Pebble

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Introduction

Over 40% of expecting fathers experience some form of stress over the course of their pregnancy, many of which report feeling overwhelmed and unsure how to best offer help (Colquhoun & Elkins, 2015). Yet despite this, the majority of pregnancy resources remained geared towards the pregnant individual, leaving their partners confused and in the dark about the process

We are Team Pebble 🐧, and our **mission** 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. To this end, we built Pebble: **the pregnancy app for partners**. We want to help you learn more for your growing family!

Value Proposition

— "Learn more for your growing family!"

Team

Divya N.	Jessica Y.	Nadin T.	Grace Z.
Designer + Developer	Designer + Developer	Designer + Developer	Designer + Developer

Problem and Solution Overview

Ultimately, we ended up focusing on the following problem: 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. The solution we developed was Pebble: an app designed for pregnant individuals' partners to easily acquire digestible information, tips, and recommendations customized for them.

We didn't start this process thinking that we would be developing an app for pregnant people's *partners*. To arrive at this solution, we underwent a rigorous needfinding/testing process to identify needs that existed and how we could best help solve them. Below, we will share with you the path we took to bring Pebble where it is today!

Needfinding Interviews

We started with an initial round of needfinding to uncover unmet needs in the realm of pregnancy. To begin this process, we interviewed a wide range of stakeholders, specifically targeting couples and individuals who met the following criteria:
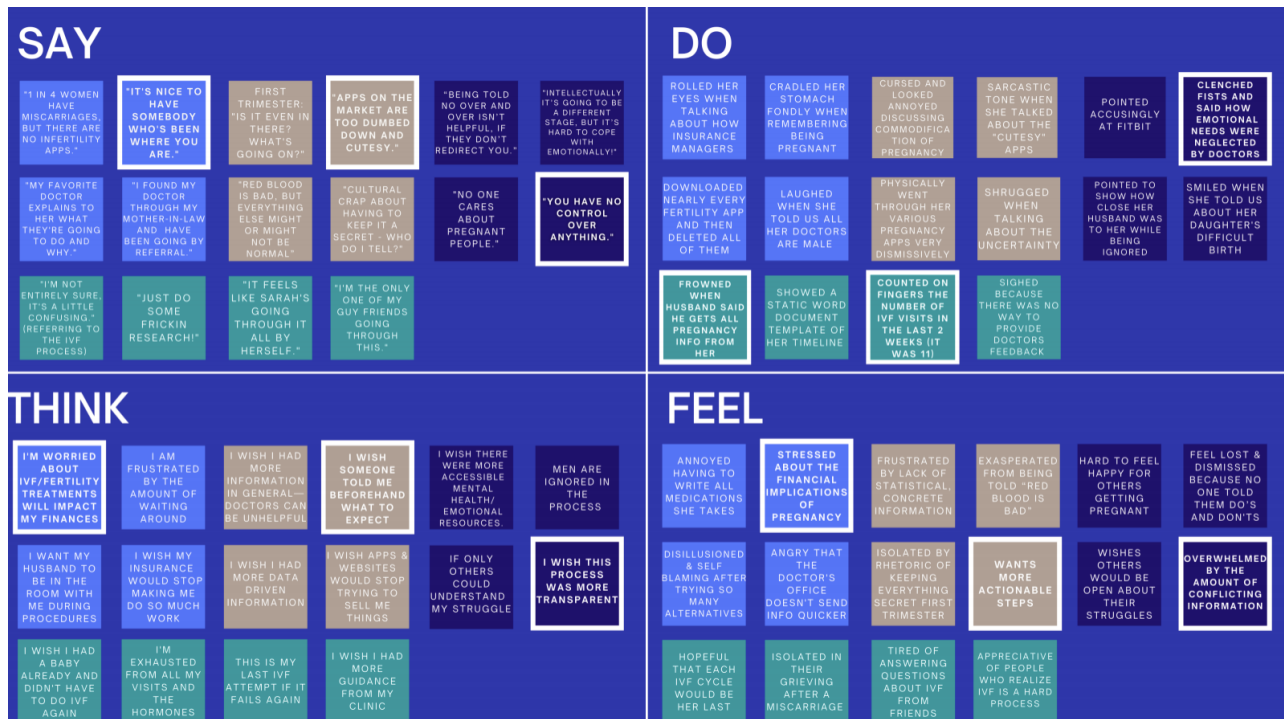1. people who are pregnant or are trying to get pregnant, as well as their partners
2. people at different stages in their pregnancy: pre-pregnancy, currently pregnant, and post-pregnancy
3. different types of pregnancies: IVF, disabilities, advanced maternal age, etc.

Collectively, we interviewed 5 individuals who were able to share their unique perspectives based on their backgrounds and experiences.

From these interviews, we gleaned a wide range of **insights** into the struggles and unmet needs of pregnancy, but five stood out to us as shared, overarching frustrations with the process. These five are listed below.

1. Many people feel frustrated by the lack of information and communication from doctors, representing a need for increased transparency and certainty about various aspects of pregnancy.
2. Aspiring parents want to be able to "do something" about their pregnancy to have some control in a new, unpredictable situation, and want to be given clear, actionable steps or strategies to make things better.
3. Pregnant people feel that the burden of educating their partner lies unduly on them, pointing to a resounding need for the non-pregnant partner in the process to gain awareness and have access to information more independently
4. People are frustrated with the emphasis on only positive aspects of pregnancy, and need to have people recognize that pregnancy is a difficult process and treat it (and them) seriously.
5. Accessibility to others who have been through a similar process helps people feel more secure informationally & emotionally connect with others who have gone through pregnancy.

Empathy Map

SAY

- "1 IN 4 WOMEN HAVE MISCARRIAGES, BUT THERE ARE NO INFERTILITY APPS."
- "IT'S NICE TO HAVE SOMEBODY WHO'S BEEN WHERE YOU ARE."
- FIRST TRIMESTER: "IS IT EVEN IN THERE? WHAT'S GOING ON?"
- "APPS ON THE MARKET ARE TOO DUMBED DOWN AND CUTESY."
- "BEING TOLD NO OVER AND OVER ISN'T HELPFUL, IF THEY DON'T REDIRECT YOU."
- "INTELLECTUALLY IT'S GOING TO BE A DIFFERENT STAGE, BUT IT'S HARD TO COPE WITH EMOTIONALLY!"
- "MY FAVORITE DOCTOR EXPLAINS TO HER WHAT THEY'RE GOING TO DO AND WHY."
- "I FOUND MY DOCTOR THROUGH MY MOTHER-IN-LAW AND HAVE BEEN GOING BY REFERRAL."
- "RED BLOOD IS BAD, BUT EVERYTHING ELSE MIGHT OR MIGHT NOT BE NORMAL."
- "CULTURAL CRAP ABOUT HAVING TO KEEP IT A SECRET - WHO DO I TELL?"
- "NO ONE CARES ABOUT PREGNANT PEOPLE."
- "YOU HAVE NO CONTROL OVER ANYTHING."
- "I'M NOT ENTIRELY SURE, IT'S A LITTLE CONFUSING." (REFERRING TO THE IVF PROCESS)
- "JUST DO SOME FRICKIN RESEARCH!"
- "IT FEELS LIKE SARAH'S GOING THROUGH IT ALL BY HERSELF."
- "I'M THE ONLY ONE OF MY GUY FRIENDS GOING THROUGH THIS."

