



Lo-fi Prototyping and Usability Testing

Value Proposition

Teamwork makes the green work.

Mission Statement

Rooted is both a community and competition platform that empowers individuals to take sustainable actions.

Problem / Solution Overview

While many people recognize the importance of sustainability, they often feel unmotivated to act sustainably when it is inconvenient to do so. Rooted taps into people's competitiveness and desire to excel among peers to encourage sustainable living.

Our Team



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pd '21



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Concept Sketches

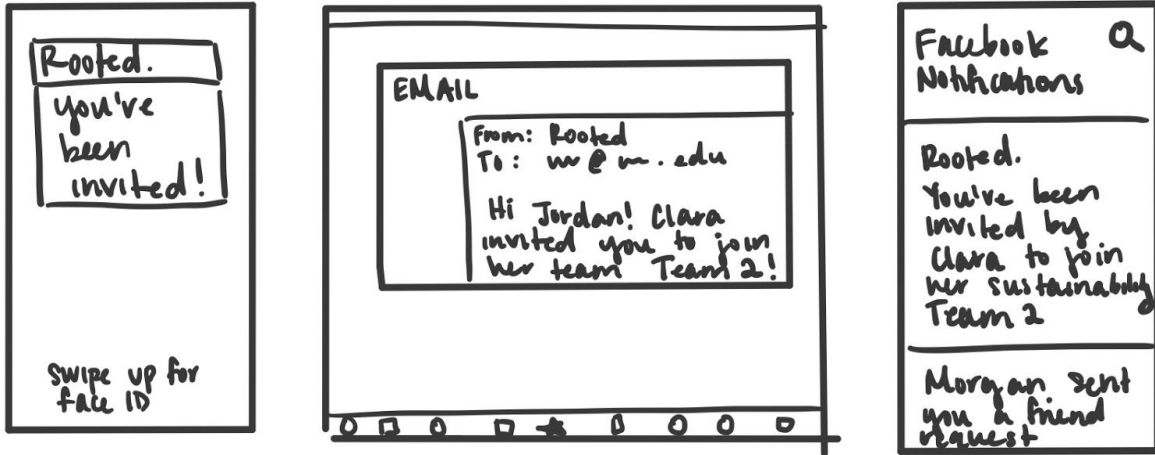


Figure 1: Notification – Join a team

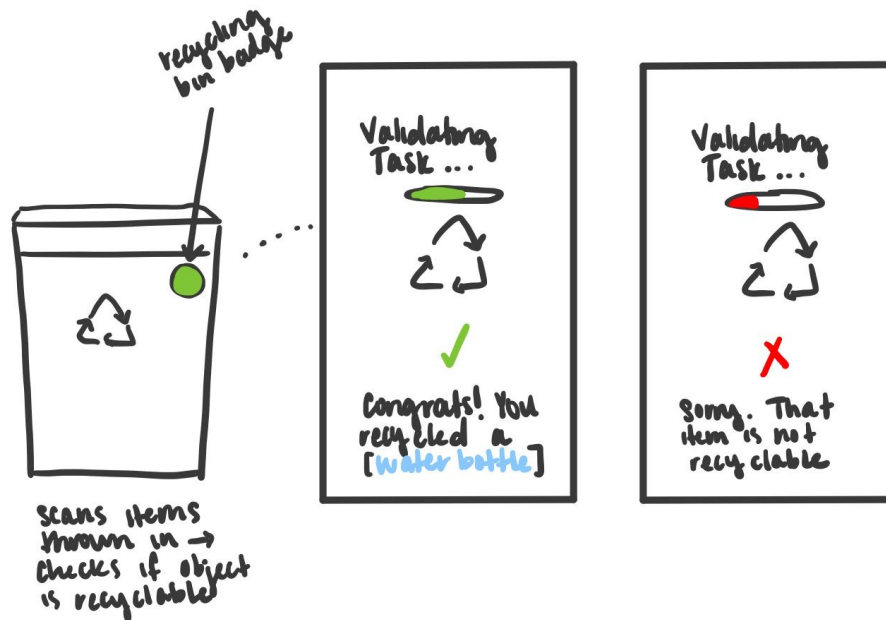


Figure 2: Wearable – Validate the sustainable task

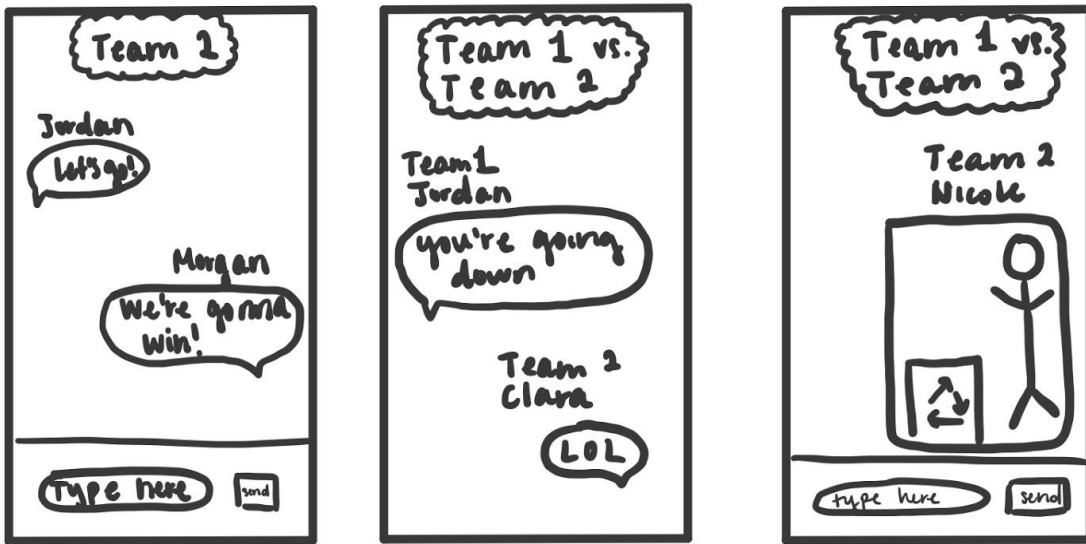


Figure 3: Chat – Inter and intra group messaging

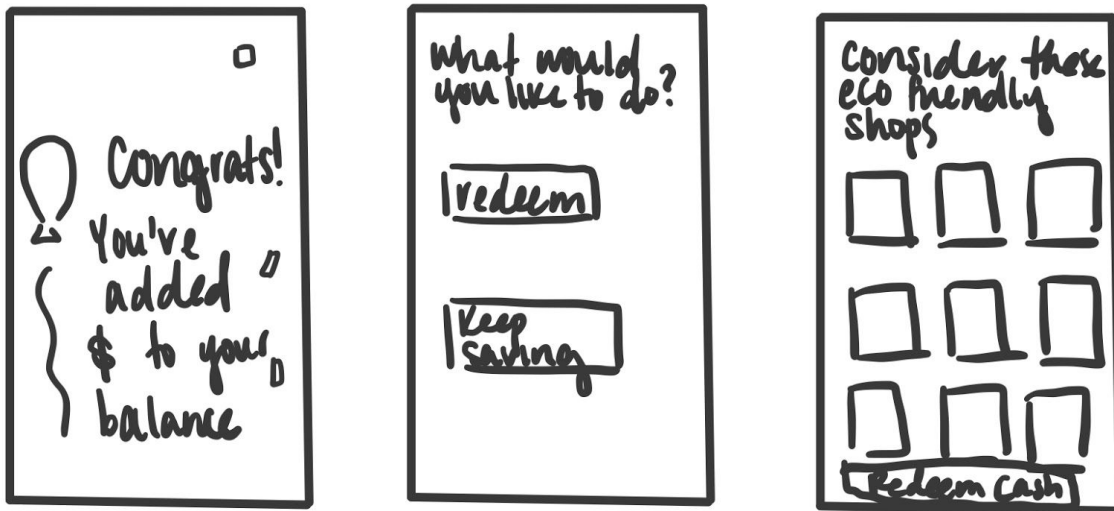


Figure 4: Selection – Choose and redeem rewards

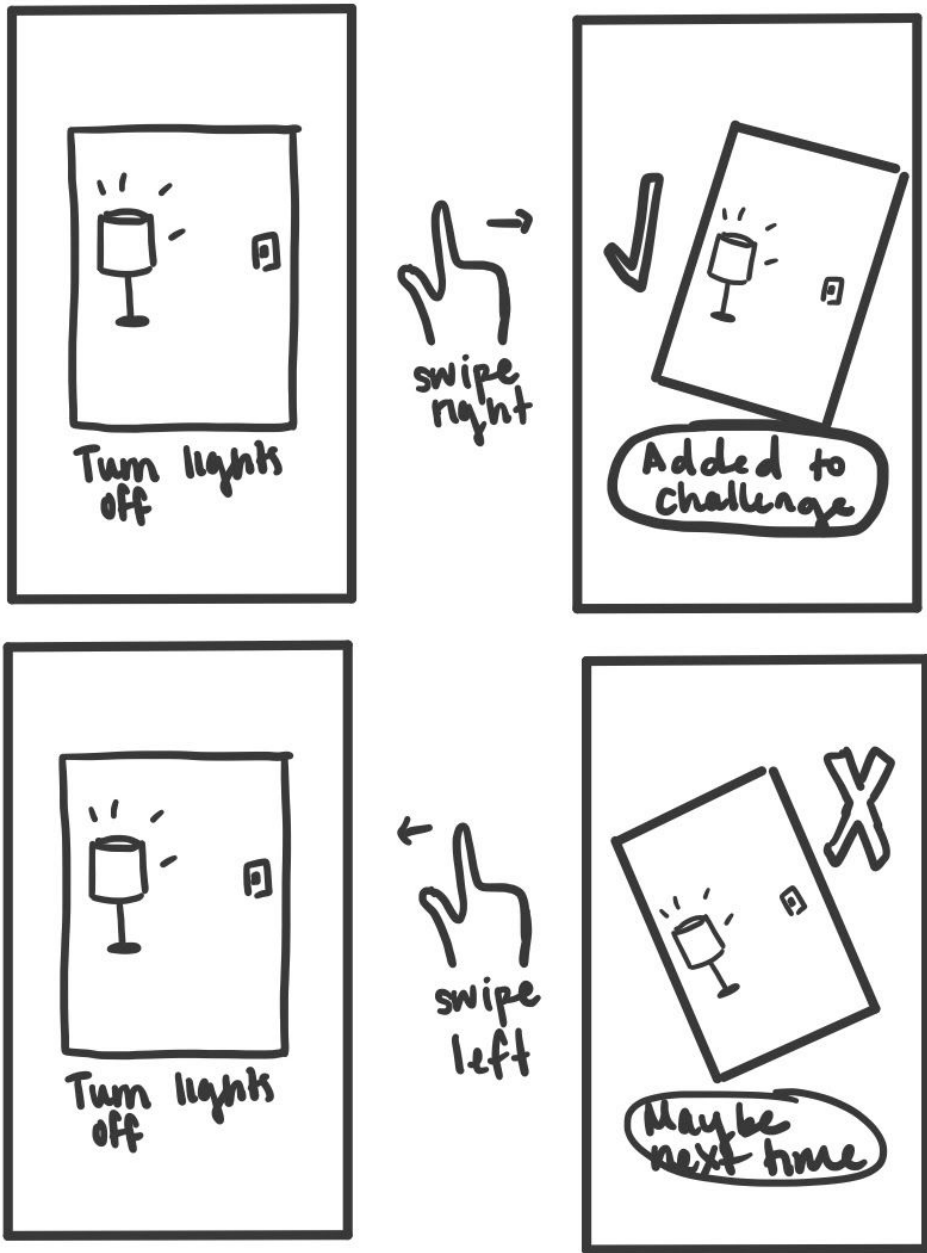


Figure 5: Swipe – Build a custom challenge

Top 2 Designs + Storyboards

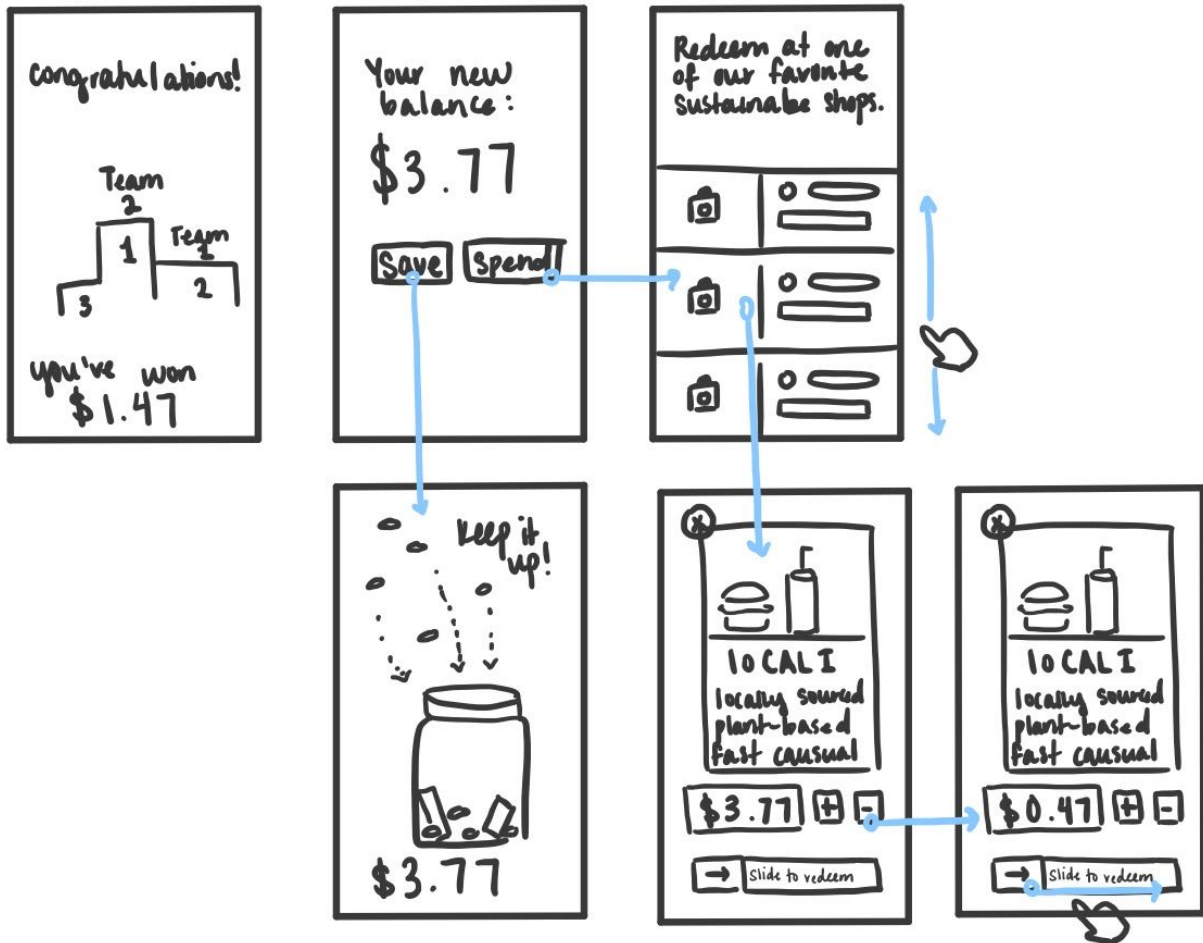


Figure 6: Managing Rewards – Choose to add to your reward balance or opt for a giftcard to a sustainable company

