



Pebble

1. Team



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2. Introduction

Value Proposition — “Learn more for your growing family!”

Mission Statement — Our goal is to ensure both partners in a pregnancy not only feel supported themselves, but also feel equipped to holistically support one another throughout the pregnancy journey.

Problem/Solution Overview — Pregnant people often wish their partners were more connected to the pregnancy process, and likewise, partners wish they had access to information to carry out their own research and better understand how they can be of support. Pebble is an app designed for pregnant individuals' partners to easily acquire digestible information, tips, and recommendations customized for them.

3. Sketches

UI Sketches (5 Design Ideas with 19 Sketches)

We brainstormed across various design directions, centering around mobile apps, games, streaming content, chatbots/voice assistants, and immersive AR/VR settings.

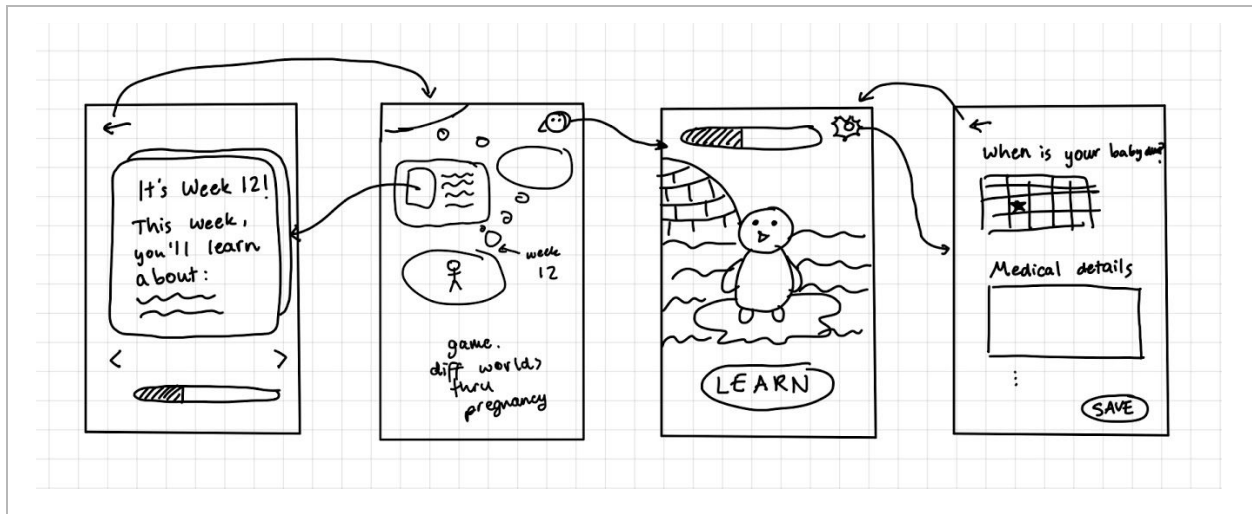


Figure 1. Gamified, World-Hopping Mobile Learning

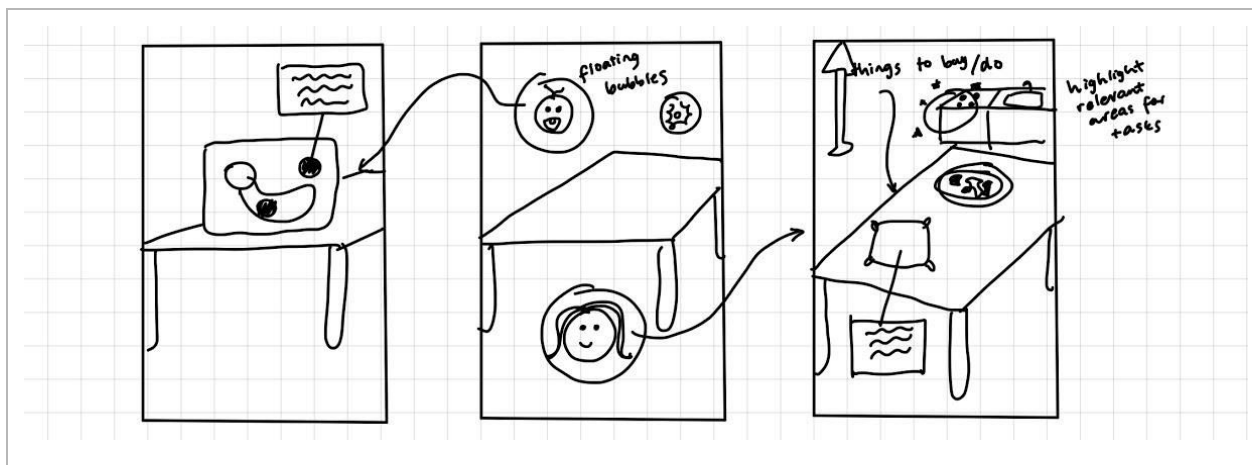


Figure 2. Interactive AR Mobile Learning/Exploration Interface

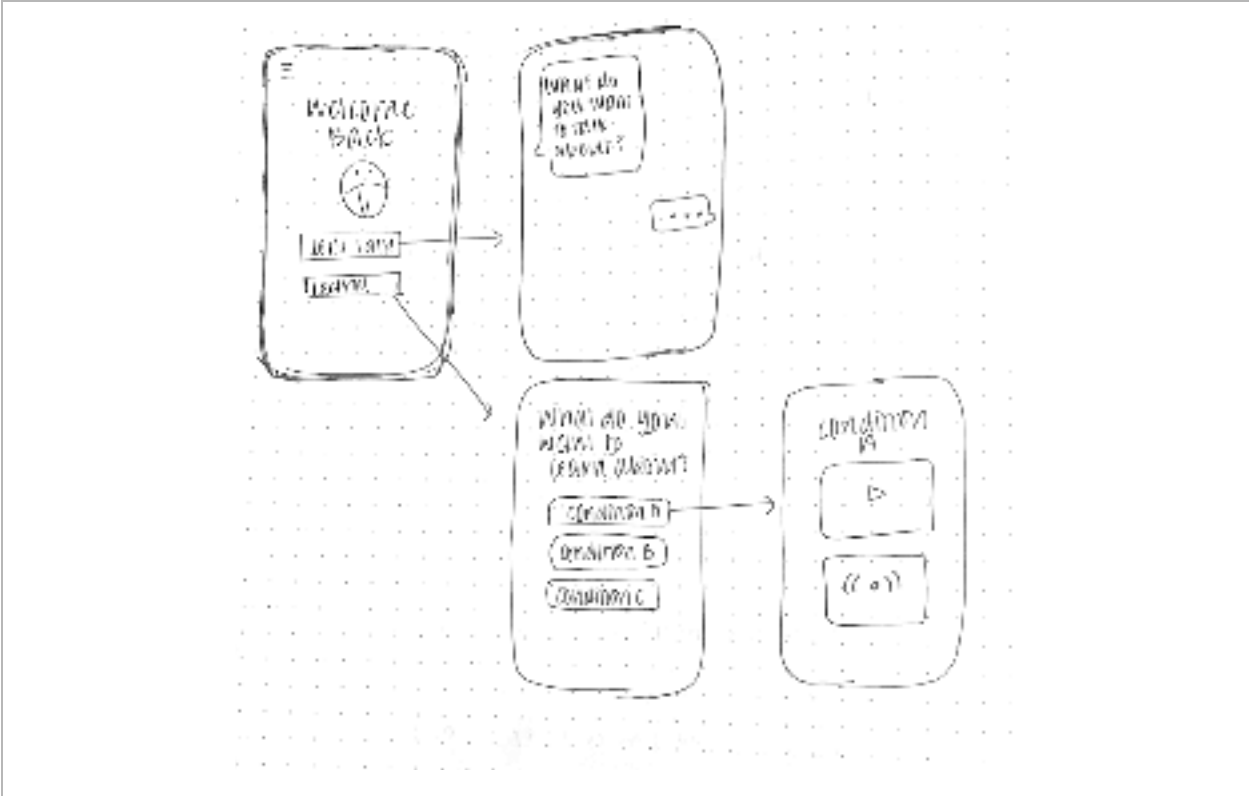


Figure 3. Chatbot Mobile App Interface, with options for a chatbot to learn or simply video/audio content