DO

- ROLLED HER EYES WHEN TALKING ABOUT HOW INSURANCE MANAGERS
- CRADLED HER STOMACH FONDLY WHEN REMEMBERING BEING PREGNANT
- CURSED AND LOOKED ANNOYED DISCUSSING COMMODIFICATION OF PREGNANCY
- SARCASTIC TONE WHEN SHE TALKED ABOUT THE "CUTESY" APPS
- POINTED ACCUSINGLY AT FITBIT
- CLENCHED FISTS AND SAID HOW EMOTIONAL NEEDS WERE NEGLECTED BY DOCTORS
- DOWNLOADED NEARLY EVERY FERTILITY APP AND THEN DELETED ALL OF THEM
- LAUGHED WHEN SHE TOLD US ALL HER DOCTORS ARE MALE
- PHYSICALLY WENT THROUGH HER VARIOUS PREGNANCY APPS VERY DISMISSIVELY
- SHRUGGED WHEN TALKING ABOUT THE UNCERTAINTY
- POINTED TO SHOW HOW CLOSE HER HUSBAND WAS TO HER WHILE BEING IGNORED
- SMILED WHEN SHE TOLD US ABOUT HER DAUGHTER'S DIFFICULT BIRTH
- FROWNED WHEN HUSBAND SAID HE GETS ALL PREGNANCY INFO FROM HER
- SHOWED A STATIC WORD DOCUMENT TEMPLATE OF HER TIMELINE
- COUNTED ON FINGERS THE NUMBER OF IVF VISITS IN THE LAST 2 WEEKS (IT WAS 11)
- SIGHED BECAUSE THERE WAS NO WAY TO PROVIDE DOCTORS FEEDBACK

THINK

- I'M WORRIED ABOUT IVF/FERTILITY TREATMENTS WILL IMPACT MY FINANCES
- I AM FRUSTRATED BY THE AMOUNT OF WAITING AROUND
- I WISH I HAD MORE INFORMATION IN GENERAL—DOCTORS CAN BE UNHELPFUL
- I WISH SOMEONE TOLD ME BEFOREHAND WHAT TO EXPECT
- I WISH THERE WERE MORE ACCESSIBLE MENTAL HEALTH/ EMOTIONAL RESOURCES.
- MEN ARE IGNORED IN THE PROCESS
- I WANT MY HUSBAND TO BE IN THE ROOM WITH ME DURING PROCEDURES
- I WISH MY INSURANCE WOULD STOP MAKING ME DO SO MUCH WORK
- I WISH I HAD MORE DATA DRIVEN INFORMATION
- WISH APPS & WEBSITES WOULD STOP TRYING TO SELL ME THINGS
- IF ONLY OTHERS COULD UNDERSTAND MY STRUGGLE
- I WISH THIS PROCESS WAS MORE TRANSPARENT
- I WISH I HAD A BABY ALREADY AND DIDN'T HAVE TO DO IVF AGAIN
- I'M EXHAUSTED FROM ALL MY VISITS AND THE HORMONES
- THIS IS MY LAST IVF ATTEMPT IF IT FAILS AGAIN
- I WISH I HAD MORE GUIDANCE FROM MY CLINIC

FEEL

- ANNOYED HAVING TO WRITE ALL MEDICATIONS SHE TAKES
- STRESSED ABOUT THE FINANCIAL IMPLICATIONS OF PREGNANCY
- FRUSTRATED BY LACK OF STATISTICAL, CONCRETE INFORMATION
- EXASPERATED FROM BEING TOLD "RED BLOOD IS BAD"
- HARD TO FEEL HAPPY FOR OTHERS GETTING PREGNANT
- FEEL LOST & DISMISSED BECAUSE NO ONE TOLD THEM DO'S AND DON'TS
- DISILLUSIONED & SELF BLAMING AFTER TRYING SO MANY ALTERNATIVES
- ANGRY THAT THE DOCTOR'S OFFICE DOESN'T SEND INFO QUICKER
- ISOLATED BY RHETORIC OF KEEPING EVERYTHING SECRET FIRST TRIMESTER
- WANTS MORE ACTIONABLE STEPS
- WISHES OTHERS WOULD BE OPEN ABOUT THEIR STRUGGLES
- OVERWHELMED BY THE AMOUNT OF CONFLICTING INFORMATION
- HOPEFUL THAT EACH IVF CYCLE WOULD BE HER LAST
- ISOLATED IN THEIR GRIEVING AFTER A MISCARRIAGE
- TIRED OF ANSWERING QUESTIONS ABOUT IVF FROM FRIENDS
- APPRECIATIVE OF PEOPLE WHO REALIZE IVF IS A HARD PROCESS

POV & Experience Prototypes

After identifying these preliminary needs, we began the process of developing user "Point of Views" and experience prototypes to get a clearer picture of how we could help pregnancy stakeholders. We developed the following POVs for our three interviews, and came up with How Might We questions to guide our solution brainstorming:

POV #1
WE MET: Sarah and Dan, a couple trying to conceive through their third round of IVF after having a miscarriage last year

WE WERE AMAZED TO REALIZE: Because he finds the process overwhelming, Dan got most of his pregnancy related information by asking Sarah, despite her explicit frustration towards loved ones not doing their own research

IT WOULD BE GAME-CHANGING TO: Help Dan support his wife by motivating him to independently learn more about IVF

How Might We's:
- How might we help the non-pregnant partner feel more involved in IVF/pregnancy-related healthcare, especially during the COVID pandemic?
- How might we help the non-pregnant partner get relevant and timely information?
- How might we make sources of information for non-pregnant partners more easily digestible and less overwhelming?
- How might we make researching pregnancy/fertility as a partner engaging instead of overwhelming?

POV #2
WE MET: Emily, a waitress/grad student of advanced maternal age currently 12 weeks pregnant with her first child

WE WERE AMAZED TO REALIZE: Emily turns to friends and online communities for information and support because she feels like she is not getting enough from traditional sources (doctor, pregnancy apps, etc), but worries about the reliability of non-medical sources

IT WOULD BE GAME-CHANGING TO: Help Emily reap the combined benefits of community support and the reliable information she receives from doctors

How Might We's:
- How might we augment trust and increase the flow of verified information on online pregnancy/fertility support communities?

- How might we use online communities to supplement pregnant individuals' potential unmet needs in their personal network?
- How might we help Emily feel supported in her pregnancy healthcare journey by ensuring she has enough information at each step?

POV #3
WE MET: Laura, a woman currently 10 weeks pregnant with her second child after having a toddler son with serious heart complications

WE WERE AMAZED TO REALIZE: Laura's old coping mechanisms were rendered ineffective due to the added stress and unfamiliar situation of her pregnancy, but multiple psychologists could not provide new methods that were applicable to her as a pregnant individual.

IT WOULD BE GAME-CHANGING TO: Equip Laura with actionable strategies catered to pregnancy that she can independently practice to support her mental health and emotional wellbeing

How Might We's
- How might we make emotional wellbeing practices for pregnant people more accessible?
- How might we better connect Laura to an attentive support network for help?
- How might we allow pregnant individuals to build their own methods for maintaining their emotional wellbeing?
- How might we leverage a support network to help pregnant people develop coping strategies?
- How might we help Laura repurpose her former coping strategies to better fit the new set of struggles she faces in pregnancy?

Based on these POVs and HMW's, we brainstormed a diverse array of solutions. These are the three we were most excited about:

TOP 3 SOLUTIONS
- HMW: How might we make researching pregnancy/fertility as a partner engaging instead of overwhelming?
  - SOLUTION: Deliver information in bite-sized chunks via a gamified format (ie: Tiktok or Duolingo for pregnant people's partners)
- HMW: How might we augment trust and flow of verified information on online pregnancy/fertility support communities?
  - SOLUTION: Create a filterable, data-driven community for pregnancy/fertility
- HMW: How might we help Laura repurpose her former coping strategies to better fit the new set of struggles she faces in pregnancy?

- ○ SOLUTION: Develop a tailored coping strategy recommender based on strategies the user already gravitates towards (ie: suggest art if user can no longer dance)

Using these solutions, we wanted to test our assumptions to understand which solutions would work best for our end users. With this in mind, we created the following experience prototypes.

EXPERIENCE PROTOTYPES
- *Prototype 1.* For our first solution, we assumed that people absorb new content about pregnancy better when it's presented in accessible chunks and in an engaging manner. To test this theory, our interviewees watched a series of educational pregnancy TikToks over Zoom (our experience prototype), and reflected afterwards about what they learned, what they remembered, as well as their level of interest. From the responses of our interviewees, we discovered that our assumption was supported, with visual aids specifically cited as being extremely helpful for visualizing abstract concepts. We also noticed that while people retained information better when positive emotions such as laughter were evoked, there needed to be a balance in the level of engagement so users are not distracted from the actual content. A caveat we discovered with this form of content presentation was that some interviewees felt skeptical of information in videos when they felt the poster lacked credentials or verification.

