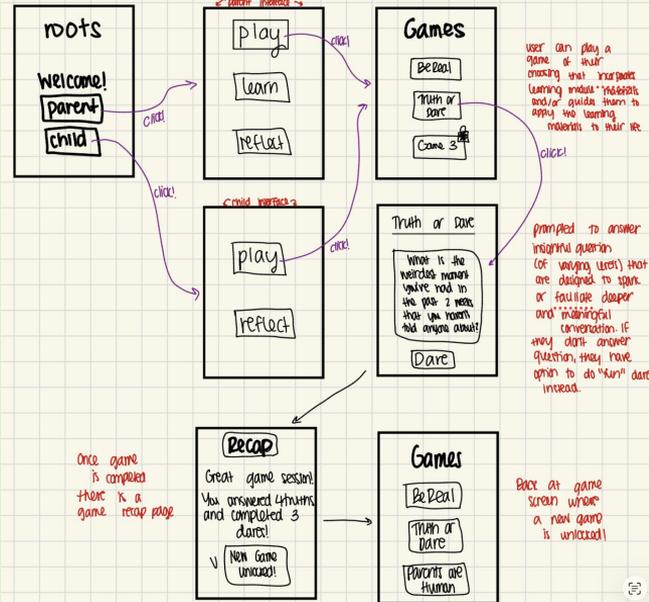
user prompted to go play games or do learning modules to add to book.

story-boards

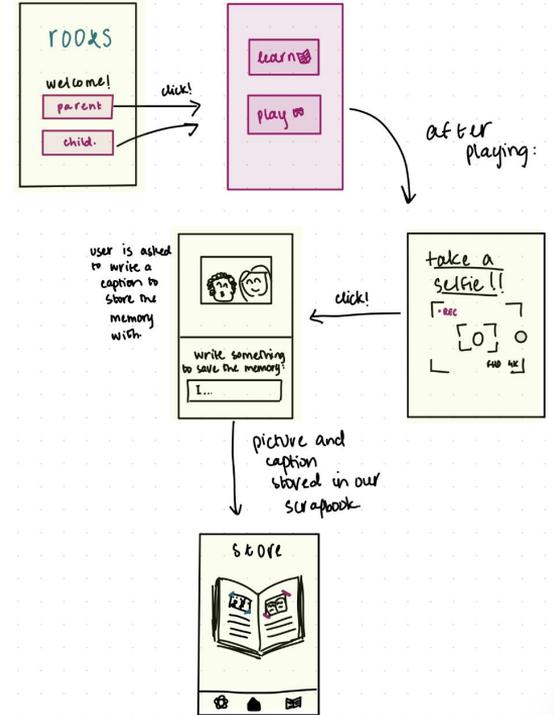
Simple



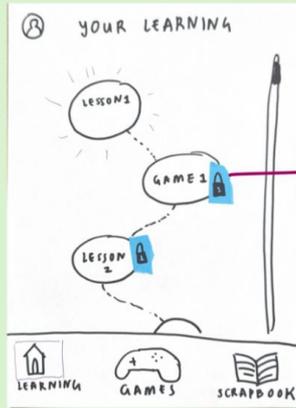
Moderate



Complete

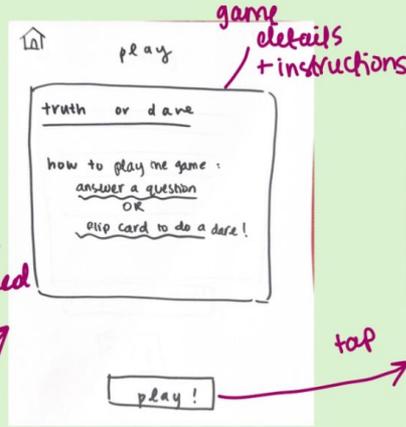


task flows: moderate



after game 1 unlocked

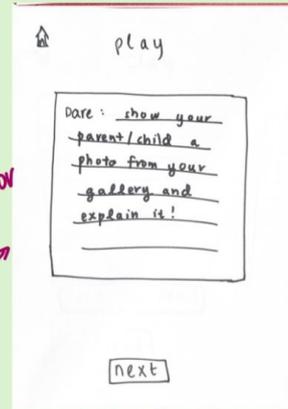
or right after learning module



tap



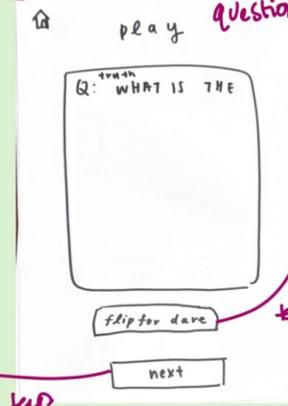
tap for dare



or tap for another question



or tap for another question

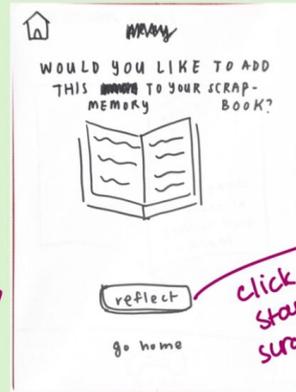


tap

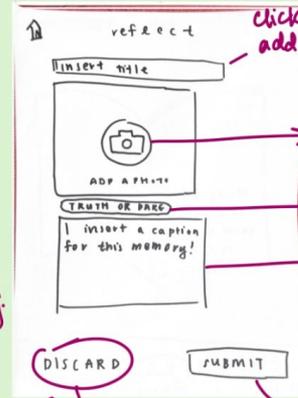
task flows: complex



click!