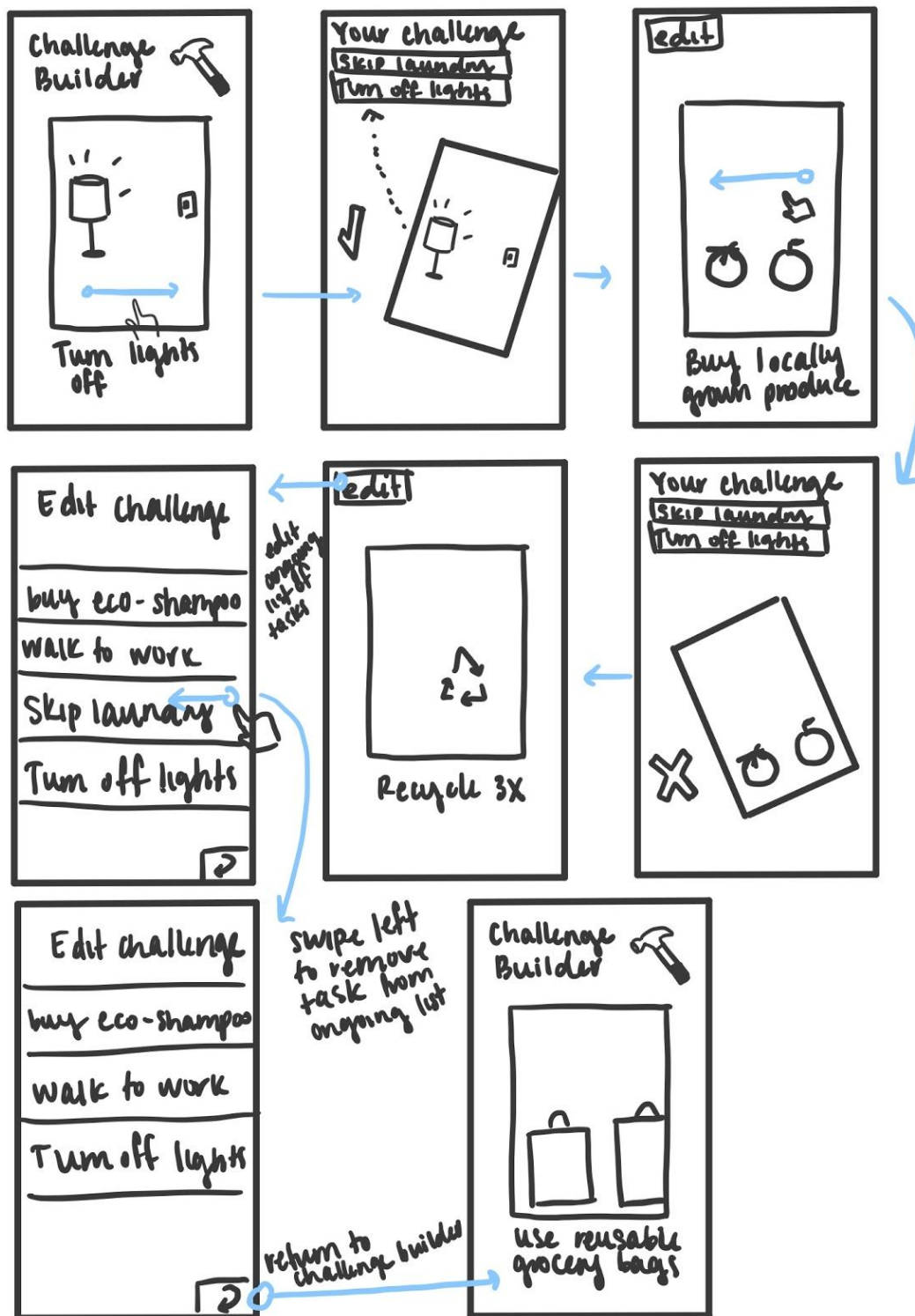


Figure 7: Challenge Builder – Through a swiping interface, build up a custom challenge

Selected Interface Designs

Managing Rewards Interface

Pros	Cons
<ul style="list-style-type: none">• Graphic showing saving accumulation encourages long term behavior change• Gives users information about where they can spend their rewards• Small but steady rewards encourage the user to continue returning to the app	<ul style="list-style-type: none">• Individualized rewards might not be as fulfilling as team rewards• Focus on monetary rewards may discourage users• Plus / Minus button could be frustrating to use

Figure 8: Pro + Con analysis for rewards interface

Challenge Builder Interface

Pros	Cons
<ul style="list-style-type: none">• Allows users to quickly combine premade tasks• Allows standardization of point values across the app by using the sum of the predefined actions• Swiping through visuals is a pleasing experience	<ul style="list-style-type: none">• No way to create custom tasks• Adding an action and switching between actions are similar• Could be time consuming to swipe through the available tasks if users are looking for a specific task

Figure 9: Pro + Con analysis for custom challenge interface

Best Design

Managing Rewards Interface

We decided that the managing rewards interface was the best design moving forward. This interface combines functionality and efficient access to key information with a visually appealing and intuitive layout.

We felt that elements of the Challenge Builder Interface would be impractical to use. In particular, swiping through multiple task options when building a custom challenge is inefficient. However, we still intend to include aspects of the Challenge Builder Interface in our final app. Specifically, swiping left / right to decline / accept a task could be an appropriate interface for generating ideas for sustainable tasks the user can complete.