- *Prototype 2.* In the context of finding online pregnancy communities, we assumed users would be more open to sharing personal details when anonymous and would be more likely to trust answers linked to a verified user. To test this assumption, we created an experience prototype that explored how users perceived reliability in different contexts. We developed a survey that asked users to rate how trustworthy they felt various mock posts were, and then asked them to create posts of their own under different privacy settings. Our results largely validated our assumption, with interviewees rating posts from verified user "dr.jill" twice as trustworthy compared to other posts, and responding that they would feel safer asking personal questions anonymously. However, a surprising observation we came across was that while users preferred to post *questions* anonymously, they were impartial to *answering* with their name attached. Furthermore, interviewees emphasized that online communities were not simply places for them to exchange information and ideas, but also a crucial source of emotional support.

- *Prototype 3.* Based on the assumption that it is easier for pregnant people to stick to mental health habits that resemble what they're used to, we ideated a tailored coping strategy recommender that would suggest methods based on the ones the user already gravitates towards. To assess this assumption, we developed a digital experience prototype that had users fill out a form comparing the effectiveness and

emotions surrounding their pre-pregnancy and pregnancy coping strategies. This experiment confirmed our assumptions, as users lamented their new coping mechanisms provided less comfort than their previous one: we saw a noticeable pattern of users trying repeatedly to return to old coping mechanisms they had initially given up due to their pregnancy. A new insight that surfaced was people often contradicted themselves in their responses, indicating potential confusion around managing their emotional health. An observation that piqued our interest was that many pregnant people prioritize self care for the sake of their baby more than for their own benefit.

Design Evolution

Solution

Based on our user interviews, we identified a key widely shared frustration in the realm of pregnancy: 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. From prototype 1, we inferred that one particularly effective method of making pregnancy education engaging and accessible was the use of multimodal learning—particularly, video and visual content targeted towards the partner's demographic. Thus, the final solution we developed was a mobile app designed for pregnant individuals' partners to easily acquire digestible information, tips, and recommendations customized for them.

We identified the following key tasks that we wanted to include in the app:

Tasks
- *Task 1 (Simple)*: View relevant information for the current week of pregnancy.
  - This task was chosen because we wanted the app to be a stand-alone way for partners to get relevant information. Finding information to make data-driven decisions is a cornerstone in being able to support the pregnant individual.
- *Task 2 (Moderate):* Search for and find information on specific topics (ie: morning sickness).
  - This task was added to facilitate finding information rapidly. The information included in the weekly curriculum is tailored for a normal pregnancy. However, many individuals may have atypical pregnancies or want to get more information about a specific condition their partner might have or a term they heard about from their doctor.
- *Task 3 (Complex):* Activate "emergency mode" to access relevant information during labor or medical emergencies.
  - When the pregnant individual goes into labor, our initial interviewees told us that it was very hectic and difficult to know what to do. The emergency mode is a one-stop-shop for all needs during labor. It charts out a course to the
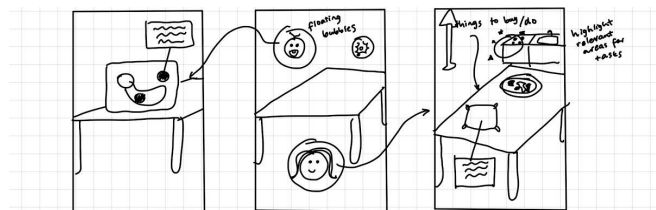
nearest hospital, calls your doctor, and texts your emergency contacts that your partner is going into labor.
- *Task 4 (Complex):* Add this week's suggested tasks to "my tasks" list.
  - In addition to getting information, there are a lot of steps partners of pregnant individuals can and should do offline. Adding tasks allows partners to determine what would be best for their situation and add relevant things to do to their list to maximize impact.
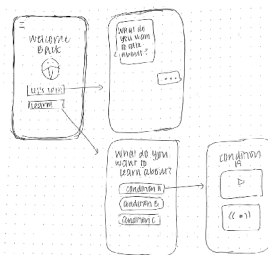
Following the determination of our solution, we brainstormed across various design directions, creating sketches centered around mobile apps, games, streaming content, chatbots/voice assistants, and immersive AR/VR settings.

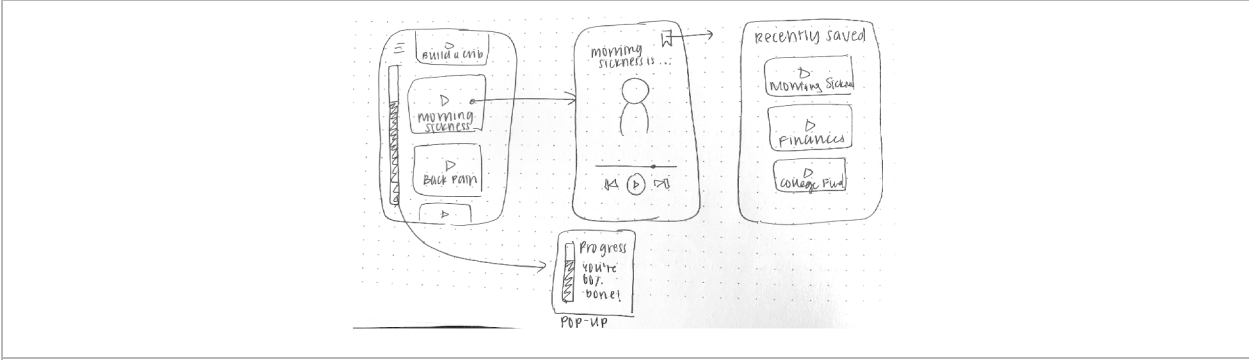

Gamified, World-Hopping Mobile Learning

Interactive AR Mobile Learning/Exploration Interface

Chatbot Mobile App Interface, with options for a chatbot to learn or simply video/audio content
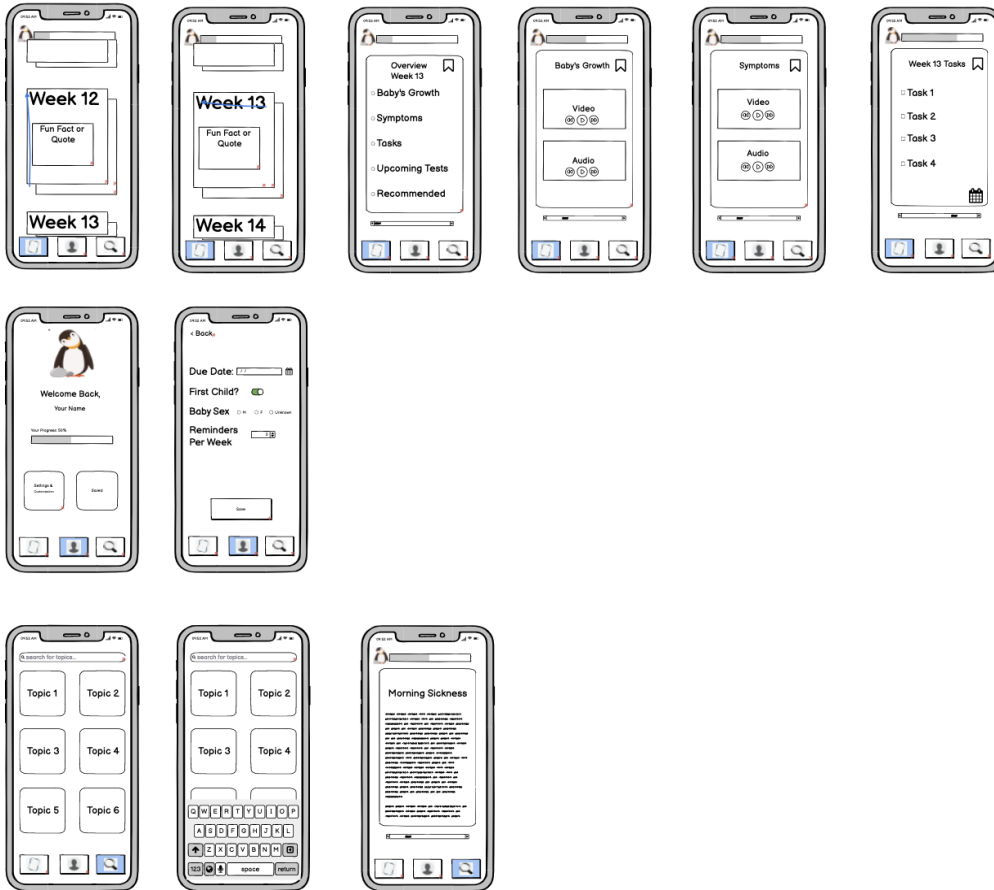
Immersive AR/VR Learning Interface (Requiring an Oculus-like headset)

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

We then storyboarded ideas for a *Card Stack Mobile Interface* and an *AR Interface* (our top two modalities). After noting the pros and cons of each modality, we selected our interface design to be the Mobile Interface due to factors such as cost, convenience, accessibility, and more. After storyboarding our three tasks for that interface and drawing from ideas generated through our design process, we created an interactive low-fi prototype using Balsamiq (image included on the next page).