click to start scrapbooking!



click to type in and add title/caption for your memories

click to get a picture

tag the picture

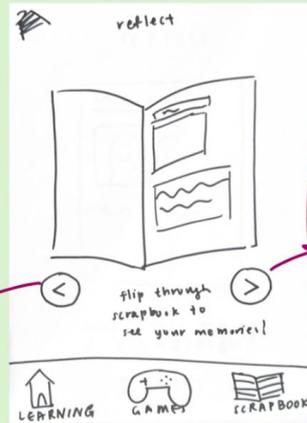
click and type in your thoughts/feelings/details/context for the picture

DISCARD

SUBMIT

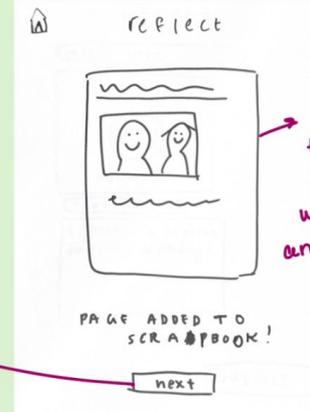
click!

takes you back to this



tap to go right in scrapbook

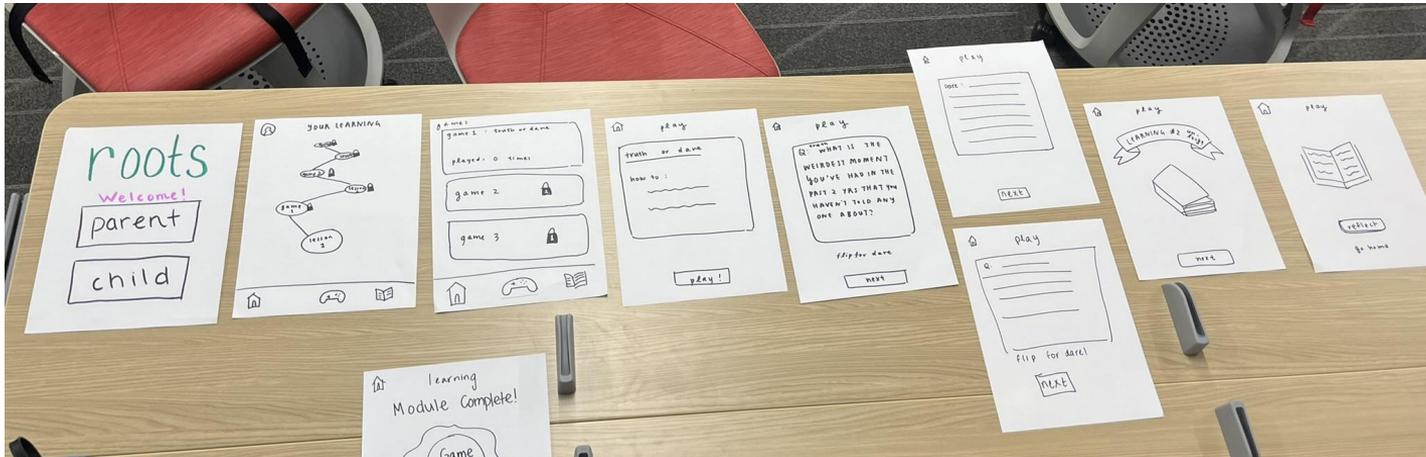
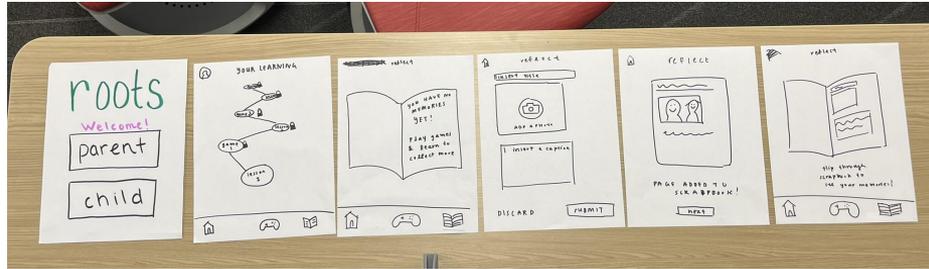
tap to flip right in scrapbook