3 Tasks + Storyboards

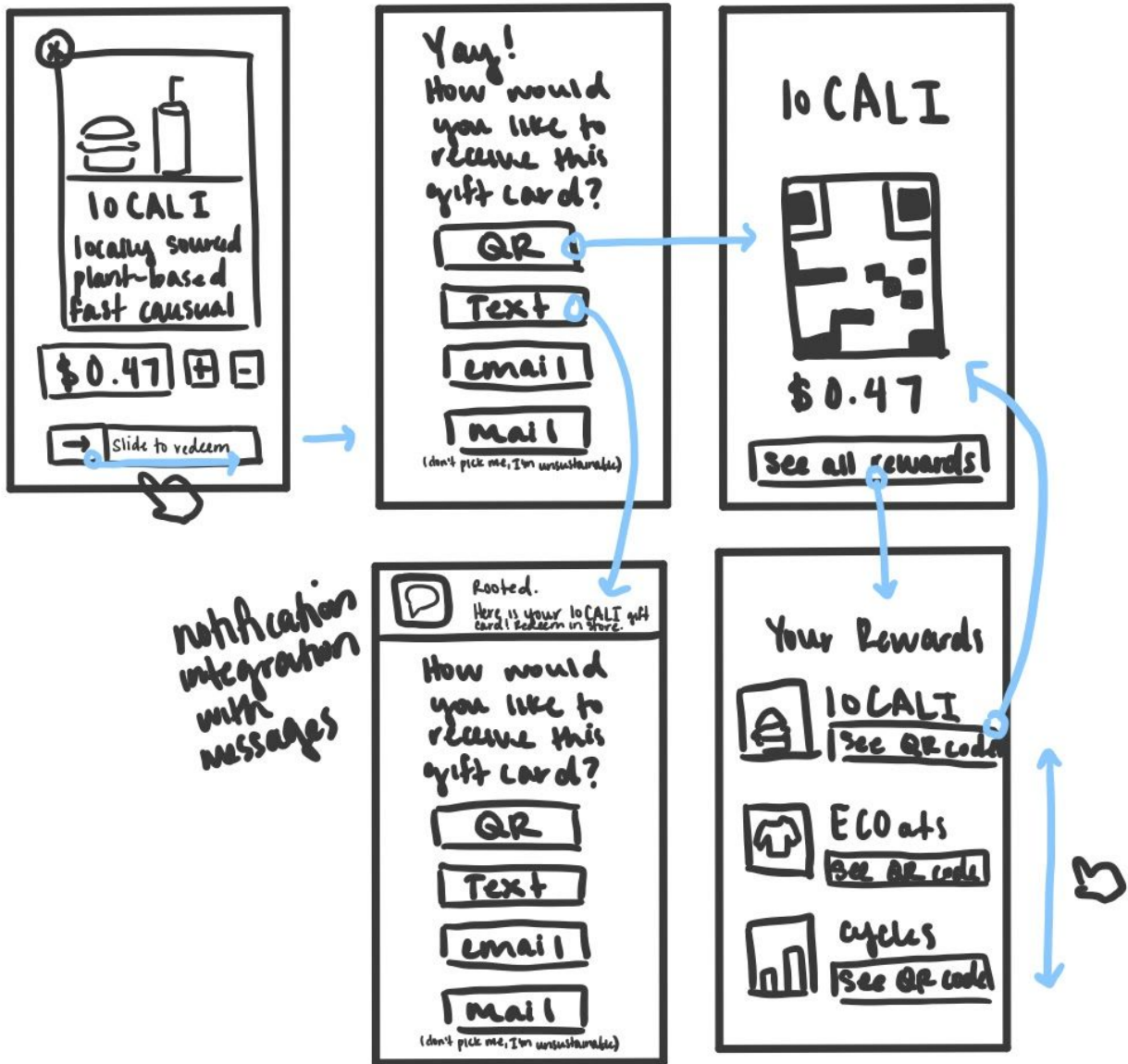


Figure 10: Simple Task – Receiving a reward (continuation of Figure 6)