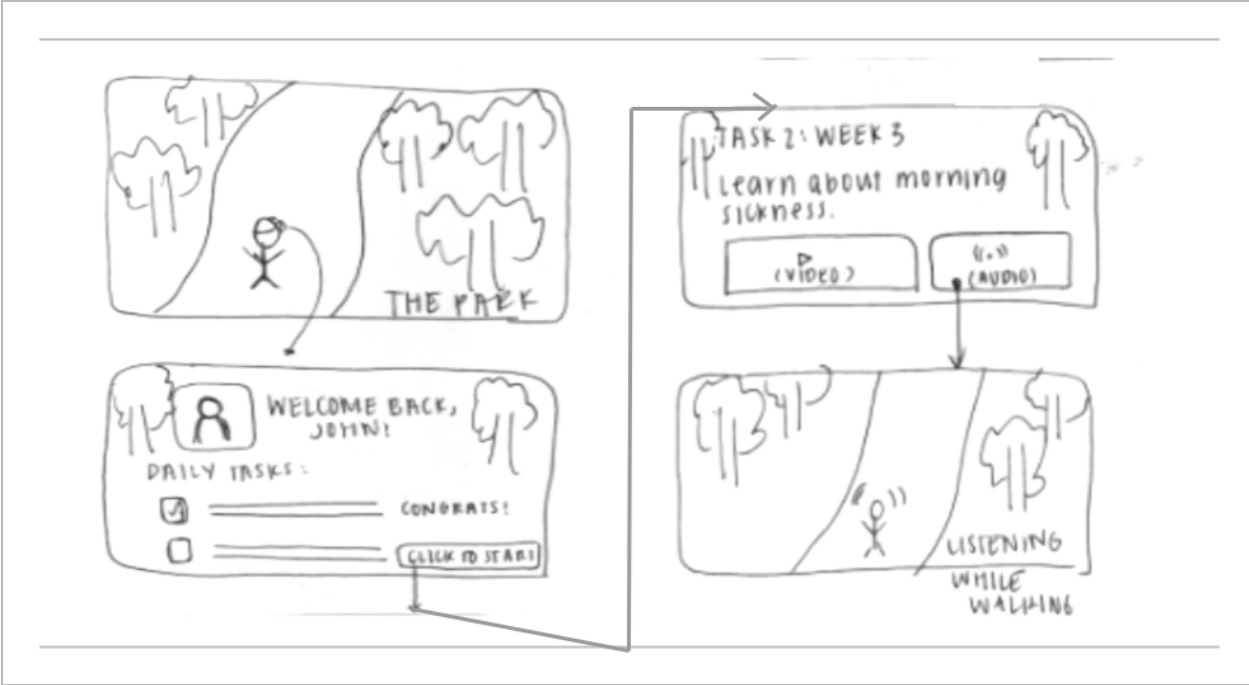


Figure 4. Immersive AR/VR Learning Interface (Requiring an Oculus-like headset)

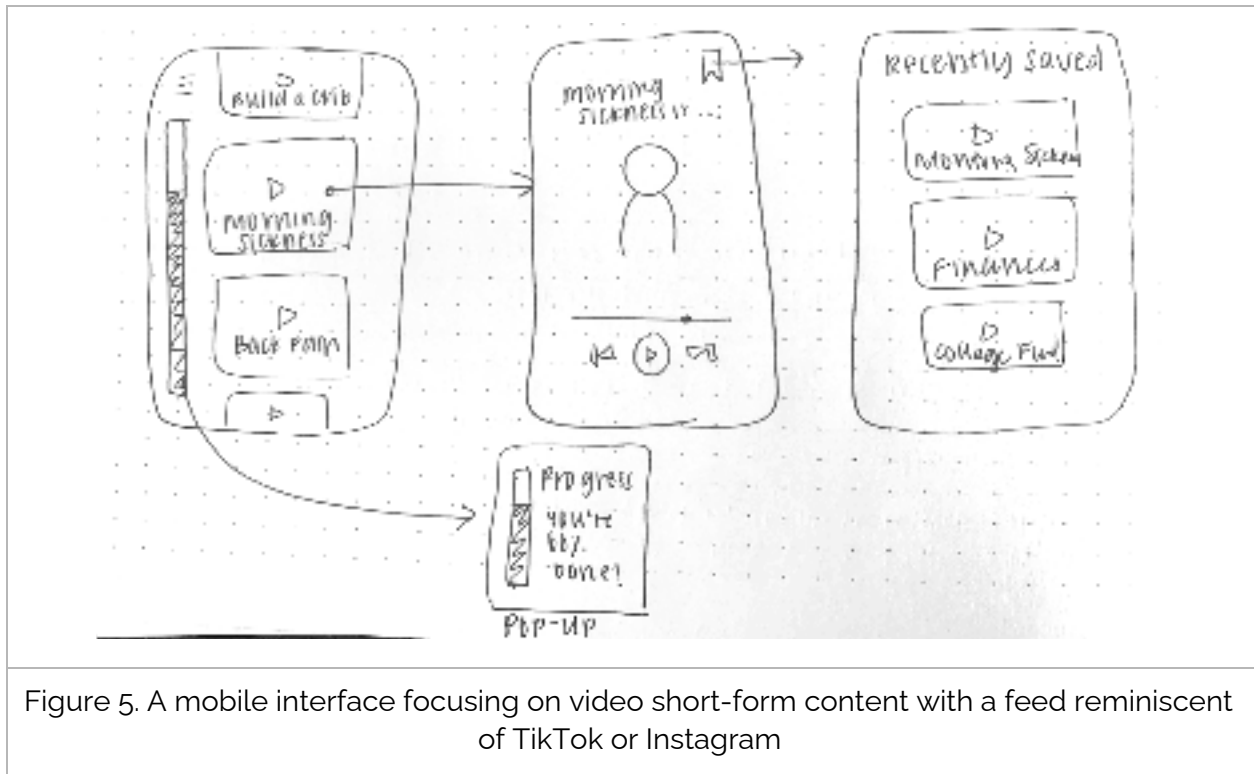
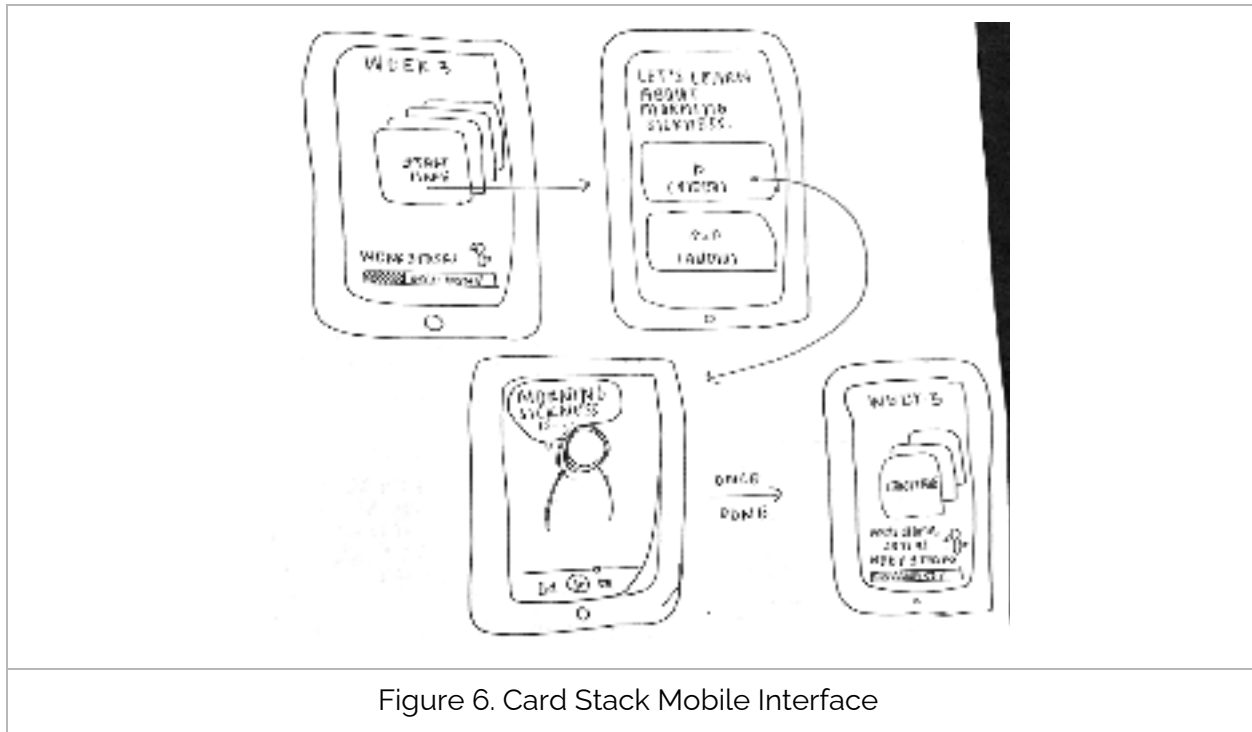