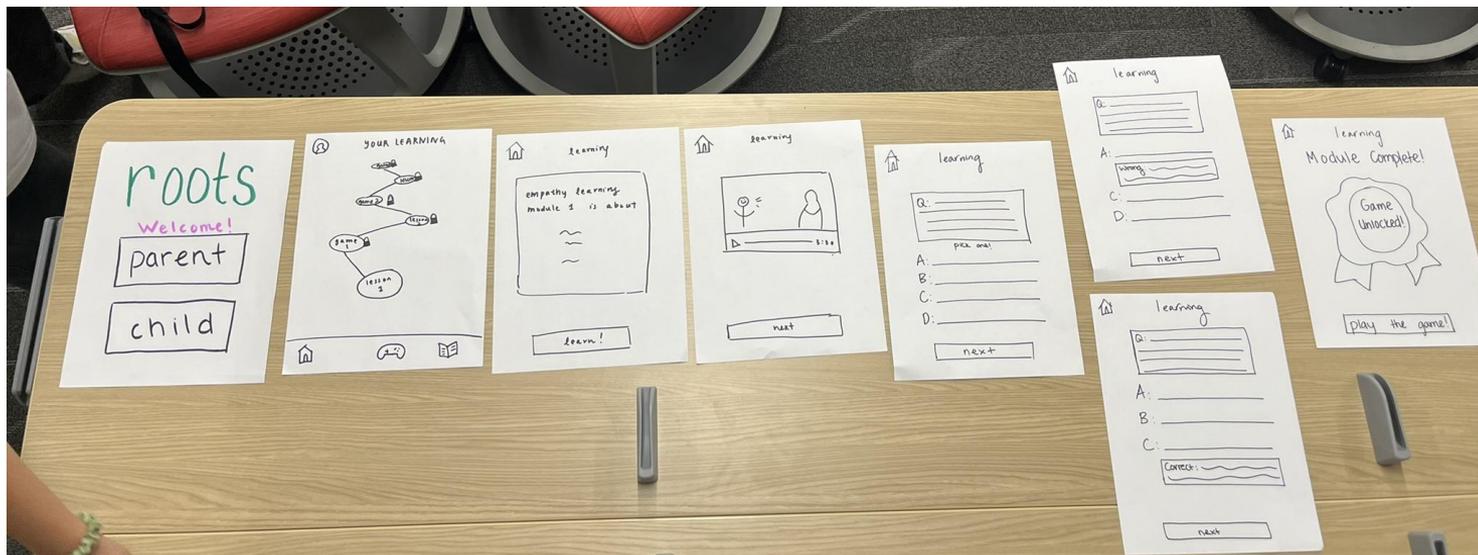
user sees their picture with title and caption

click!

our paper prototype

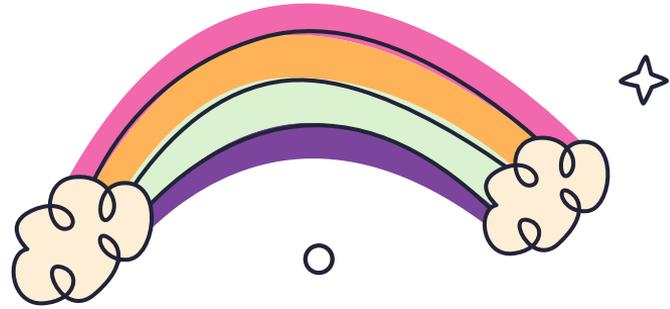


our paper prototype



04

prototype
testing





team member roles



Naomi
Computer



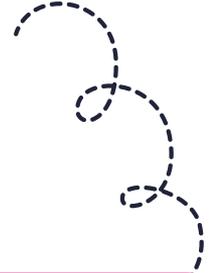
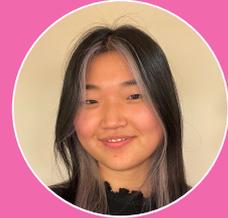
Aimen
Facilitator



Mai
Note-taker



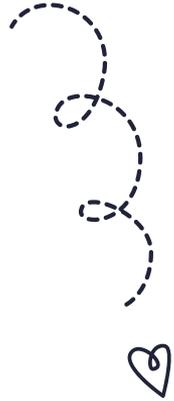
Angela
Note-taker



testing environment

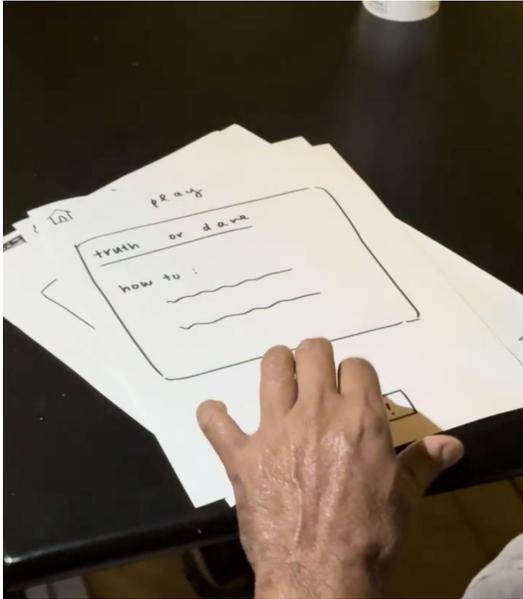


- Starbucks and T4 on University Ave in the evening and approached strangers
- Target: variety of age groups – both parents and children