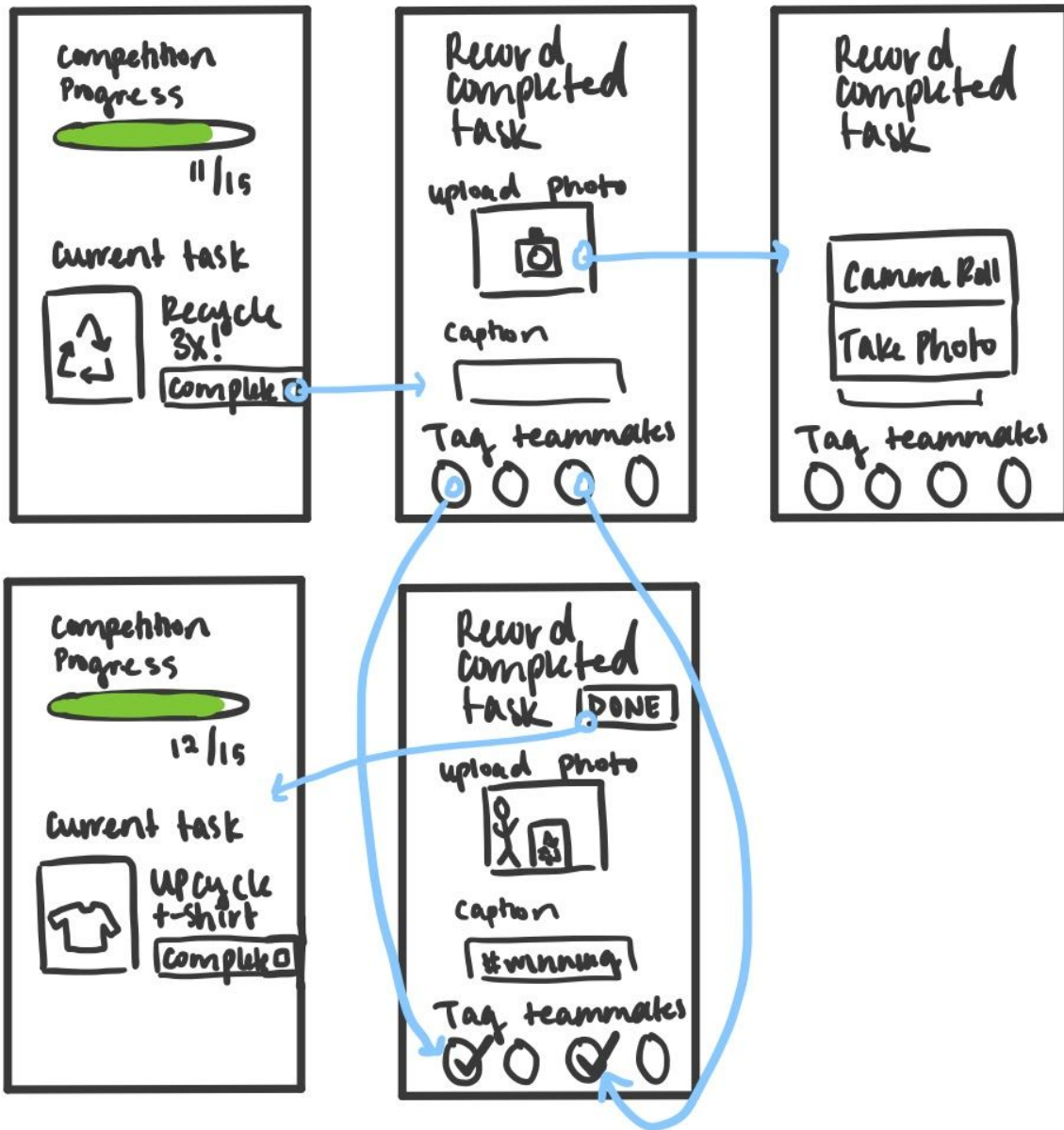


Figure 11: Medium Task – Logging a completed task

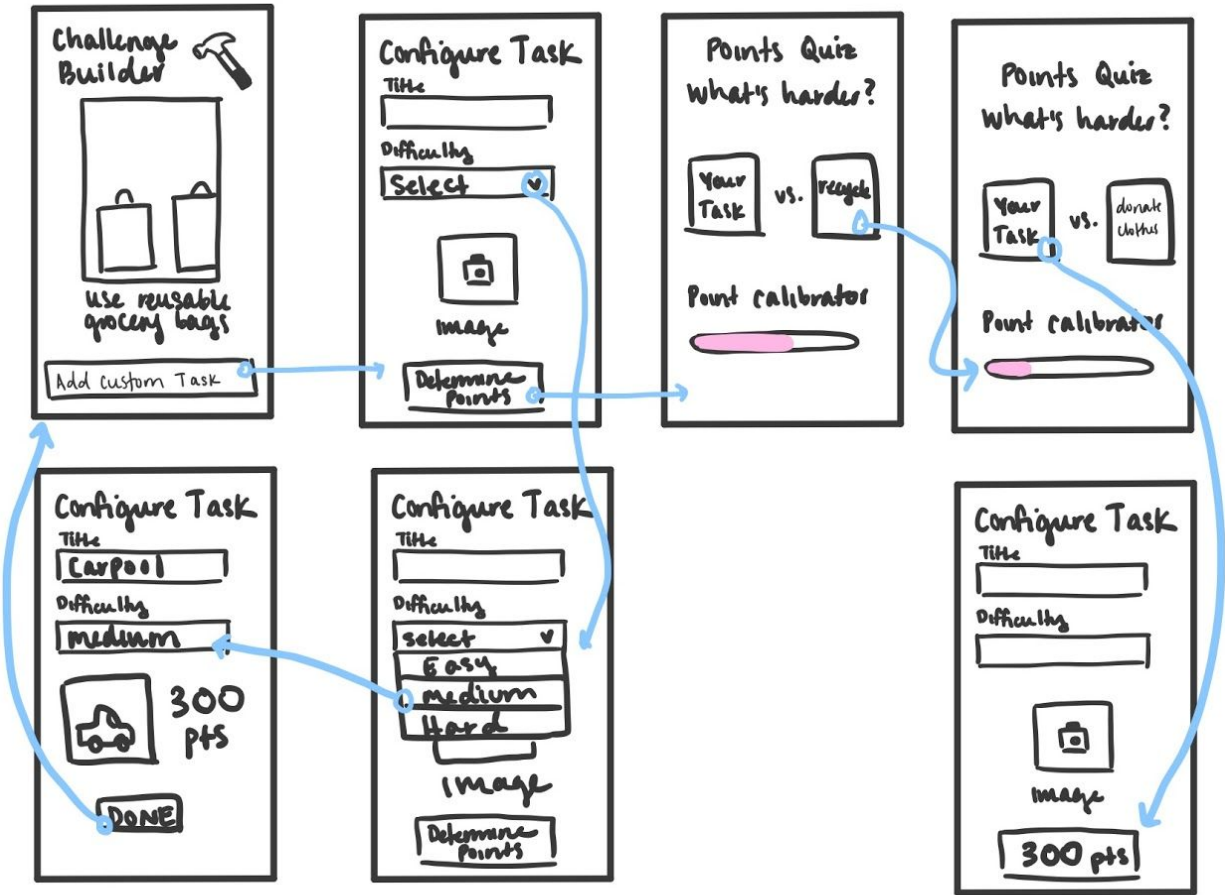


Figure 12: Complex Task – Designing a custom task (continuation of Figure 7)

Lo-fi Prototype

Design Interface	Functionality
Current Tasks Page	Displays all sustainable tasks in progress. Users can record completed tasks or add a custom task.
Add Custom Task Button	Takes users into the Task Builder to design a custom sustainable task.
Select Task Difficulty Dropdown	Select difficulty level for custom task to inform the Point Calibration Quiz.
Point Calibration Quiz	Determines point value assigned to custom task. Takes users through a series of task comparisons where they select the harder task.
Complete Task Button	Takes users into the Record Completed Task interface.
Tag Teammates	(Within the Record Completed Task interface) Tag teammates who also participated in the task.
Rewards Interface	Automatically entered when rewards are won.
Spend Rewards Balance Button	Takes users into a list of stores where they can redeem rewards.
Adjust Amount of Money to Redeem Buttons	Users can determine how much of their rewards balance to redeem at each store.
Slide to Redeem Reward Button	Modeled after to slide to redeem rewards for Capital One credit card.
QR Code + alpha-numerical	Users can scan QR code as a gift card in

Code	stores or type in the alpha-numerical code at online checkout.
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Figure 13: Design interface deep-dive