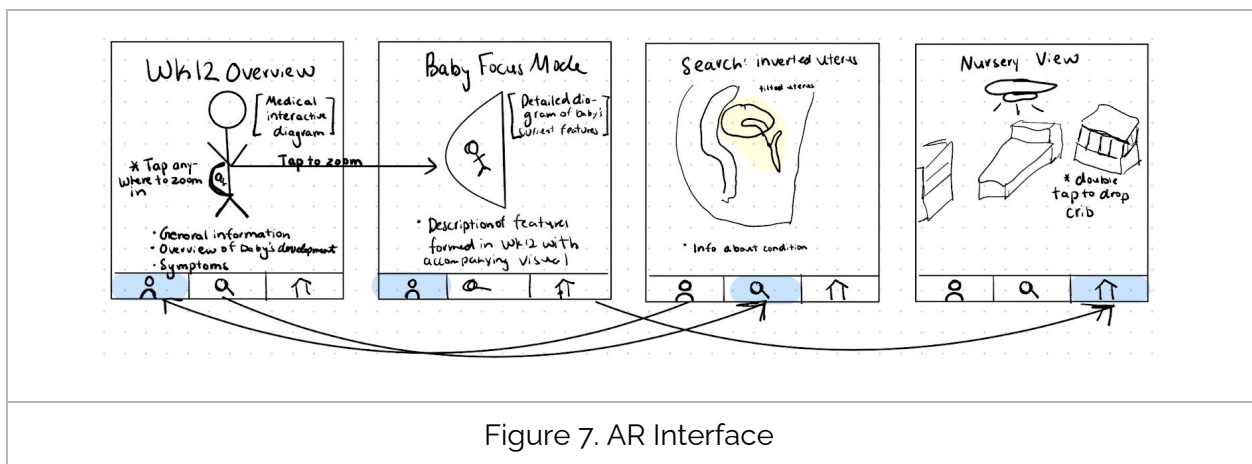
Figure 5. A mobile interface focusing on video short-form content with a feed reminiscent of TikTok or Instagram

Top Two Designs

The top designs we chose were a *Card Stack Mobile Interface* and an *AR Interface*. Below are detailed storyboards for these two designs.



In the Card Stack Mobile Interface (Figure 6), partners can swipe through card stacks for each week. Each card will provide information in digestible, engaging modes such as audio/video.