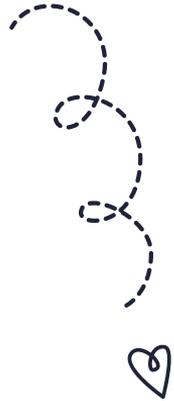




testing apparatus



- Created a paper prototype which manually responded to people's actions
- Formulated rough script for each participant



our testers

○



prateek

Father, 40s



josh

Father, 50s



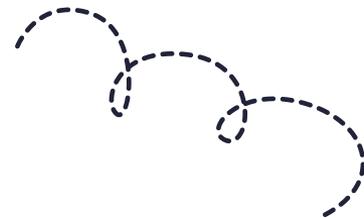
robin

Daughter, 18



ted

Son, 18



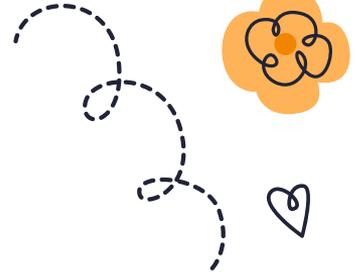
*



○



procedure & process



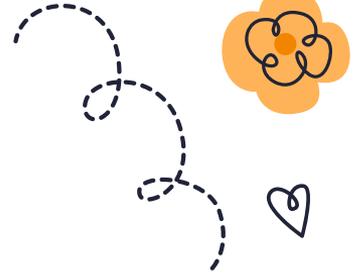
1. **introduction:** who we are, what we are testing
2. **context:** the purpose of our app
3. **tasks:** we explained our three tasks, simple, moderate, and complex
4. **execution:** we allowed the users to work through the tasks (and think out loud)
5. **feedback:** we asked them for both qualitative feedback (e.g. how did you feel about the app) and quantitative feedback (how would you rate each task)



procedure & process

We did 2 rounds of testing:

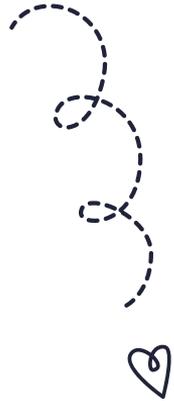
- One with parents - updated our paper prototype
- Then with children



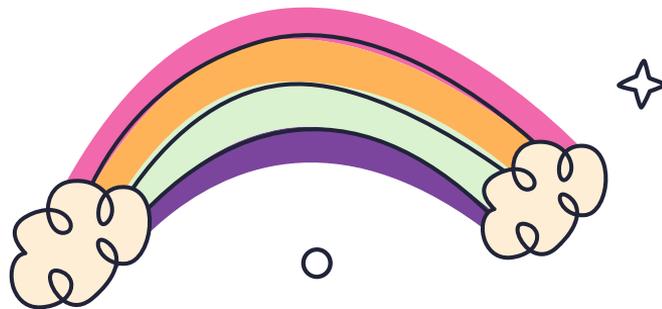
usability goals & key measurements

Ease of navigation: how intuitive is it to use our app?

Eagerness to use: how likely is it that they would use different features of the app, on a scale of 1-10.



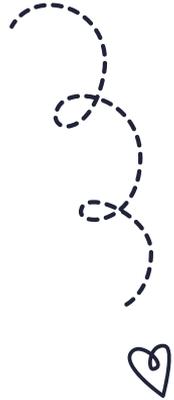
05
results



process data

All participants:

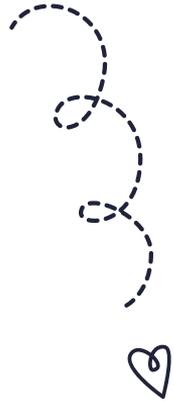
- Described the interface as intuitive.
- Completed all assigned tasks.
- Enjoyed the bite-sized learning modules.
- Were eager to explore the app.



process data

Some Participants:

- Felt unclear about what the reflection should be about:
 - 1 participant: unsure if reflection about game or learning
 - 1 participant: thought they were supposed to upload their dare photo from the Truth or Dare game





process data



Older Participants:

- Found the interface intuitive after they figured it out, but struggled initially
- Confused by bottom-up home layout.
- Suggested a tutorial to be included at the start.
- Expressed not wanting their kids to download the app (concern about more screen time).
- Confused about how to scroll through scrapbook.
- Unsure which module to start, requested starting module be clearly highlighted.
- All misclicks occurred with older participants.





process data

Younger Participants:

- Described interface as intuitive and figured it out quickly
- Neutral about playing games unless initiated by parents
- Wanted games to start with lower vulnerability and build up
- Mentioned potential to feel pressured by parent to answer something they didn't want to
- Suggested that the app be framed like a business proposal to get parents onboard more successfully (“how to get your kid to be successful”)



bottom-line data (older participants)

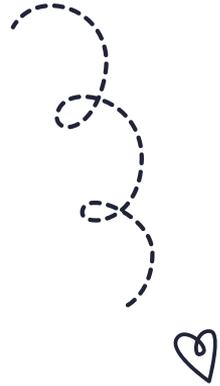


7

Total Misclicks

7.5

How intuitive on a scale of 1-10 (on average) our app was.