Week 12

Fun Fact or Quote

Week 13

Week 13

Fun Fact or Quote

Week 14

Overview
Week 13
▫ Baby's Growth
▫ Symptoms
▫ Tasks
▫ Upcoming Tests
▫ Recommended

Baby's Growth

Video

Audio

Symptoms

Video

Audio

Week 13 Tasks
▫ Task 1
▫ Task 2
▫ Task 3
▫ Task 4

Welcome Back,
Your Name

Your Progress 50%

Settings & Customization

Saved

< Back

Due Date:
First Child?
Baby Sex   ○ M   ○ F   ○ Unknown
Reminders
Per Week

Save

Q search for topics...

Topic 1   Topic 2
Topic 3   Topic 4
Topic 5   Topic 6

Q search for topics...

Topic 1   Topic 2
Topic 3   Topic 4

Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123 space return

Morning Sickness

To get feedback on this initial prototype, we sought out partners of pregnant individuals for testing. We tested our prototype through interactive interviews with 3 expecting dads from a variety of age ranges and experiences with pregnancy. 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 needed to make were:
- replacing the swiping action to access cards with something more intuitive
- changing our task and progress bar flow
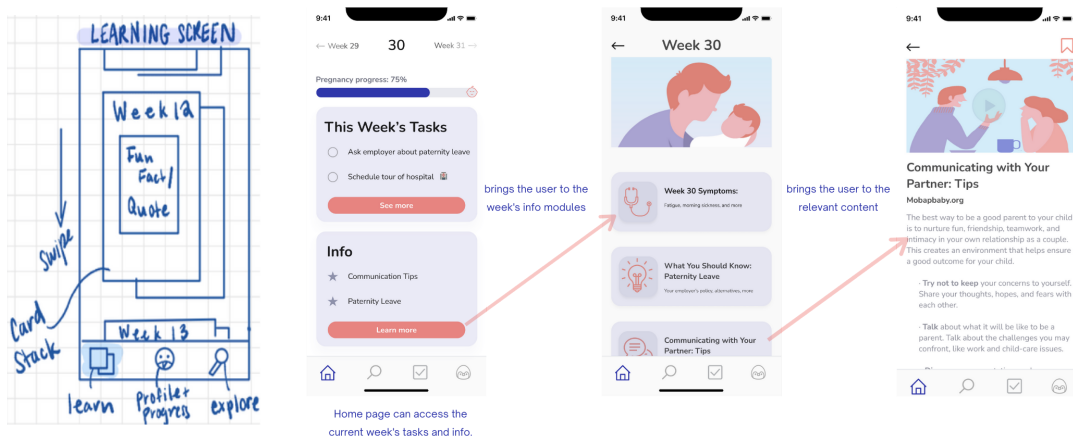- implementing the emergency labor button

Major Design Changes (low-fi prototype → med-fi prototype)

We made a few design changes for our medium-fi prototype based on valuable feedback we received from our section and from our user tests. The changes are listed below:

1) **Redesigned card stack into module-based flow for weekly info & tasks**
   In our low-fi prototype, week-to-week navigation relied on swipeable card stacks and swiping brought the user to the next/previous week's card stack and enabled the user to explore the current week's content cards. However, users found swiping—especially the left swipe—extremely unintuitive and thought that having to swipe through every weeks' card stacks to get to a specific weeks' content was very slow and tedious.

   In our redesigned model, weekly information utilizes a tap-based module layout. Users navigate from week to week by scrolling through the horizontal date scrollbar at the top of the screen. Each week, users are brought to a home screen that can take them to the current week's **information** (which is further broken into tappable modules) and the current week's **tasks.**
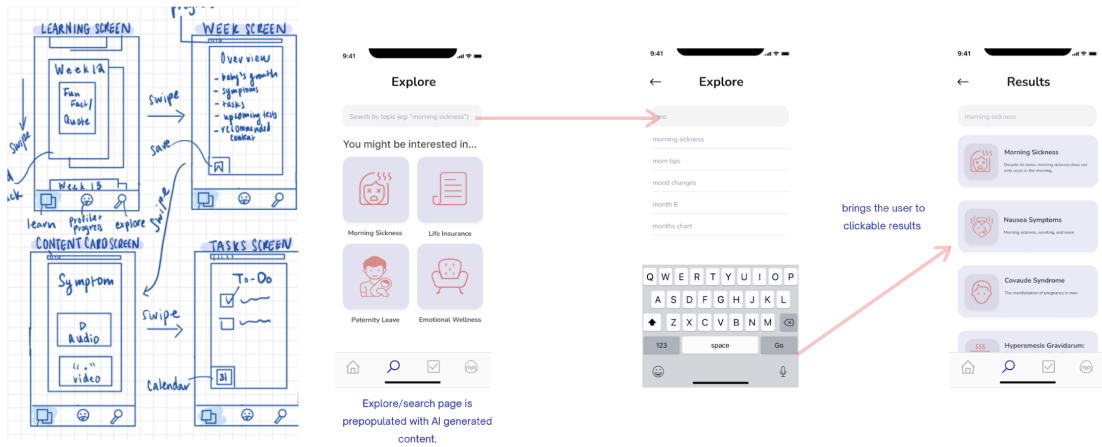

2) **Fleshed out and clarified user flow for adding and completing tasks**
   In our low-fi prototype, tasks were buried in the current week's card stack as a content card and were only accessible and completable by navigating to the current week. Interviewees pointed out that in practice, tasks are likely to carry over week to week and that a rollover feature would be useful. They also noted that tasks would be one of the most useful components of the app for them and should be made easily accessible.

   In our revised design, tasks are featured as one of the four main tabs in our app. The tasks screen is broken down into two toggles: 1) Week X Tasks which show the current week's suggested tasks 2) My Tasks which shows all of the user's ongoing
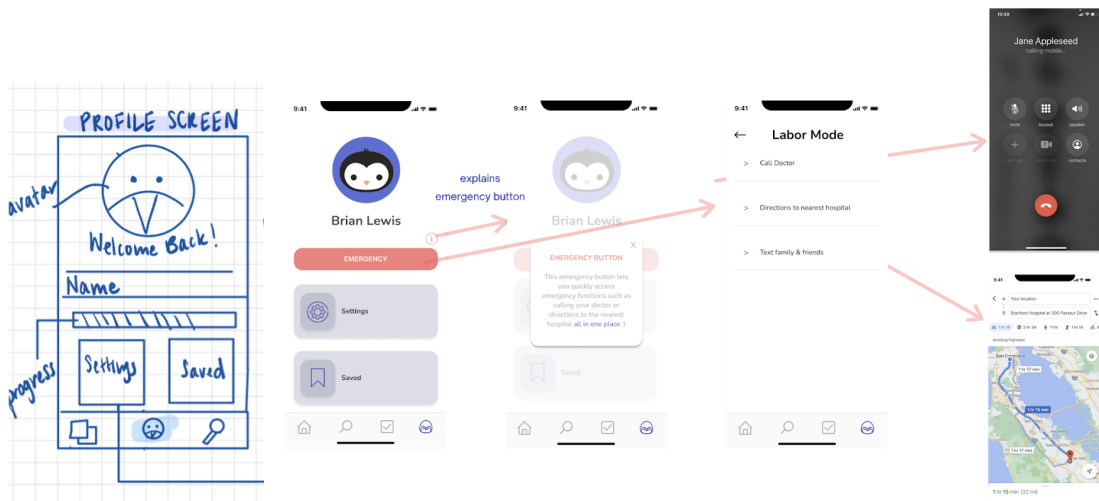
tasks (which carry over week to week). Tasks can be added from the current week to the My Tasks list and can be completed from My Tasks.