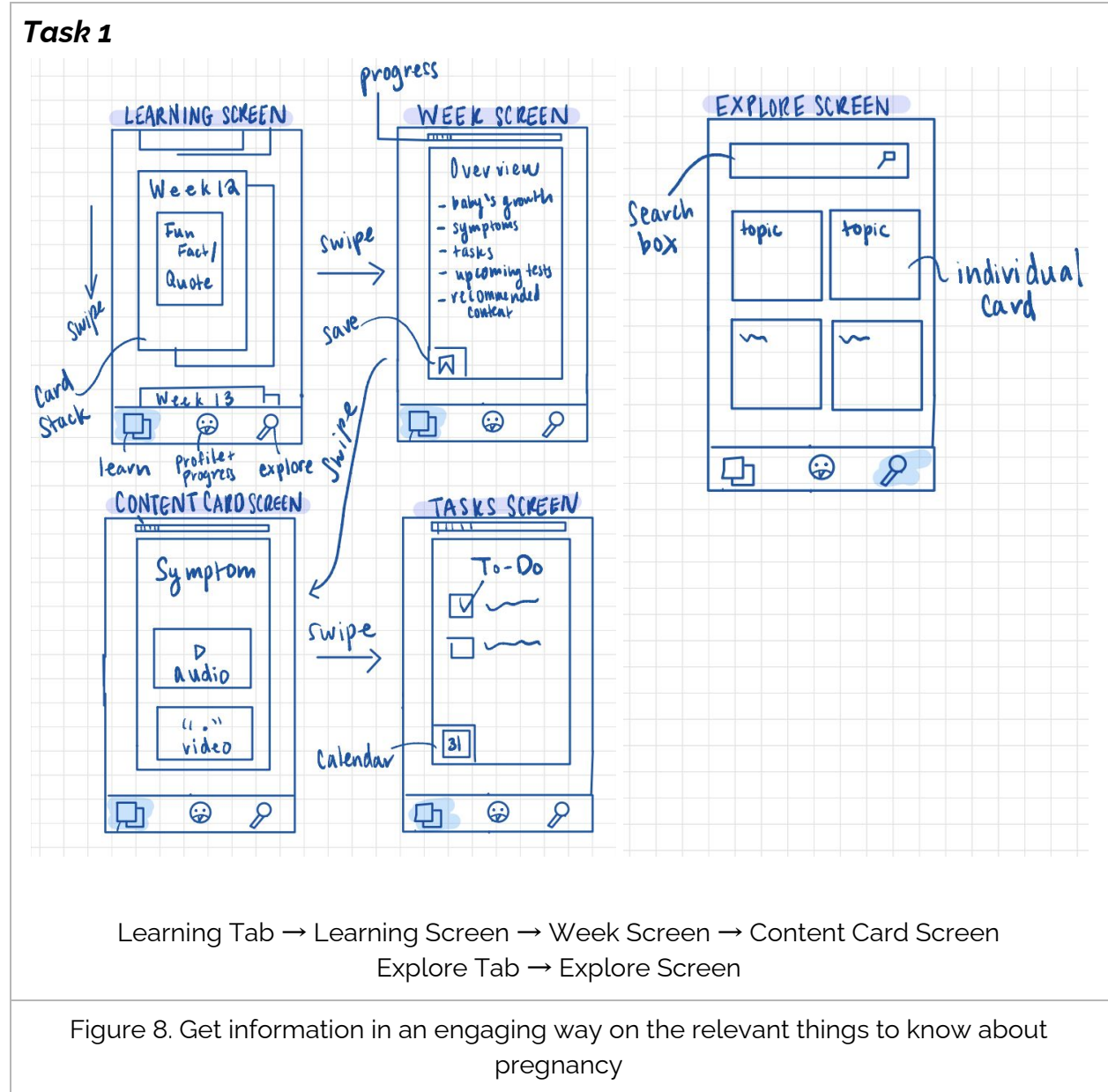


In the AR Interface (Figure 7), partners can learn more about their baby's development, search for information on specific topics, and plan out their baby's nursery in AR.

4. Selected Interface Design

Storyboard for 3 Tasks

*Highlighted icons indicate the tab the user is currently on



Task 2

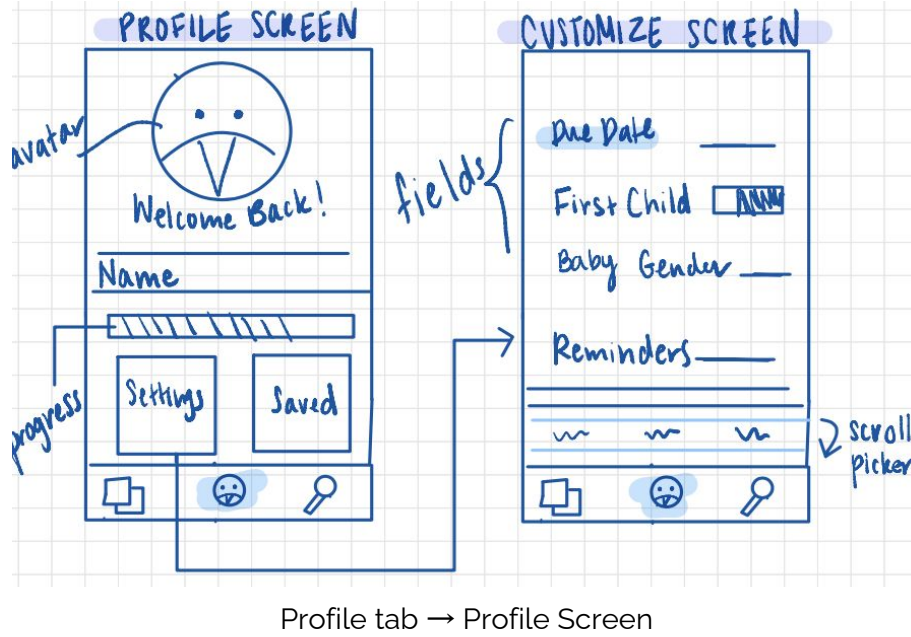


Figure 9. Understand your learning progress to build confidence

Task 3

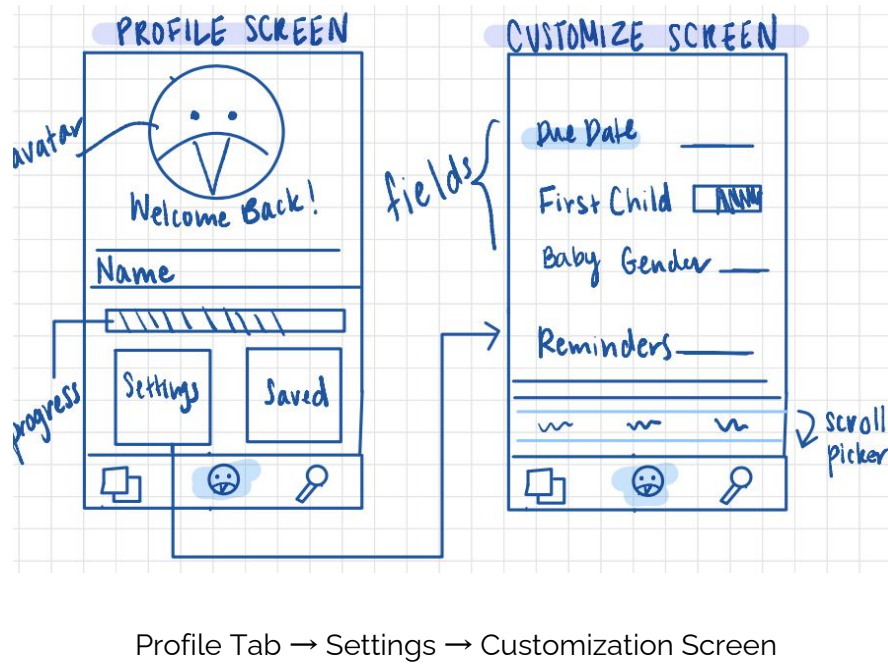
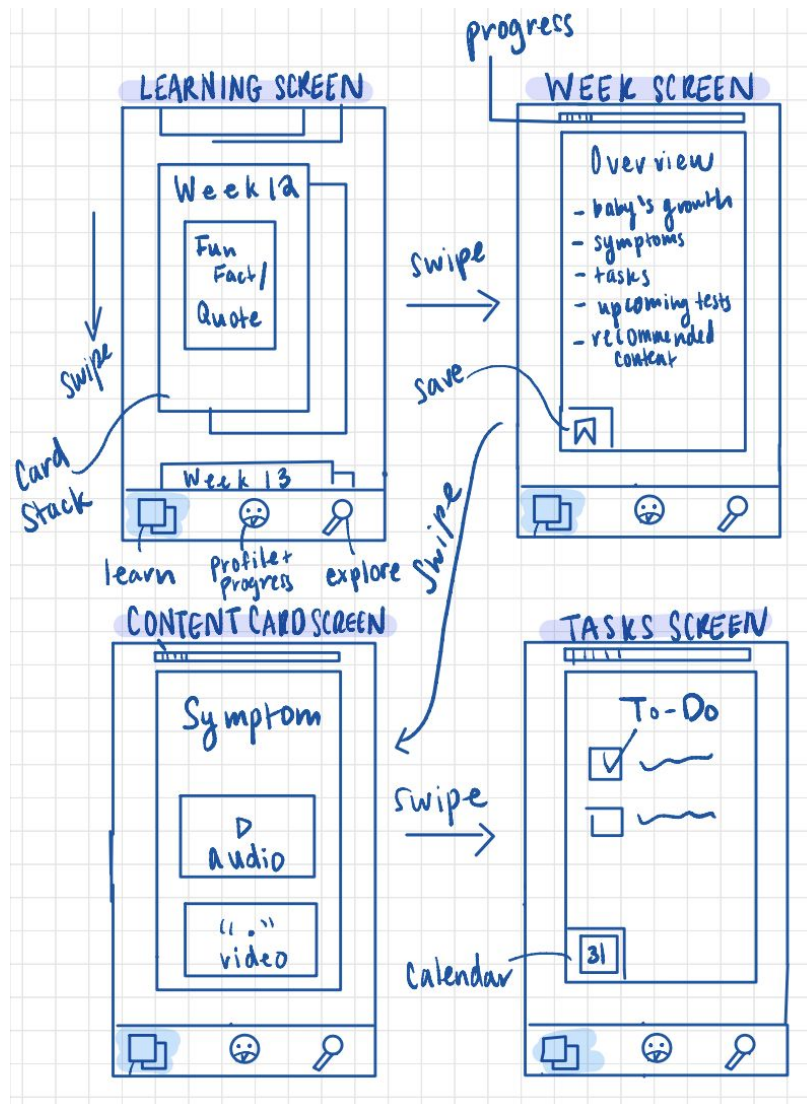