8

How likely on a scale of 1-10 (on average) are participants to use different parts of the app.

bottom-line data (younger participants)



0

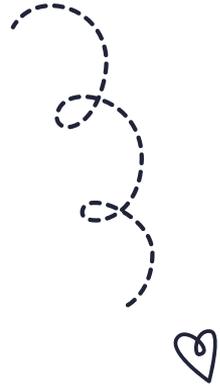
Total Misclicks

8.5

How intuitive on
a scale of 1-10
(on average) our
app was.

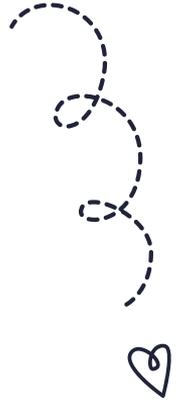
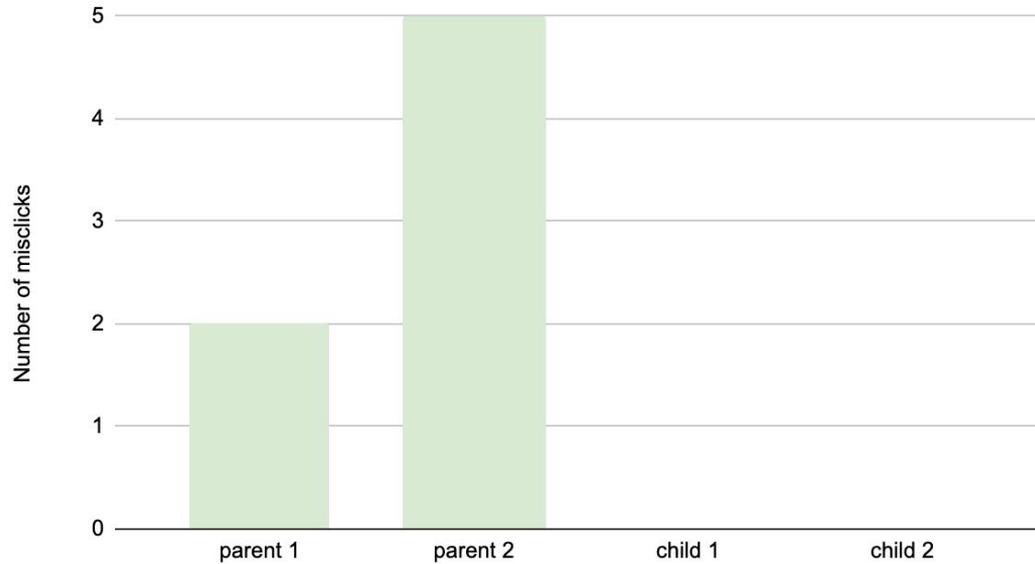
6

How likely on a
scale of 1-10 (on
average) are
participants to use
different parts of the
app.



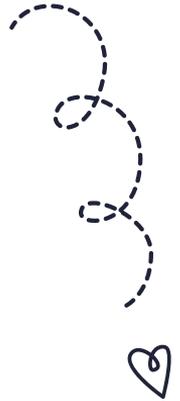
bottom-line data

Usability Problem Incidents



bottom-line data

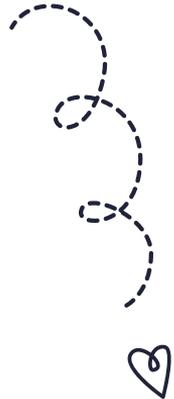
usability goals were
achieved better with
younger participants than
with older ones.



stage 1: critical incidents...

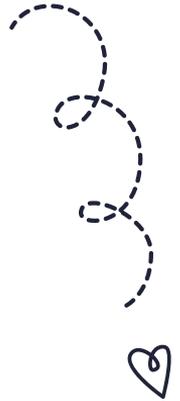
From our first iteration with the two fathers:

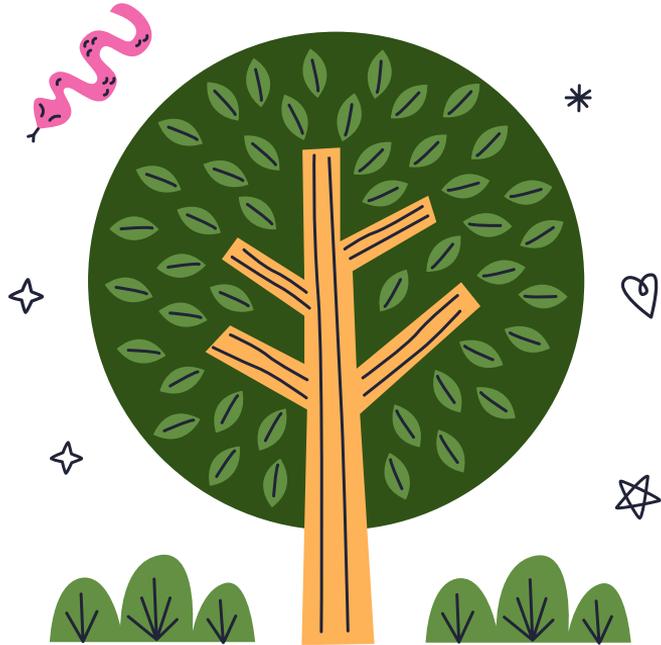
- **major usability issue:** we had to explain that “swiping” is flipping through the scrapbook
- **minor usability issue:** we had to explain that the “learnings” were the lessons on the home screen
- One took **15 minutes** to complete the prototype, the other **8.5 minutes**



prototype feedback

- Were not clear that tasks were supposed to be done in a specific order
- We didn't sufficiently introduce ourselves, which meant that they didn't understand that it wasn't a test
- Prototype wasn't responsive enough to "misclicks" – didn't have enough screens for "incorrect" flows