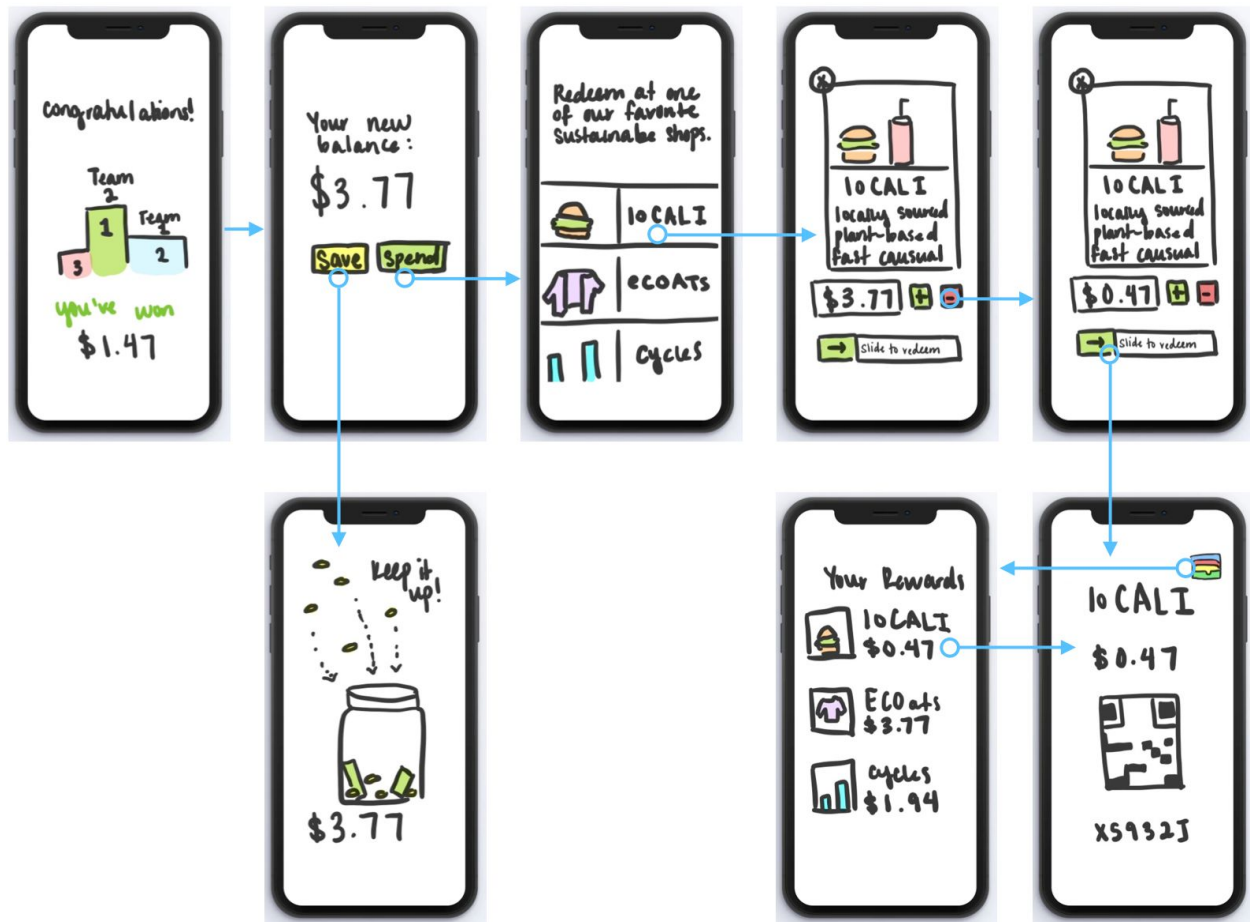


Figure 14: Lo-fi of simple task – Redeeming a reward

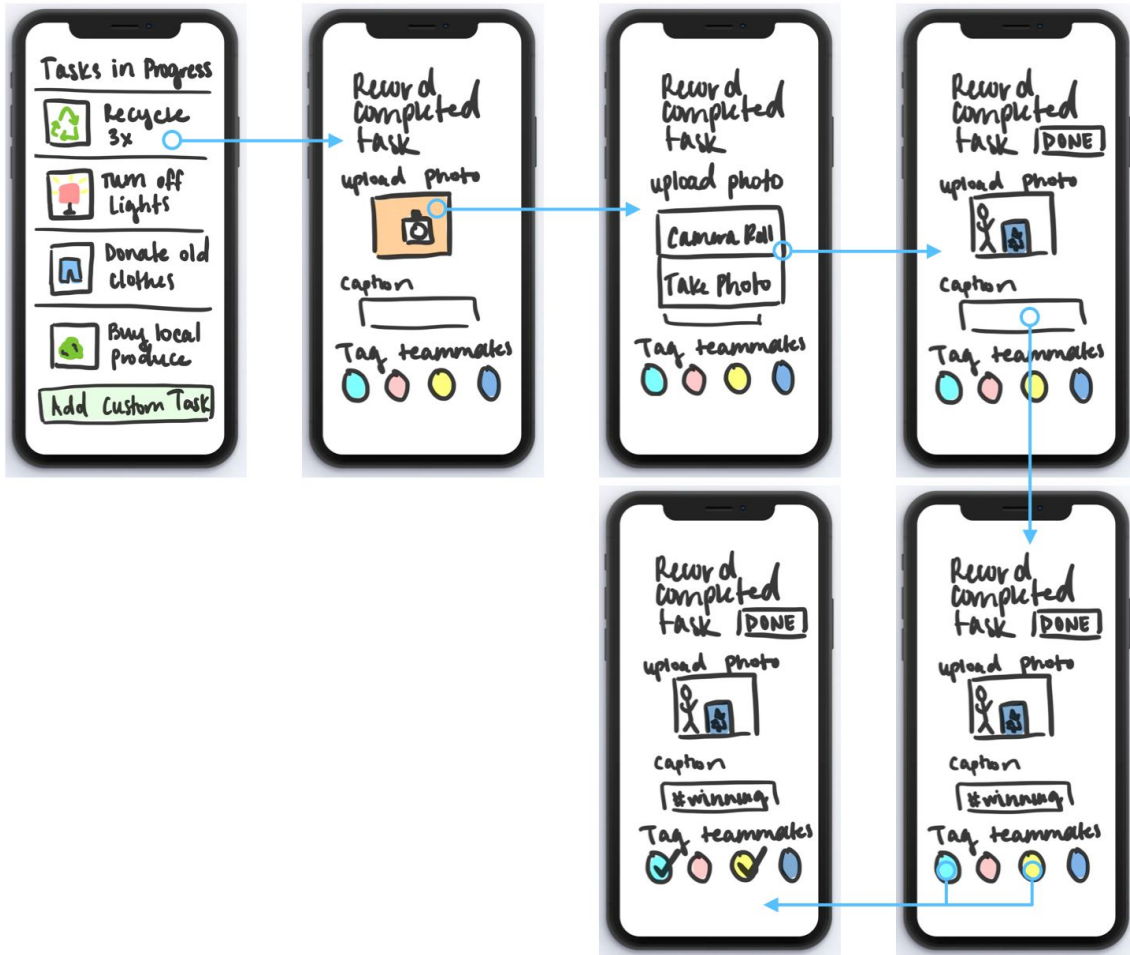


Figure 15: Lo-fi of medium task – logging a completed task

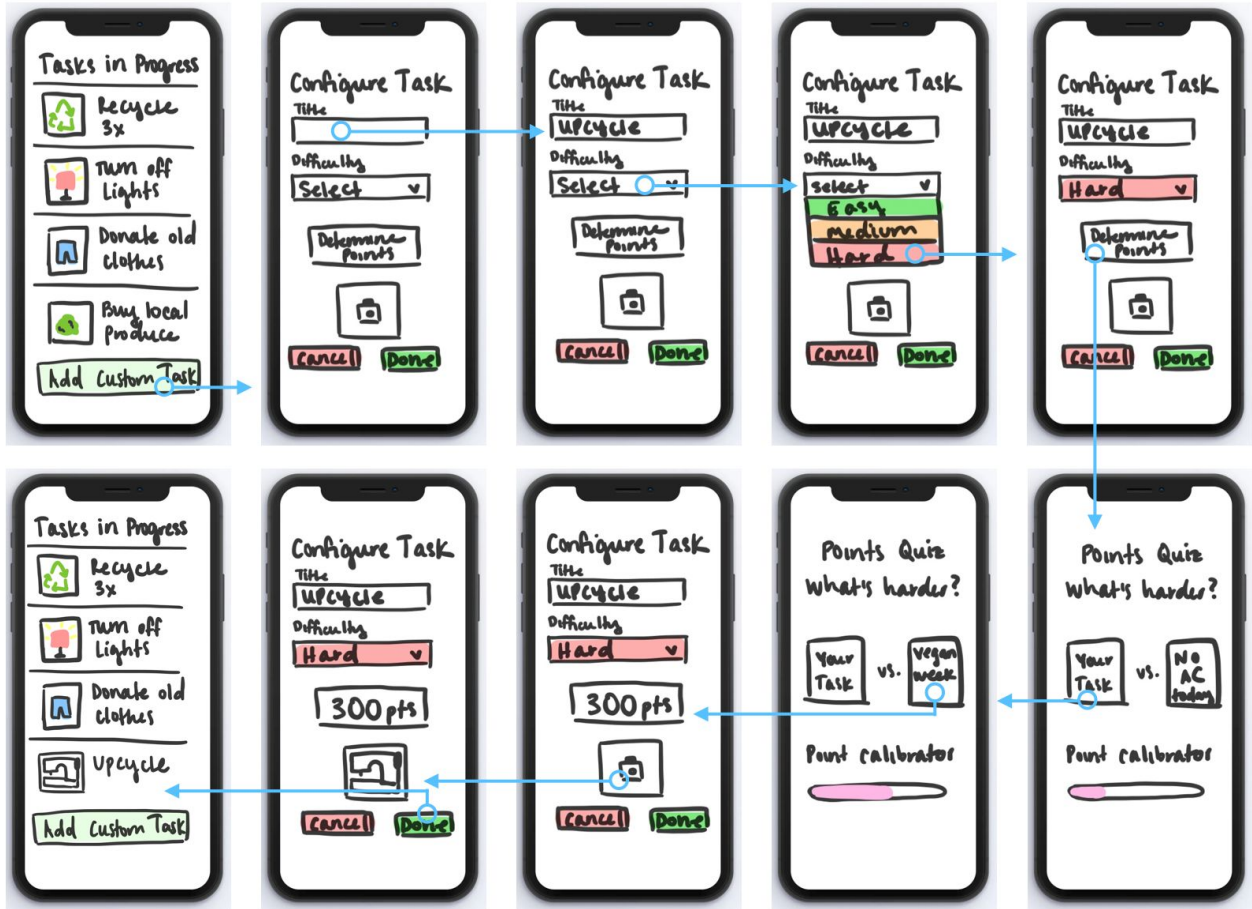


Figure 16: Lo-fi of complex task – Designing a custom task

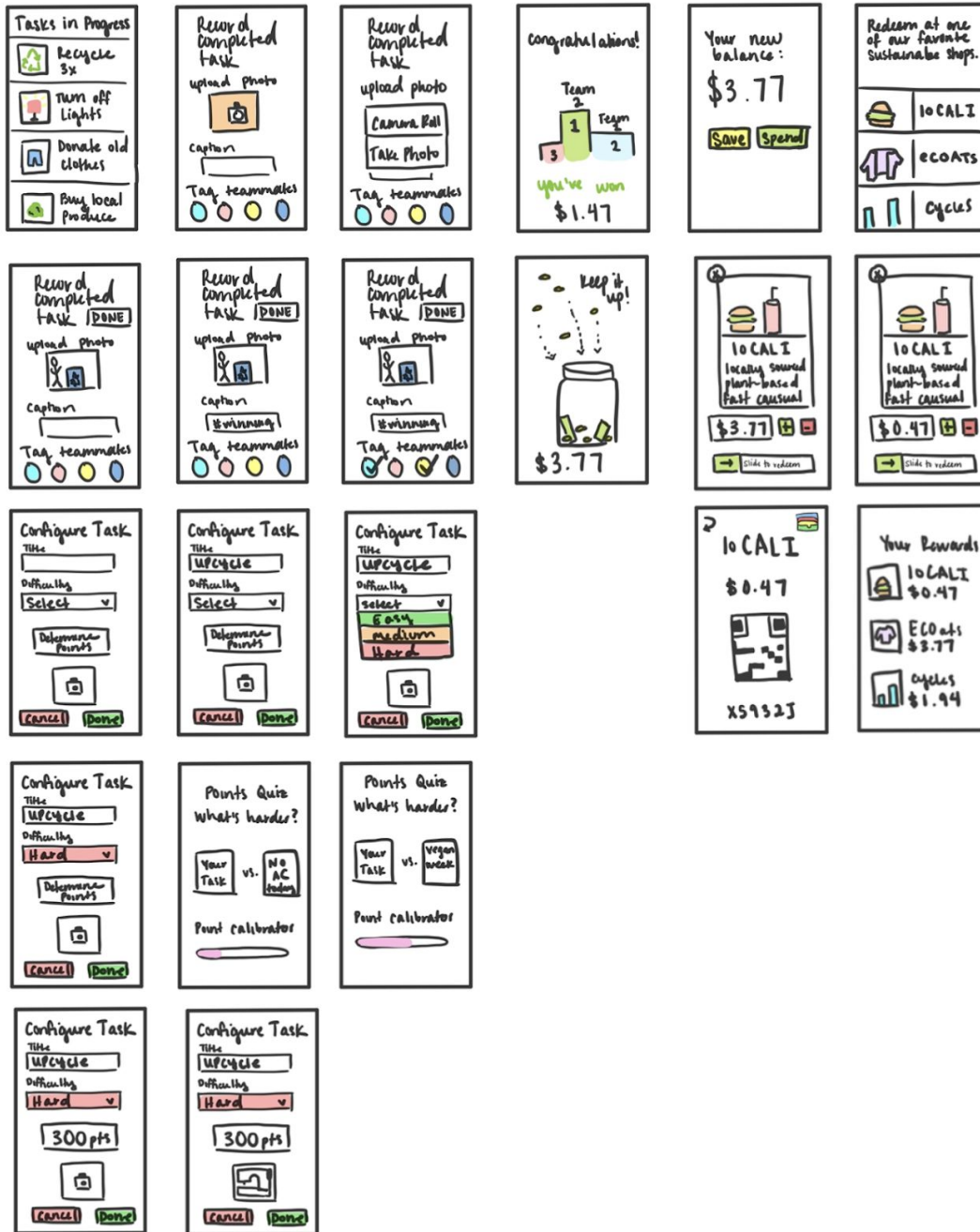


Figure 17: Full lo-fi system

Testing Methodology

Participants

We recruited young adults with strong group identities. We reasoned that young adults are often involved in extracurricular groups, live with peers, and seek external social approval. We found participants through our personal networks, focusing on second-degree connections.

- Stanford sophomore majoring in Ecological and Biosphere Engineering, involved in a close-knit sustainability-focused social group
- 23-year-old leader of an outdoor adventuring group
- 22-year-old track and field athlete majoring in Business at the Eastern Washington University, who has a competitive nature and team mentality

Environment

We uploaded all paper sketches to POP by Marvel and established linkage between screens. We conducted usability tests on Zoom and sent participants the link to our POP prototype upon joining the virtual meeting. We asked participants to flip their laptop around and “hug” it so that we could observe their finger movements as they navigated through the prototype. Due to this setup, we could not observe participants’ facial expressions, but made this decision intentionally to prioritize visibility of their finger movements and prototype screens.

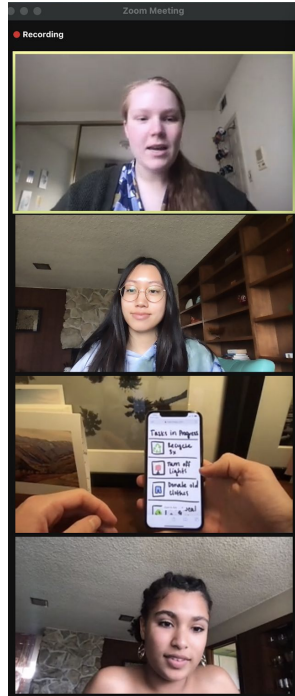