Figure 10. Personalize your recommendations by providing individual background

Task 4



Learning Tab → Learning Screen → Task Screen

Figure 11. Complete different categories of recommended relevant tasks offline, including emotional well-being practices and logistical tasks

Reasoning For Selection

Mobile Interface

PROS	CONS
Parallels female-centered pregnancy apps so partners can feel connected	Less immersive than AR, so it could be harder to learn information
Can host different forms of media for multimodal learning	Less detailed visualization for learning about medical conditions
Easily usable/accessible in different locations, can be transported easily	Not as engaging/eye-catching as an AR solution
Mobile learning format is familiar/intuitive	

AR Interface with Glasses/Headset

PROS	CONS
Detailed visualization is helpful for learning (especially medical conditions)	Not conveniently usable (eg: would be inconvenient to use in a car/store)
Engaging and interactive	Limited by what is visualizable in AR/VR
	Barrier to entry (less intuitive to use) and more expensive

Based on these factors, we decided a mobile application would be best, based on cost, accessibility and practicality.

We wanted to optimize accessibility because Pebble is tailored for learning in bite-sized chunks, such as while standing in a checkout line, commuting, etc. In these situations, an AR/VR-based system wouldn't be accessible due to set-up times and transportation burden. Furthermore, most of our interviewees expressed financial concerns and AR/VR hardware would impose significant financial burden.

Additionally, for presenting data-driven information (a prominent unmet need in our user interviews), mobile interfaces are able to present text and visuals more effectively than AR/VR.

5. Prototype description

Our prototype is reminiscent of other mobile apps, allowing users to learn about the pregnancy journey through cards of information with tasks and other logistics/emotional support. It uses familiar gestures like swipes and taps, but is novel compared to other market applications in catering relevant digested information to the partner.

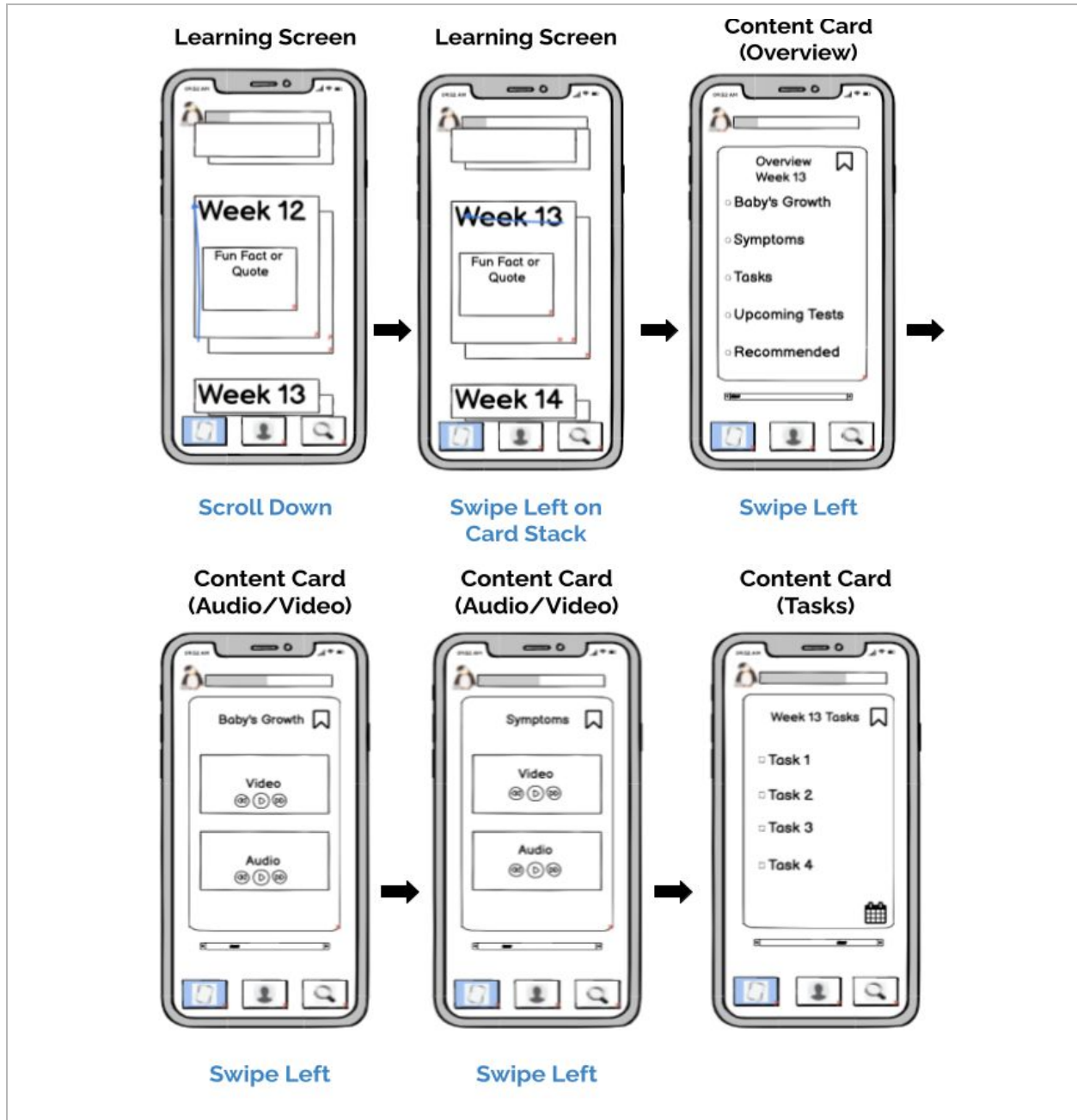


Figure 12. Navigate through the weeks
Go through information in the content card stack for Week 13