Explore/search page is prepopulated with AI generated content.

brings the user to clickable results

3) Added an "emergency button" for labor or medical emergencies

Our low-fi prototype did not contain a labor/emergency mode, and only used profile & settings screens to customize the content users encountered in content cards. A user we interviewed suggested implementing a "labor button" to provide the user with fast, necessary info during labor or an emergency (doctor's phone number, directions to nearest hospital, notifying contacts, etc).

In response to this suggestion, we added an emergency button to the user's profile screen in our redesign. When tapped, this button takes the user to a page that displays actionable items such as calling your doctor, hospital directions, etc. This feature is clearly applicable and helpful to all of the app's intended users.

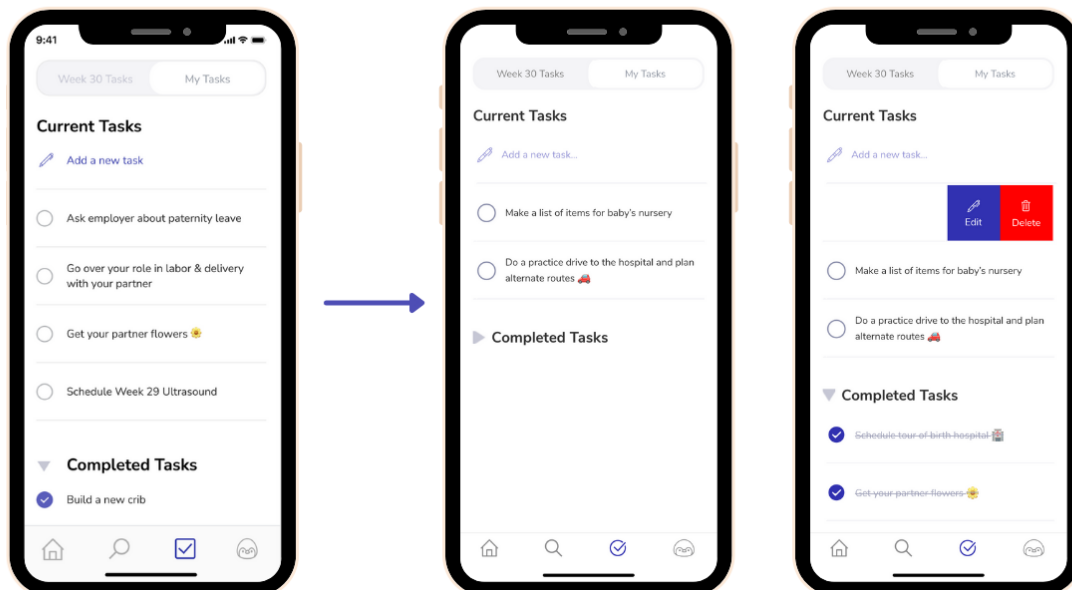**Major Design Changes (med-fi prototype → high-fi prototype)**

We had our medium-fi prototype evaluated by 4 heuristic evaluators who collectively found 17 severity 3/4 violations and 34 severity 1/2 violations across a wide range of design heuristics, most notably, Visibility of System Status and Flexibility and Efficiency of Use. Below, we break down the violations our evaluators identified and discuss our respective fixes in the High-Fi prototype.

1. **Tasks**

    Our evaluators pointed out that our medium-fi prototype lacked the following functionality for our Tasks page:

    a. Personalization: There is no feature for users to personalize tasks by creating new tasks in addition to suggested tasks, and/or personalize suggested tasks. *(H7: Flexibility & Efficiency of Use, Severity 4)*

    b. Ability to Delete Tasks: There is no feature for users to delete tasks from both the added and unadded sections. (*H3: User Control and Freedom, Severity 3)*

    With this feedback in mind, we modified our tasks screen to include an "add new task" field at the top of the tasks list to allow users to type in their own tasks. We also implemented swipe functionality that allows users to edit or delete existing tasks from their current tasks list. Below, you can see the implementation of these additions from our medium fi prototype *(left)* to high fi prototype *(right)*.
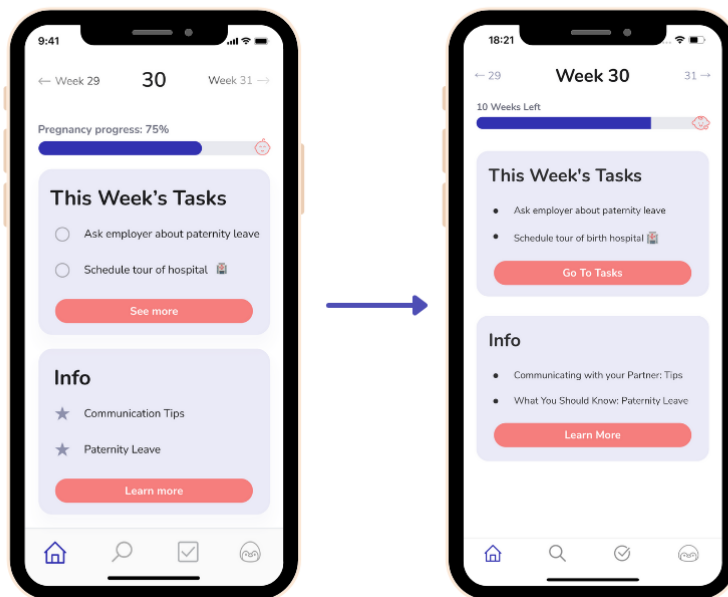

2. **Progress & Home Page**

    Our evaluators pointed out the following flaws on our medium-fi Progress and Home pages:

a. Lack of Information from Progress Bar**:** The progress bar is not informative because % left is an abstract measure and has little actionable meaning. *(H1: Visibility of System Status, Severity 3)*

b. Misleading Display of Tasks on Home Page: Current week's to-do tasks are visible from home and look tappable, but there is no actual way for users to complete a task from the home screen. *(H1: Visibility of System Status, Severity 3)*

c. No In-app Progress Display: There is no user progress status for current week task completion. A circular chart showing the number of tasks they've completed for the week would be nice. *(H2: Visibility of System Status, Severity 2)*

With this feedback in mind, we modified our home screen to display the number of weeks left until their partner's due date, rather than their percentage progress, because this was more meaningful/tangible information. We also switched from using checkboxes to bullet points in front of the current week's tasks to make it clear that this box is meant to be a preview, rather than a way to complete tasks. The third violation—No In-app Progress Display—was not implemented because feedback from user testing indicated that users would find in app progress (showing information like tasks completed, modules read, etc) demotivating, and make the app seem more like a chore to complete. Below, you can see the implementation of these additions from our medium fi prototype (left) to high fi prototype (right)
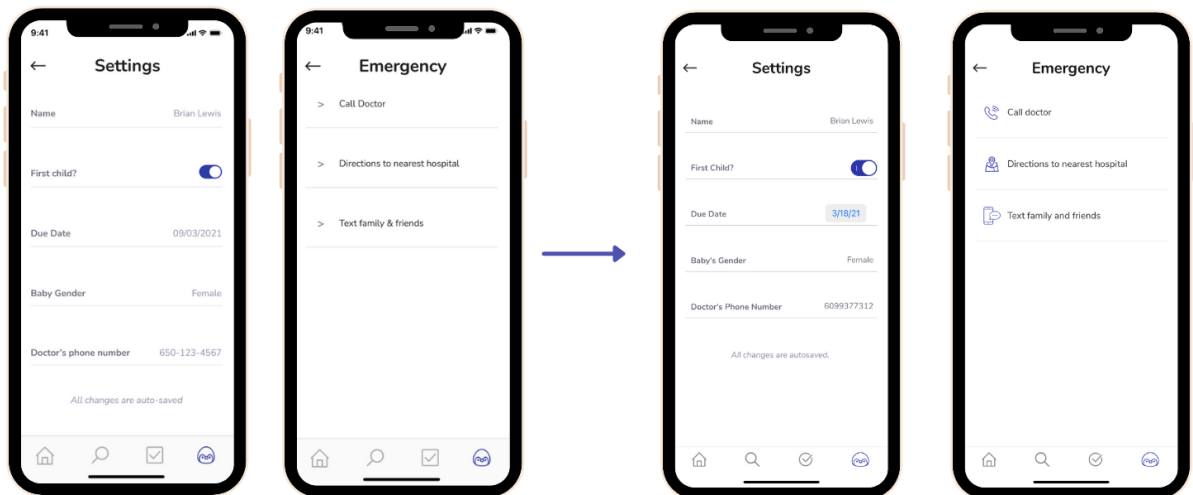
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3. **Profile, Settings, and Emergency Pages**