Figure 18: Testing environment

Tasks

We were interested in identifying any particular pain-points, areas of confusion, or receptiveness to our 3 tasks:

1. Simple: Redeem a reward
2. Medium: Log a completed task
3. Complex: Design a custom task

Procedure

1. Team introduction + project overview
2. Ask the participant to execute a specific task.
3. Open-ended debrief (i.e., How was that for you?)
4. Repeat for all 3 tasks.

5. Wrap up with asking for general feedback on the prototype, particular pain points, and aspects they wish were different. Follow up on moments in the test that stood out to us.

Test Measures

- Number of times participant said they were confused
 - **Record task:** 2, 1, 2 = 5
 - **Redeem Reward:** 1, 3, 3 = 7
 - **Custom Task:** 1, 1, 2 = 4
- Time spent performing task
 - **Record task:** 0:50, 0:46, 1:07 = 2:43
 - **Redeem Reward:** 1:11, 1:09, 1:25 = 3:45
 - **Custom Task:** 1:03, 1:07, 1:18 = 3:28
- Number of times participant navigated to incorrect screen
 - **Record task:** 0, 0, 0 = 0
 - **Redeem Reward:** 1, 1, 1 = 3
 - **Custom Task:** 0, 0, 0 = 0
- Number of times participant asked for clarification on instructions
 - **Record task:** 1, 0, 3 = 4
 - **Redeem Reward:** 2, 1, 4 = 7
 - **Custom Task:** 1, 0, 2 = 3

Team Interview Roles

- Greeter + Facilitator: Provides the user an overview of our project and guides them through the test using a script
- Transcript + Behavior Observer: Takes transcript-style notes, records finger movements and behavioral cues
- Reactions + Emotions Observer: Notes participant's implicit and explicit reactions, testing experience, and confusion.