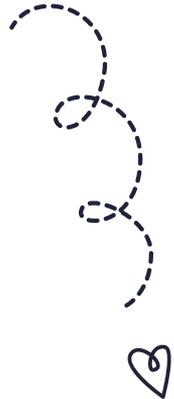
key learning

Designing for older adults is much different than designing for children – everything has to be literal

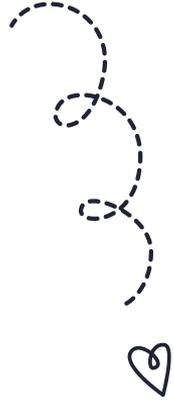
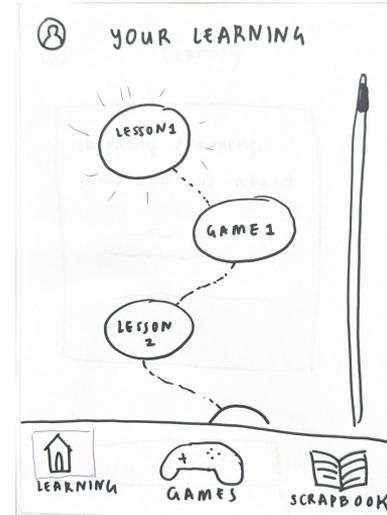
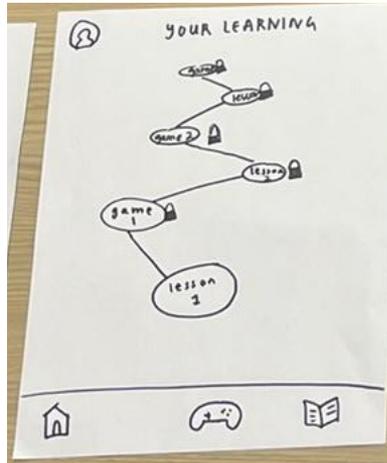
the redesign (prototype)

In response to all their feedback, we:

- Added text beneath all buttons
- Made text on the home screen bigger
- Added a scroll bar to the home page (to make gesture obvious)
- Highlighted already clicked buttons
- Added more explanatory text to the game, scrapbook, and learning modules
- Added sticky note locks for a more interactive prototype
- Turned all “flip” (swipe) gestures into buttons for the scrapbook



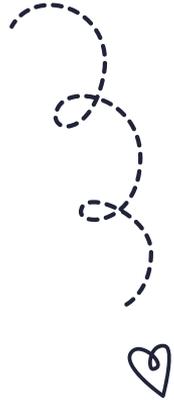
the redesign (prototype)



the redesign (experiment)

In response to all their feedback, we:

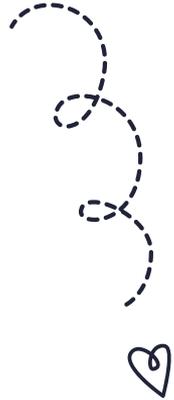
- Swapped roles – Naomi and Angela facilitated, Aimen was computer, Mai took notes; more people speaking made the environment more relaxed
- Asked more qualitative questions rather than quantitative
- Explained that the tasks one-by-one



stage 2: critical incidents

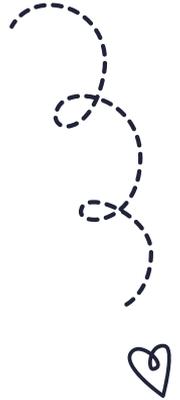
From our second iteration on high school students:

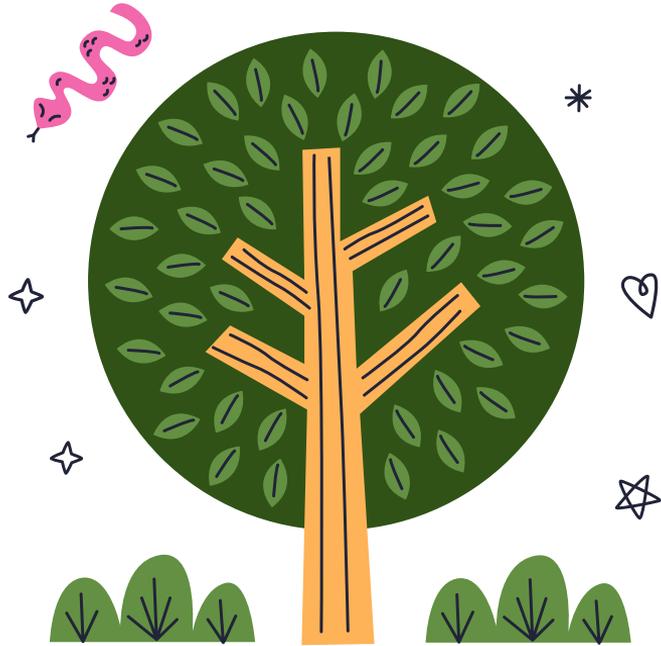
- Had a much easier time navigating the prototype
- One took **3.5 minutes** to complete the prototype, the other **4 minutes**