Our evaluators pointed out the following missing features on Profile, Settings, and Emergency Pages:

    a. No Error Prevention on Setting Page: It appears that the user can accidentally exit the settings page without saving changes. *(H5: Error Prevention, Severity 3)*

    b. User Info is Not Editable in Settings: The user's name and previous information are not stored or editable in settings. *(H2: Match Between System and Real World, Severity 2)*

    c. No Visual Indicators in Emergency Page: In the Emergency page, there is no visual representation of the actions so users do not know what they are pressing on. *(H7: Flexibility and Efficiency of Use, Severity 3)*

To fix these violations, we made several UI changes. Firstly, we removed the save button on the settings page and made changes auto-saved instead for user convenience. We added a note to reflect this, so users would not be confused. Next, we added important information such as the user's name and doctor's phone number as fields on the settings page. Finally, we replaced action icons on the emergency page (previously just carets) with small images to help the user visualize what action each button will take. Below, you can see the implementation of these additions from our medium fi prototype (left) to high fi prototype (right).
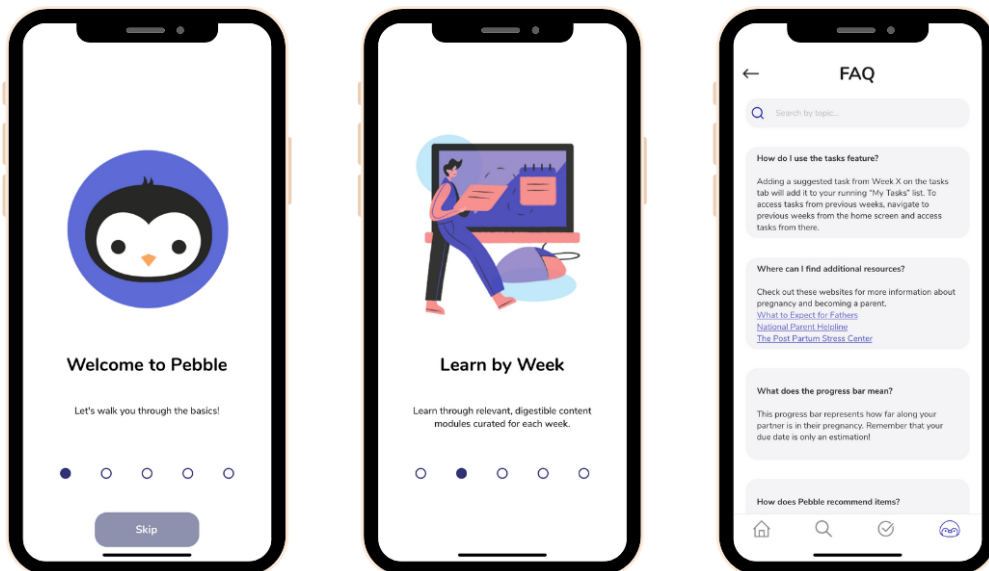

4. **Onboarding and FAQ**

Lastly, evaluators noted that additional onboarding and FAQ resources would be helpful in the following contexts:

    a. Onboarding Instructions: Onboarding screens would be helpful to understanding the app *(H10: Help and Documentation, Severity 0)*

b. Understanding Flow of Tasks Page: Some parts of the task page are confusing without additional clarification, for example, it is unclear whether the home screen has tasks from week 30 or the most urgent tasks overall that the user has accumulated *(H6: Recognition Not Recall, Severity 2)*

c. Seeking Additional Help: It would be helpful to have a page that covers pregnancy-related questions and concerns not covered in the app *(H10: Help and Documentation, Severity 2)*

To address these violations and help first-time users navigate Pebble, we decided to add onboarding screens as well as a Frequently Asked Questions screen to our revised prototype. The onboarding screen will explain how Pebble works, while the FAQ screen will allow users to get answers both about Pebble and access resources on pregnancy as a whole. Below, you can see the two new screens we added to implement these features.

Additional Design Changes (med-fi prototype → high-fi prototype, less significant)
Other minor enhancements were made based on the heuristic evaluations and are shown below.

- H1: Visibility of System Status / Severity: 3
  Problem: Unclear whether week 30 is the current week, or a future/past week that the user navigated to using the left/right Week # buttons.
  Fix: Highlight current week by making it a different color in week scrollbar/header

- H2: Match between System and World / Severity: 3
  Problem: When a user presses the "see more" button, they would have to use the bottom navigation bar to return to the home page.
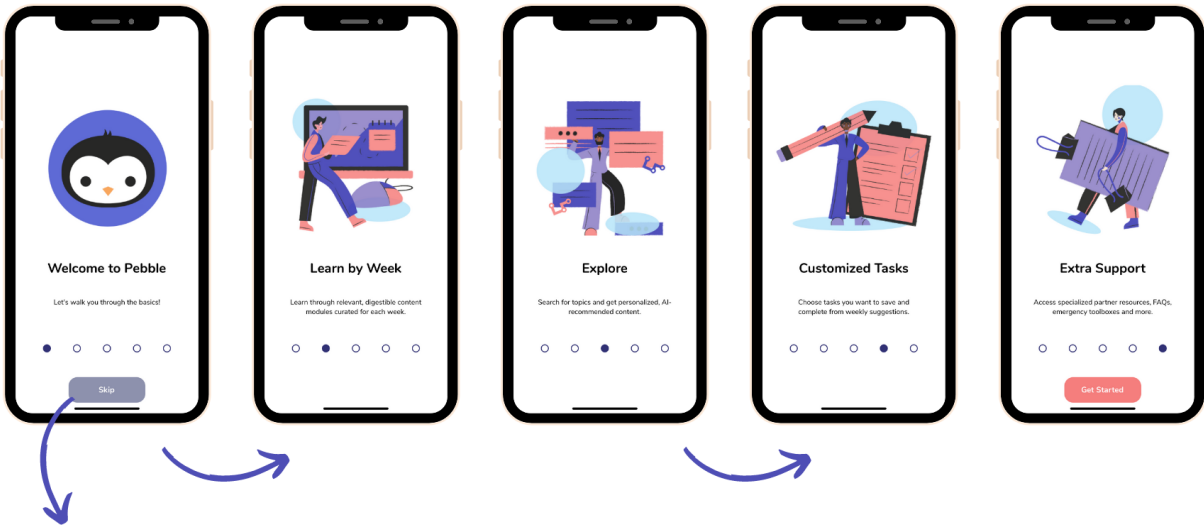
Did Not Fix: Chose not to implement this change because it would make the task screen cluttered if we tried to implement a back button as well.