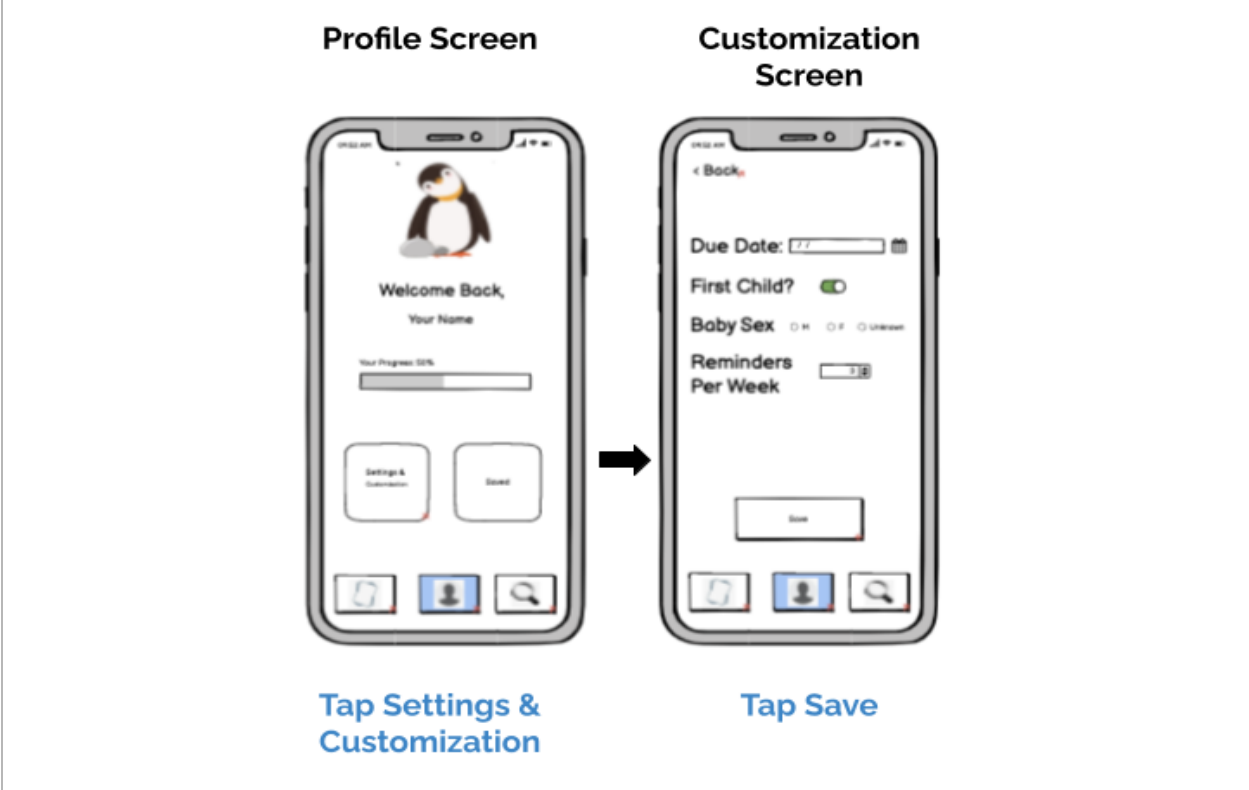


Figure 13. Edit background information to receive customized recommendations
View current progress in pregnancy