feedback

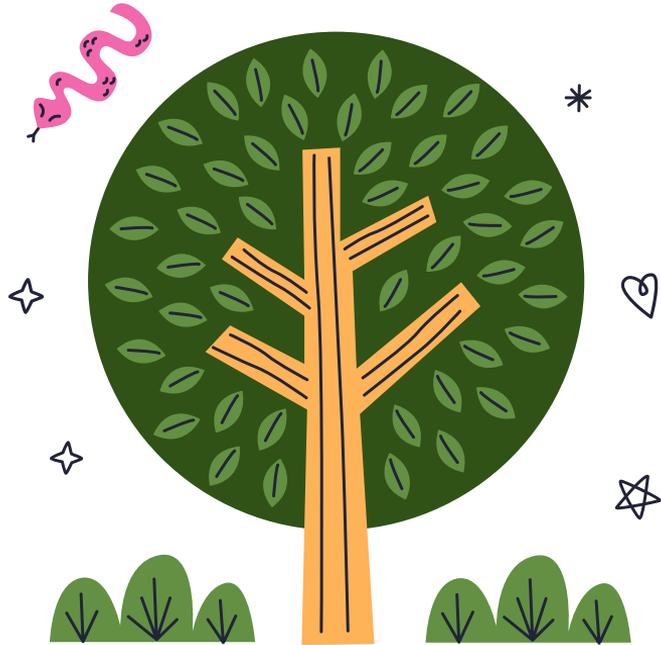
- Intuitive UI
- Children have less attention span: wanted a x2 speedup button for videos, also mentioned “less likely” to do another learning module if I didn't like the first one.
- **When we asked in what scenario would they actually play a game with their parent, they responded, “if he/she brought it to me”**





key learning #1

The game would be better introduced by the parents than by the kids – who would have a hard time convincing their parents to play



key learning #2

Immigrant parents would be most likely to use the app if it implied a more “success-oriented” approach: “how to talk to your kids so they will listen” or “how to raise a successful child”

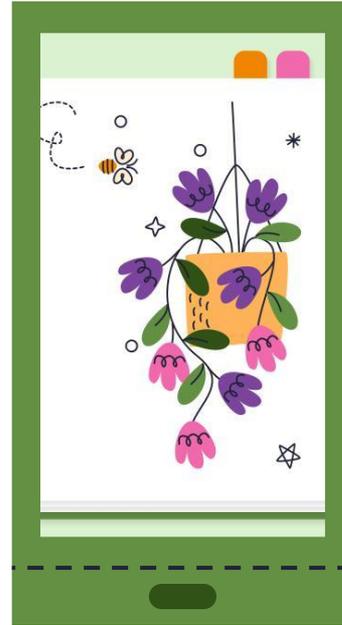
task 1: learn an empathy skill

Overall rating: **8.8/10**

- Rated highly by both parents and children
- Fewest usability incidents



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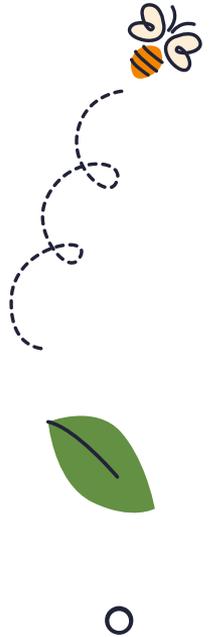


task 2: user practices vulnerability



Overall rating: **4.3/10**

- Lowest rated by children: 3.5, but their complaint was feasibility (would not feel comfortable bringing it to parents)
- Highly rated by parents: 8
- Both parents and children wanted a “ramp-up” with less intimate questions in the game at first

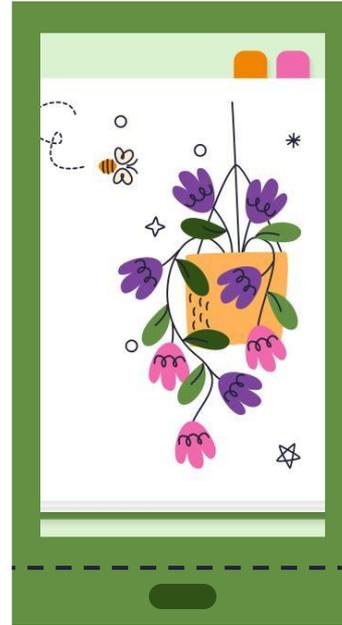


task 3: reflect on the activity

Overall rating: **8.8/10**

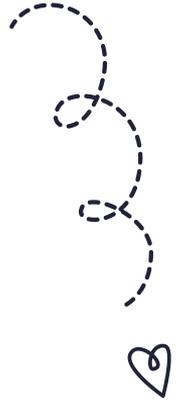
- Both parents and children confused on what they were reflecting on – needed more guidance