- H1: Visibility of System Status / Severity: 3
  Problem: Stars denoting the items inside the "Info" card view are confusing
  Fix: Switching to regular bullets on the home screen instead of stars

- H2: Match between System and World / Severity: 3
  Problem: X's over woman's eyes in "morning sickness" signifies death
  Fix: Updated the icon to not include X's over the woman's eyes

- H1: Visibility of System Status / Severity: 3
  Problem: Toggle on settings page is switched on by default
  Fix: Changed the background color to indicate the toggle is off by default

- H4: Consistency and Standards / Severity: 3
  Problem: "Bookmark", "star", and "saved" icons are all used for saving functionality
  Fix: Standardized all saving functionality to use the bookmark icon

- H5: Error Prevention / Severity: 3
  Problem: The user can accidentally exit the settings page without saving changes
  Fix: "All changes are autosaved" message is shown once settings are modified

- H6. Recognition, Not Recall / Severity: 3
  Problem: After navigating to the tasks page, it is unclear whether the home screen has tasks from week 30 or the most urgent tasks overall.
  Fix: Added a clarification to FAQ + info about this added in onboarding

- H6: Recognition, Not Recall / Severity: 3
  Problem: Users can't access unsaved tasks from the previous week
  Fix: Homescreen scrollbar is used to navigate between weeks on the home page

- H6. Recognition, Not Recall / Severity: 3
  Problem: Users can't complete a task from Week 30 tasks page
  Did Not Fix: Did not adopt because week 30 tasks page is just to add items to my tasks and tasks can only be completed from my tasks, made this distinction clearer in FAQ + onboarding
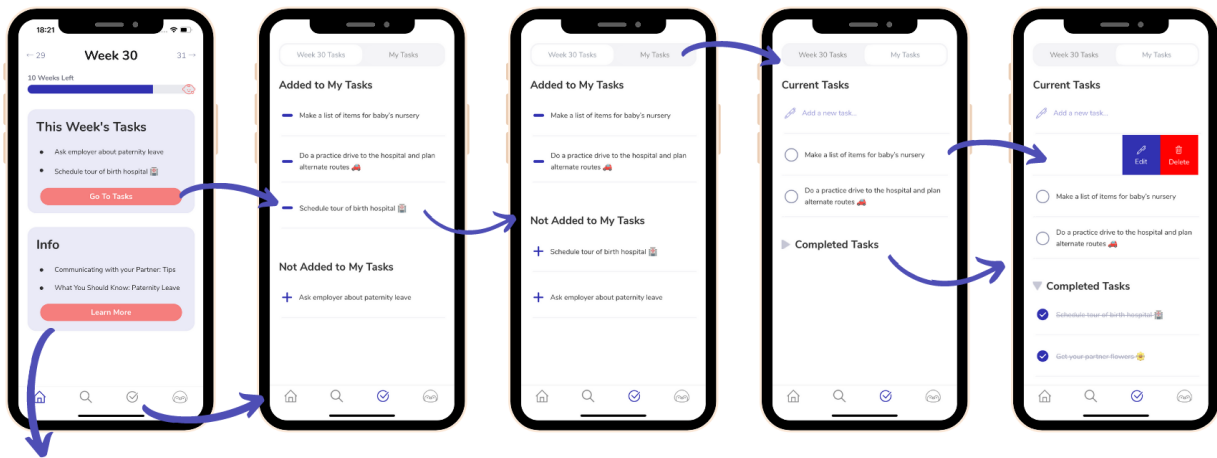
High-fi Storyboard

After implementing the design of our high-fi prototype, we implemented the prototype itself in React Native (see more implementation details below). On the next page, you can view a detailed storyboard of our high-fi prototype:
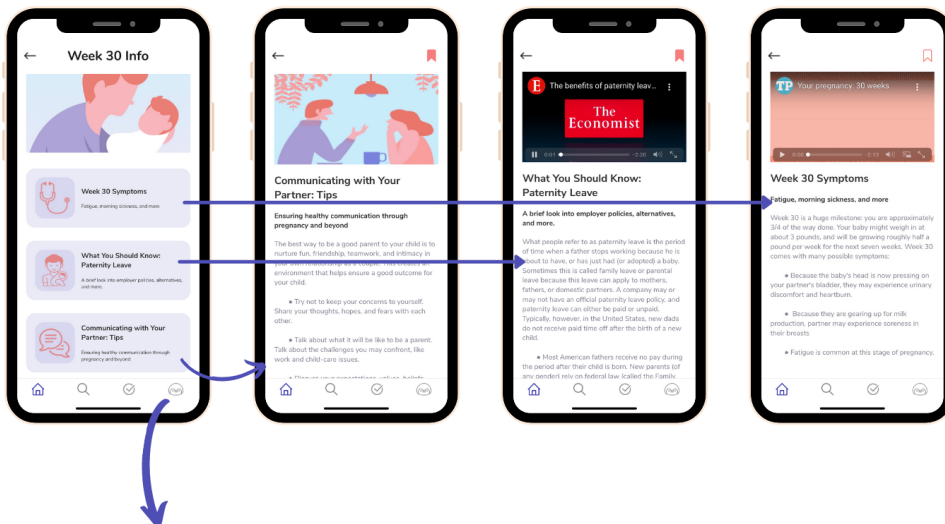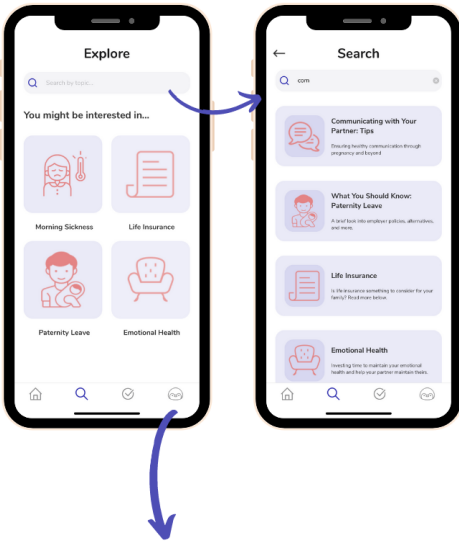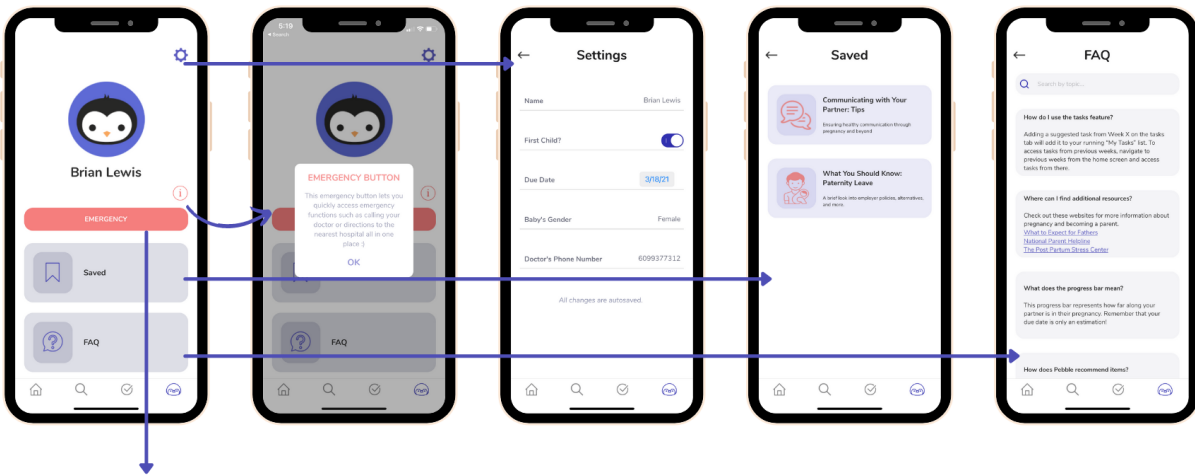
Onboarding

Welcome to Pebble

Let's walk you through the basics!

Skip

Learn by Week

Learn through relevant, digestible content modules curated for each week.

Explore

Search for topics and get personalized, AI-recommended content.

Customized Tasks

Choose tasks you want to save and complete from weekly suggestions.

Extra Support

Access specialized partner resources, FAQs, emergency toolboxes and more.

Get Started

Tasks

Week 30

29 | 31 →

10 Weeks Left

This Week's Tasks

- Ask employer about paternity leave
- Schedule tour of birth hospital

Go To Tasks

Info

- Communicating with your Partner: Tips
- What You Should Know: Paternity Leave

Learn More

Week 30 Tasks | My Tasks

Added to My Tasks

- Make a list of items for baby's nursery
- Do a practice drive to the hospital and plan alternate routes 🚗
- Schedule tour of birth hospital 🏥

Not Added to My Tasks

+ Ask employer about paternity leave

Week 30 Tasks | My Tasks

Added to My Tasks

- Make a list of items for baby's nursery
- Do a practice drive to the hospital and plan alternate routes 🚗

Not Added to My Tasks

+ Schedule tour of birth hospital 🏥
+ Ask employer about paternity leave

Week 30 Tasks | My Tasks

Current Tasks

Add a new task...