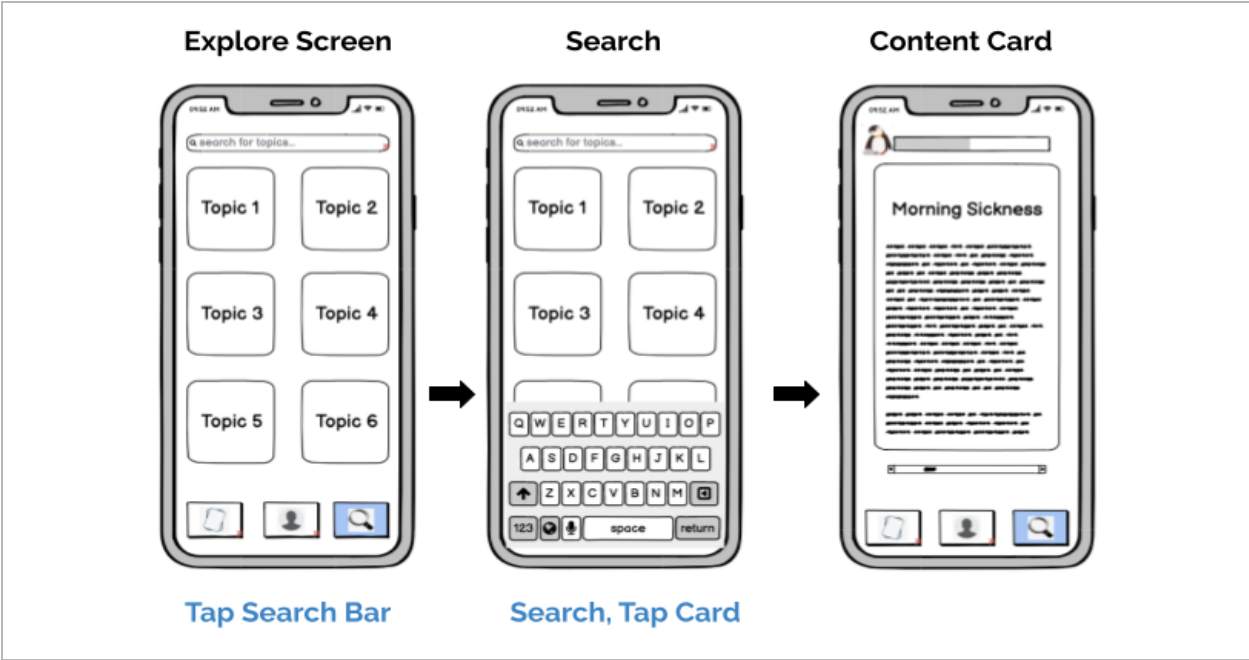


Figure 14. Search for specific information or topic

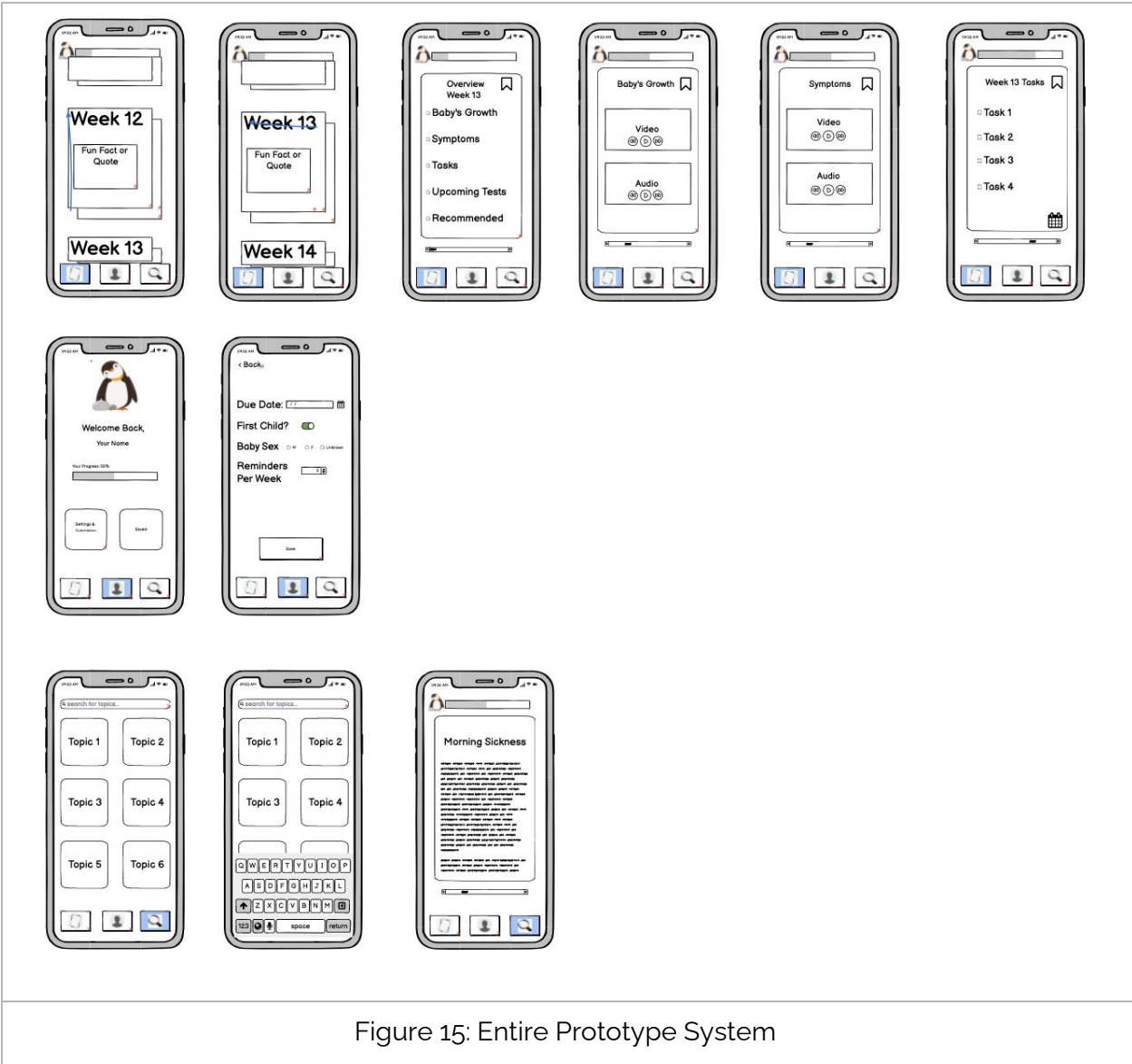


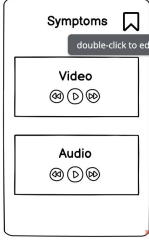


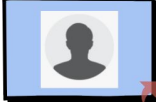







Figure 15: Entire Prototype System

Description of Main Component

Element	Functionality	Look
Learning Tab	Houses all card decks and modules	

<p>Card Stack</p>	<p>User can swipe left to reveal more content cards in the stack for that week.</p>	
<p>Content Card</p>	<p>Each card contains relevant information. Cards have audio, video, text, or checklists of tasks. Cards are accessible through the week stacks or Explore screen results.</p>	
<p>Save Button</p>	<p>User can save a card to revisit.</p>	
<p>Video/Audio Button</p>	<p>Allows user to view multimedia and pause/rewind/fast-forward content.</p>	
<p>Profile Tab</p>	<p>Brings user to the Profile Screen.</p>	
<p>Progress Bar</p>	<p>Allows user to view their current progress.</p>	
<p>Settings & Customization Button</p>	<p>Brings user to Customization Screen.</p>	
<p>Saved Button</p>	<p>Brings user to their saved cards.</p>	
<p>Customization Screen</p>	<p>Allows user to update information related to their pregnancy for personalized recommendations.</p>	

Explore Tab	Brings user to Explore Screen.	
Search Bar	Allows user to search for distinct terms.	<input type="text" value="Search for topics..."/>
Topic Cards	Provides user with topics cards based on search	<div style="border: 1px solid black; border-radius: 10px; padding: 10px; text-align: center;">Topic 1</div>

6. Testing Methodology

Participants & Environment

To find partners of pregnant people, we posted on subreddits like r/daddit, r/predaddit, and r/babybump. Due to COVID-19, user interviews were conducted over Zoom. We compensated participants with a \$5 Starbucks gift card.

We interviewed expecting dads from a variety of age ranges and experiences with pregnancy.

- Andy*, a DJ/project manager at a pharmaceutical company whose wife is 17 weeks pregnant with their second child
- Doug*, a freelance writer whose wife is 12 weeks pregnant with their first child
- Matthew*, an analytical chemist in his fifties whose wife is pregnant with her first child (his second)

* Modified names were used to protect our participants' privacy.

Tasks

1. Find information on your tasks for Week 13 [testing Learn tab]
2. Edit your background information to receive customized recommendations [testing Profile tab]
3. Find information about morning sickness [testing Explore tab]

Testing Procedure

We began by receiving consent for the interview, then giving participants an overview of the class, the problem we're addressing, and our app idea. Afterwards, one of our team members shared their screen with our low-fi prototype, and remotely controlled the prototype as the participant interacted with it.

We asked participants to complete each of our three tasks sequentially, thinking aloud as they did. If they started clicking/swiping/etc. the wrong way, we asked them why they had

thought to do so. After each task was completed, we asked for feedback about what was intuitive or confusing.

We concluded by debriefing and giving the participant space to suggest changes or new features for Pebble.