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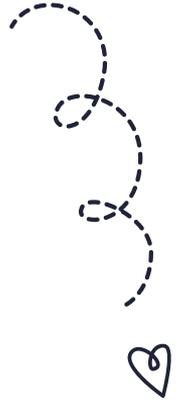
other observations

- Both parents and children said that *content* of games and learning modules would determine the quality of the app the most



what testing couldn't reveal

- Tested with individual participants, not pairs of children/parents

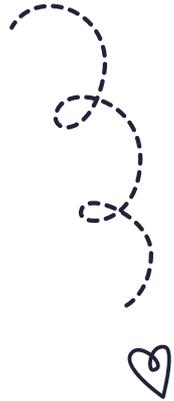


implications

- Must be intentional about designing for older users (primary base)
 - Prioritize **clear UI** with strong, **obvious visual cues**
 - Use **top-down hierarchy**
 - **Provide onboarding** to reduce initial struggle
 - Favor readable and **large typography, high contrast, and larger clickables**
- Product direction: parent-only experience
 - No separate flow for kids
 - Make activities **parent-centered**
 - Market as a “business proposal”

moving forward...

- If we are pivoting towards parents + older adults:
 - UI needs to be more literal
 - Content could include podcasts as well as videos, especially considering visibility issues/time constraints for older adults
- Making sure to pitch as a business model to parents (like Dr. Helen Hsu said)



APPENDIX



Mobile App Full Pros/Cons List:

Mobile App

Pros	Cons
<ul style="list-style-type: none">• Highly visual interface<ul style="list-style-type: none">◦ Allows us to embed videos and visuals for lessons◦ Allows us to implement games for parents/kids to play• Lower barrier to entry, immigrant families already have lower grasp of technology so smartphones are more accessible• Highly adaptable for language needs:<ul style="list-style-type: none">◦ Supports voice notes + auto-transcription, heritage-language keyboards, large tap targets, captions (fits low-English/low-literacy needs).• Strong accessibility support: OS-text sizing, captions, translations, etc.• Integrates much more easily into user base's life• Can host more robust tutorials for older users• Easier to capture longer reflections (text/audio/photo)	<ul style="list-style-type: none">• Cannot integrate physiological signals like heart rate which can indicate when a parent or child is in distress• Trust and security expectations are higher when storing personal photos especially with children• Mobile app fatigue: there are already so many apps out there, must convince people this is one worth their time• Must support a wide range of devices (Androids and iPhones)• Easy to get distracted on mobile

Smartwatch Full Pros/Cons List:

Smartwatch

Pros	Cons
<ul style="list-style-type: none">● Very low friction: Glanceable nudges; quick taps for mood tags or yes/no on tiny actions.● Always-on presence: Prompts during “micro-moments” (commute, walks) without pulling out phone.● Lightweight UI which pushes back against over-polishing or rumination● Encourages brevity and authenticity because of the small interface	<ul style="list-style-type: none">● More inaccessible, most people don't have smartwatches● Very limited input● Very limited UI: poor fit for lessons, videos, and nuanced reflection<ul style="list-style-type: none">○ Especially poor UI for target demographic (older adults)● Health data raises extra concerns for security and privacy

log of critical incidents: parent 1

Incident	Severity
Thought the learning journey map went top-to-bottom instead of bottom-to-top	1
Confused by the truth or dare game "how to" screen initially but then understood it	1
Confused whether reflection based on game or learning	2

log of critical incidents: parent 2

Incident	Severity
Confused by the scrapbook page where they didn't know where to go if they didn't have any memories yet (“collect more of what?”, “so what do i click?”)	3
Clicked on locked game 2	2
Clicked “next” for dare instead of “flip for dare” - button wasn't clear enough	1
Confused about how to flip through the scrapbook - “how do i flip then?”	3

log of critical incidents: child 1

Incident	Severity
Confused if there is a back button so they could see the question again once they saw the “wrong” banner	2
Zero wrong clicks	0
Understood that the reflection would be for the game	0
Understood the purpose of the learning module	0

log of critical incidents: child 2

Incident	Severity
“Would want to scroll down to see how long this entire thing is” (about the learning journey map)	0
“Helpful if there was a speed-up option” (about learning module video)	1
Was confused about what memory was being added to the scrapbook	2

script

Facilitator: "Hi how are you? We'd like for you to try out a low fidelity prototype of an app that we're working on designing. The goal of the app is to help enhance connection between parents and children."

Facilitator: "To use our prototype, it would be great if you could just pretend that these pieces of paper in front of you were a phone screen. From there, just use the app freely, tapping on the paper where you would imagine tapping on a real screen."

Facilitator: "We'll be tracking some things as we go, like where you click and any impressions you might have- so don't mind us taking notes." Facilitator: "We want to see both how you engage with the app naturally, and how easy it might be for you to complete certain more specific tasks when you're aware of the goal. Please think out loud. First, we'd like to see you do a learning module."

Facilitator: "Great! Now, we'd like to see you play a game."

Facilitator: "Great! Now, we'd like to see you reflect."

Facilitator: "How likely are you to do each thing we tried today 1-10?"