- ○ Make a list of items for baby's nursery
- ○ Do a practice drive to the hospital and plan alternate routes 🚗

▶ Completed Tasks

Week 30 Tasks | My Tasks

Current Tasks

Add a new task...

Edit | Delete

- ○ Make a list of items for baby's nursery
- ○ Do a practice drive to the hospital and plan alternate routes 🚗

▼ Completed Tasks

- ✓ Schedule tour of birth hospital
- ✓ Get your partner flowers 😊

Learn by Week

Week 30 Info

- **Week 30 Symptoms**
  Fatigue, morning sickness, and more
- **What You Should Know: Paternity Leave**
  A brief look into employer policies, alternatives, and more.
- **Communicating with Your Partner: Tips**
  Ensuring healthy communication through pregnancy and beyond

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Communicating with Your Partner: Tips

Ensuring healthy communication through pregnancy and beyond

The best way to be a good parent to your child is to nurture fun, friendship, teamwork, and intimacy in your relationship as a couple. This creates an environment that helps ensure a good outcome for your child.

- Try not to keep your concerns to yourself. Share your thoughts, hopes, and fears with each other.
- Talk about what it will be like to be a parent. Talk about the challenges you may confront, like work and child-care issues.
- Discuss your expectations, values, beliefs...

The benefits of paternity leav...

The Economist

What You Should Know: Paternity Leave

A brief look into employer policies, alternatives, and more.

What people refer to as paternity leave is the period of time when a father stops working because he is about to have, or has just had (or adopted) a baby. Sometimes this is called family leave or parental leave because this leave can apply to mothers, fathers, or domestic partners. A company may or may not have an official paternity leave policy, and paternity leave can either be paid or unpaid. Typically, however, in the United States, new dads do not receive paid time off after the birth of a new child.

- Most American fathers receive no pay during the period after their child is born. New parents (of any gender) rely on federal law (called the Family...

TP | Your pregnancy: 30 weeks

Week 30 Symptoms

Fatigue, morning sickness, and more

Week 30 is a huge milestone: you are approximately 3/4 of the way done. Your baby might weigh in at about 3 pounds, and will be growing roughly half a pound per week for the next seven weeks. Week 30 comes with many possible symptoms:

- Because the baby's head is now pressing on your partner's bladder, they may experience urinary discomfort and heartburn.
- Because they are gearing up for milk production, partner may experience soreness in their breasts.
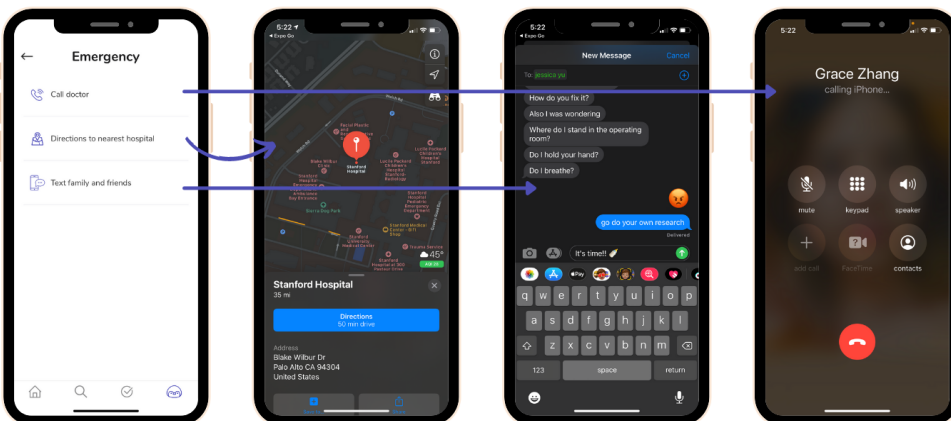- Fatigue is common at this stage of pregnancy.

Explore

Profile, Settings, & FAQ

Emergency Mode

Final Prototype Implementation

Tools

A wide variety of tools were used to build and run our prototype. For the implementation of the high-fi prototype, we used React Native and Expo, relying on three text editors (Xcode, Atom, VSCode) due to differences in individual preference. To design any additional graphics that went into our app, we continued to use and update our Figma prototype.

Although there was a learning curve, React Native turned out to be a fairly flexible and intuitive platform to use. Owing to its extensive support network and available libraries, we were able to implement a majority of the desired functionality our app: dynamically rendered, saveable articles with multimodal educational content, week adaptable, storage synced state-tracked tasks that could be modified and deleted, actionable emergency tools such as calling your doctor, instantaneously texting loved ones, getting hospital directions, and more. We did run into some limitations of the platform however; for example, we were unable to implement in app hospital navigation due to limitations with the allowed use of google maps' API. This was resolved by having Pebble open the user's native map application outside of the app.

Wizard of Oz and Hardcoded Data

Although we have made significant progress on our prototype, some parts of the design were not able to be implemented within the limited time frame and remain hardcoded and/or simulated for the purpose of demonstration.

The following components of the app have been simulated using the Wizard of Oz technique:

1. **AI tasks algorithm**
   In the final product, an AI algorithm would be used to rank the user's tasks so that more important tasks appear first on the screen. In this high-fi prototype, this functionality is simulated by portraying tasks in chronological order.
2. **Pre-populated Explore suggestions**
   In the final product, the Explore screen would be pre-populated with suggested articles based on an AI algorithm derived from past user interactions. Currently, this AI functionality is simulated and the screen is populated with predetermined relevant topics.

The following components of the app have been hard coded for demonstration purposes:

1. Learning content for Week 30
2. Tasks for each stage
3. Stage of pregnancy
4. Map to the nearest hospital

Summary and Next Steps

Over the past 10 weeks, our team underwent the entire design process in the problem domain of pregnancy. Through interviewing over a dozen stakeholders, we identified a shared problem to be the lack of accessible, understandable resources to empower the pregnant person's *partner* to actively understand and and contribute to the process. We underwent three rounds of iterative design, incorporating feedback from user interviews and testing every step of the way, and finally produced our high-fidelity prototype of Pebble: an app that presents digestible information and recommendations so that the non-pregnant partner can better support their pregnant partner through the pregnancy journey. Here are some of our key takeaways from the process:

1. **Empathizing and Listening to Our Users**
   By far the most valuable steps of our iterative design process came from interfacing with users and listening to the needs and desires of the people we were designing for. Although we began this process intending to design an application for the pregnant users themselves, through listening to and analyzing the experiences of our interviewees, we found that the most urgent need actually lay in the lack of resources targeted towards their partners. Similarly, many of the key features of our app were developed at the direct request of expecting fathers we interviewed: such as the emergency button feature, week to week task suggestions, and more. Principles from this class were used throughout the design and implementation process.

2. **The Pregnancy Market Remains Underserved**
   Despite the growing number of pregnancy related apps and technologies (Ovia, Sprout, etc), the pregnancy community still remains vastly overlooked in many contexts and has many unmet needs. Through even our limited interviews, pregnant people expressed frustrations with inability to acquire information from doctors, find relevant communities online, and adapt their previous technologies and wearables (such as fitbits) to their pregnancy. This is even more so for partners of pregnant individuals and Pebble has opened our eyes to this space and potential problems.

For next steps, we would love to expand our solution to cover more of these unmet needs. After resolving unimplemented elements from this iteration of our design (hard-coded and wizard of oz components), we plan to conduct more detailed research about the content of the app that would be most useful to its users. Through our interviews, we gleaned insight into the fact that the mental health aspect of pregnant people's partners is widely (and frustratingly) overlooked in existing resources; however, compiling and analyzing research to provide usable information for users could take months, or even years. In addition, something users mentioned they would find valuable is the integration of a two-pronged user design: in essence, developing companion apps for both the pregnant person and their partner. Through this approach, features such as tasks could be synced across both

partners' devices, streamlining communication and sharing of information. Through the implementation of these stretch goals, we hope to find ourselves one step closer to fulfilling our mission: to ensure both partners in a pregnancy feel supported themselves and also feel equipped to holistically support one another throughout their pregnancy journey.

Acknowledgements