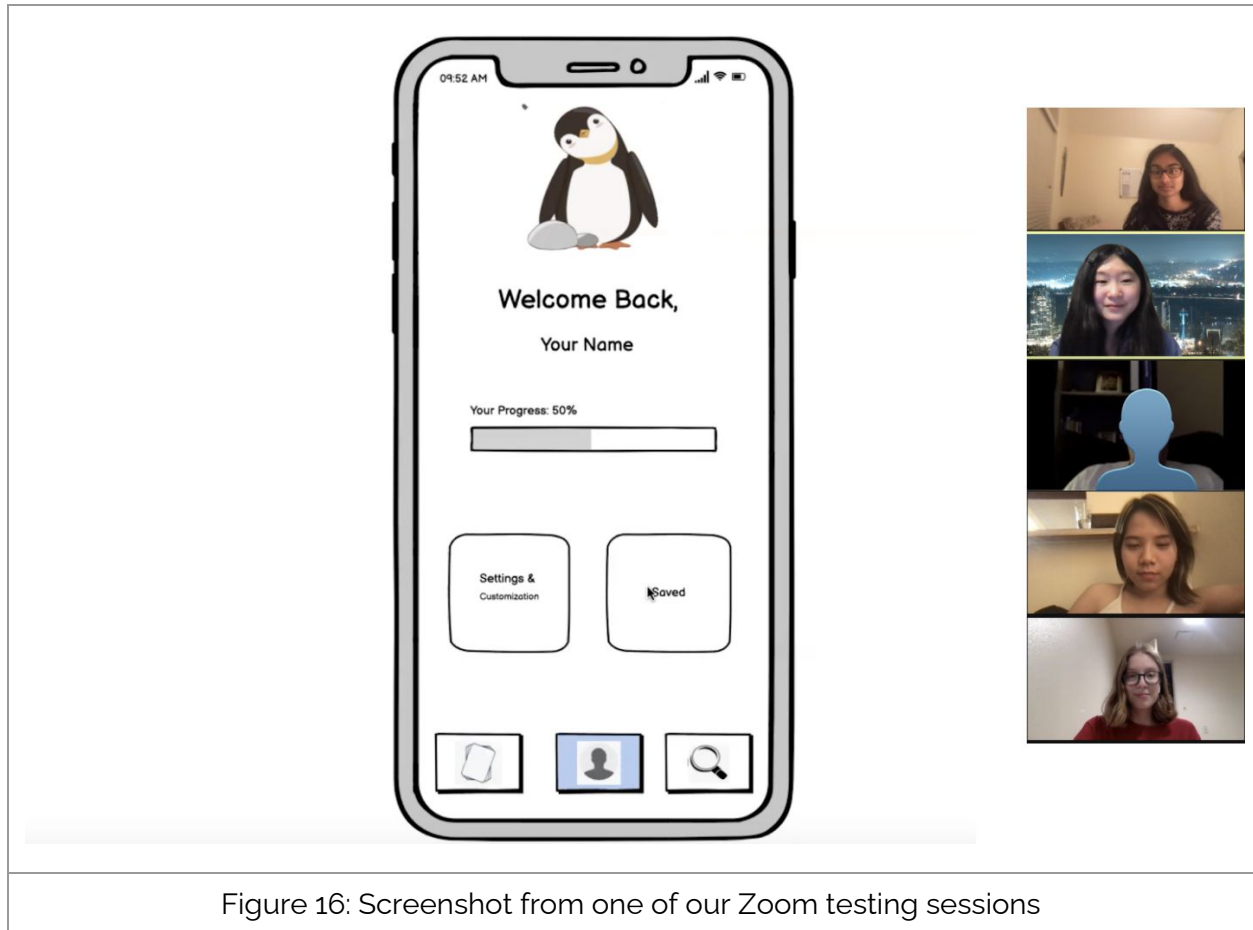


Figure 16: Screenshot from one of our Zoom testing sessions

Metrics

- Time spent completing task
- Number of times user went to wrong screen or tried an incorrect gesture
- Uncertainty/hesitation in completing task
- Observing facial expressions and what users said

Roles

- Observer: Grace
- Facilitator: Nadin
- Greeter: Jessica
- Computer: Divya

7. Results

All participants were able to complete the three tasks.

For the *first task*, participants were instructed to imagine they were the partner of someone 13 weeks pregnant and find information about tasks they needed to complete. To carry this out, they needed to first swipe up to reach the week 13 card stack, then swipe left to reach the tasks card. Participants struggled with the second part of this task (swiping left to find the tasks).

For the *second task*, participants were instructed to edit their background information so they could customize recommendations. All three participants found it intuitive to click on the profile icon and navigate to the settings/customization page.

For the *third task*, participants were instructed to find information about morning sickness. They all found it intuitive to click the search icon then search for the phrase "morning sickness" in the search bar.

Task Execution Timings

	Task 1	Task 2	Task 3
Andy	10+35 sec	5 sec	5 sec
Doug	10+80 sec	20 sec	25 sec
Matthew	15+120 sec	20 sec	30 sec
Average	12+78 sec	15 sec	20 sec

Table 1: Timings of task execution. For task 1, the first number is the amount of time to reach the week 13 deck and the second number is the amount of time from the week 13 deck to reach the week 13 tasks card.

8. Discussion

Overall, our design was dubbed fun and intuitive. Participants were able to interact with the app in a similar manner to what we intended and responded well to the workflow. Users were interested in the bite-sized chunks of information, the presence of to-do lists, the presence of a progress bar, and the personalization of tasks per week.

All tasks were successfully completed by the users. The biggest area of needed improvement is in Task 1, which proved to be the most unintuitive: while participants easily understood the swipe up functionality, they didn't automatically think to swipe left to reach the information/tasks page from the Learn tab. Instead, they tried tapping on the card stack

to reach the next screen. In contrast, Tasks 2 and 3 were a lot more intuitive because they used a workflow that is very typical for mobile apps (profile page and explore).

This interview cycle gave us many new ideas. Participants all reaffirmed their desire for information tailored toward a partner audience. One participant noted that having weekly tasks may not be necessary, but instead suggested a structure of "early second trimester" or similar timeframes.

Interestingly, all interviewed partners wanted less developmental and medical details and more logistical and emotional advice. Suggested features from the interviewees included community ("One million percent I'd want community"); an emergency button for labor with doctor's phone number/instant-calling emergency contacts/directions to nearest hospital, nicknaming the baby in the customization bar, and clickable keywords.

Based on the feedback, we decided the three major UI changes we'll make are:

- replacing the swiping action to access cards with a tap to enlarge
- changing our progress bar referring to the percentage of pregnancy completed and clarifying its meaning by adding a baby icon on the right
- and implementing the emergency labor button.

Word count: 1476 words (without figure captions)

9. Appendices

- a. Consent form handed to participants

Consent Form

This student team is interviewing and observing as part of the coursework for Computer Science course CS 147 at Stanford University. Participants provide data that is used to understand the possible opportunities of the design. Data may be collected by interview, observation and questionnaire.

Participation in this experiment is voluntary. Participants may withdraw themselves and their data at any time without fear of consequences. Concerns about the experiment may be discussed with the researchers ([Divya Nagaraj](#), [Grace Zhang](#), [Jessica Yu](#), [Nadin Tamer](#)) or with Professor James Landay, the instructor of CS 147:

James A. Landay
CS Department
Stanford University
650-498-8215
landay at cs.stanford.edu

Participant anonymity will be maintained by the separate storage of names from data. Data will only be identified by participant number. No identifying information about the participants will be available to anyone except the student researchers and their supervisors/teaching staff.

I hereby acknowledge that I have been given an opportunity to ask questions about the nature of the research and my participation in it. I give my consent to have data collected on my behavior and opinions in relation to the Health & Wellness Team 5's research. I also give permission for images or audio/video recordings of me being interviewed to be used in presentations or publications, as long as I am not personally identifiable in the images/video. I understand that I may withdraw my permission at any time.

Name _____

Participant Number _____

Date _____

Signature _____

Witness name _____

Witness signature _____

b. Critical incident logs from interviews
Andy (#1)

Incident	Severity
Kept tapping on tasks and didn't understand he needed to swipe left	4
Said he'd want the content to be customized more than generic information	3
Felt like there was an extra step between the landing page and the task page	2
Expressed an "AHA" when he found the correct term after searching on explore	0
Really liked the typical workflows of the profile and explore page that he felt comfortable with	0
Said he was excited at how accessible this information was	0

Doug (#2)

Incident	Severity
Unable to initially identify left swipe to attain week information	4
Indicated that he might skip over baby's growth and symptoms	2
Said progress bar for tasks would make him feel less motivated	3
Excited about prospect of communal aspect to the app	0
Expressed excitement about existence of an app tailored to partner	0
Said progress bar for pregnancy progress would be motivating	0

Matthew (#3)

Incident	Severity
Kept tapping on card stack and title of the card to magnify; did not think to swipe left	4
Thought it was unnecessary to separate tasks by week, suggested a more general time frame instead	2
Was not very interested in learning about the medical aspects of pregnancy in lots of detail	1
Would like more content related to the mental health aspect of pregnancy, especially for partners	2
Found scrolling up/down between different weeks intuitive	0
Was able to easily find profile and search pages	0
Liked the idea of having tasks within the app & especially emphasized logistical considerations like car seats, cribs, health insurance etc.	0