Results

Simple: Redeem a reward

All 3 participants were confused by the option to “save” or “spend” their newly earned balance. Participants felt their balance should automatically reflect new earnings, rather than have to select “save.”

1 participant thought the dollar amount applied towards loCALL was the price of an item at that store, rather than a balance to be redeemed.

1 participant did not understand the wallet concept. Without prior context of earning those rewards, it was not intuitive why they had a wallet containing multiple gift cards.

1 participant was unsure how and where they would scan the reward QR code.

All 3 participants did not understand that the + / - buttons adjust the amount of money to redeem at a store. 2 participants did not interact with the buttons at all and 1 thought the buttons adjusted a price.

Medium: Log a completed task

All 3 participants clicked on the “Recycle 3x” button having been told they completed recycling 3 times and needed to log the task.

All 3 participants followed the input fields from top to bottom (photo, caption, tagging teammates).

All 3 participants understood the caption and team tagging features immediately.

1 participant felt that filling out all of the input fields, especially uploading the photo, was unnecessary for logging a task (versus a simple checkbox).

Retrospectively, all 3 participants described this task as very easy and straightforward.

Complex: Design a custom task

All 3 participants knew to scroll down and select “Add Custom Task” upon instruction to create a custom task.

All 3 participants were thrown off by the preset input fields. They went into the task with an idea (e.g., 1 participant intended to create an “eating vegetarian” task), but were surprised to see the pre-set “upcycling” and “hard” difficulty.

All 3 participants moved more quickly through this task than logging a completed task, perhaps because they were accustomed to the interface of input fields at this point.

All 3 participants liked the point calibration feature. 2 participants described it as “intuitive,” and the other 1 as “logical”. Their voices and body language got very excited during the points quiz.

1 participant momentarily forgot what their custom task was during the points quiz (the quiz used the words “Your Task” instead of the custom task’s name).

After pressing “Done,” 1 participant mentioned that the custom task appeared on their dashboard, as they expected it to.

1 participant mentioned the word “task” may have a negative connotation, appearing as an obligation.

Discussion

Participants received two of our task interfaces well, which validated the chosen interface for task completion and creation. However, participants consistently struggled with the rewards interface. In particular, the confusion seemed to arise both from the general concept of rewards and how they could be used, as well as interface decisions, such as having the rewards automatically open after completing a task, and having options to “save” or “spend”. Thus, we will focus on redesigning this interface to improve usability. When redesigning it, we will focus on streamlining users’ choices. It may also be useful to have a small pop-up the first time a reward is won explaining how rewards work within the app. Moving forward, our goal will be to flesh out the task completion and task creation tasks, as well as redesign the reward winning interface, in order to improve the usability and user experience.

Appendices

Blank Consent Form

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 (Clara MacAvoy, Jordan Fong, Nicole Woo, Morgan Zagerman) 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 Team 2'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 _____

Script

Intro: Hi _____. Thank you so much for taking the time today to try out our prototype. Before we get started with testing let me explain a little bit about our team. My name is _____. *introduce team* (who will be observing). Our team is designing an app. It's called Rooted and it's a community and competition platform that empowers individuals to make sustainable choices. Today you will be testing out three of our tasks within our app! Right now, we are focused on working out the functionality, so we are using an app called Marvel to compile rough paper sketches. We will be giving you instructions for what to do and then you will walk us through how you carry out the task. Do you have any questions? Let's get started.

Task 1 (Medium): You're in the middle of competing in a challenge with your team, and you just completed the last sustainable task which is Recycling 3x. Can you log that completion for us? While you are doing so please explain or think out loud about why you are making decisions or how you interact with the prototype. Go ahead and check out all the screens and let us know what you think.

Debrief 1: How was that for you?

Task 2 (Simple): Now your team has won the challenge and will receive a reward. Can you walk us through selecting and receiving a reward from loCALI? Again, please share your thinking with us while navigating through the screens. Go ahead and start when you are ready.

Debrief 2: How did that go for you?

Task 3 (Complex): And lastly for this task we would like you to design a custom sustainable task within the app. And just a reminder please think out loud! You can begin when you are ready.

Debrief 3: And again, how was that for you?

Conclusion: To wrap up, are there any features you particularly liked or wish were different? Was any part of this exercise difficult for you?

Great, Thank you again for taking the time to do this. Do you have any questions, thoughts, or concerns about anything that you experienced with the tasks?

Critical Incident Logs

Red text denotes errors (4 = usability catastrophe), green text denotes successes (0 = no problem)

Participant #1

Incident	Severity Rating
Thought he needed to click on the words Record completed task to start recording the task	2
"I've uploaded a photo perhaps?" Did not understand when the photo was uploaded	2
Understood the caption very quickly	0
Understood that tagging teammates is a way to hold accountability	0
Thought reward was coming from LoCALi so he you needed to click save button to collect reward	4
Got stuck on the saving page, no back button, had no idea what to do next	4
Once on Redeem page had a realization about what the task was he was trying to complete	1
Did not interact with +- buttons	2

"Oh ok" when he saw the wallet icon, confused by QR code page before seeing that	2
"I guess I don't really understand what these rewards are" did not understand what his wallet was storing	3
Understood to scroll down for "Add Custom Task" button at bottom of Task Dashboard	0
Added title for custom task first	0
"Sure like so this is very logical I am just configuring the task as it says" understood what custom task screen was asking implicitly	0
"Vegan week is definitely harder" got really sure of himself on the points quiz, voice got faster and more excited	0
"Ok great, that was really logical" in reference to points quiz	0
Thought that space to add photo for custom task was an icon	2
Knew to look for new Task on bottom of dashboard	0

Participant #2

Incident	Severity Rating
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Got held up on Record a Task page, did not know what to do next and that logging details was necessary	3
Thought that caption should be about what he recycled	2
Understood the tag teammate function	0
Clicked money first on congratulations screen	0
Chose to save the balance first instead of spend "Oh wait maybe I was supposed to spend it?"	4
Expected balance to immediately update without pressing save	3
Long pause at the redeem at sustainable shops screen, "ummmm"	2
Did not understand what the numbers meant, if it was a balance or a cost	4
Confused by what + - buttons were used for	3
Confused at QR code page, "I've got \$0.47 for LoCALi maybe still? To spend there?"	3
Understood what wallet was from the icon	1

"Difficulty? It was one of these? Ok it was hard?" not sure what to select in difficulty drop down	2
Entered in New Task title first	0
Figured out points quiz really quickly, and thought it was cool	0
Momentarily forgot his task was upcycling while in the points quiz	2
"300 points cool" liked that it calculated points for him	0

Participant #3

Incident	Severity Rating
Did not know what to do on Record a completed task page initially, needed clarification	2
Chose to upload picture first	0
Thought caption was a title	1
Chose to save first, wanted to spend the money on his teammates	4
Did not understand what the list of redeemable shops was	4
Very unsure on the page where you adjust balance, did not know if he was allowed to slide to redeem	3

Wanted to go back on the QR code page instead of go to wallet	2
Understood that QR code was meant to be scanned in a physical location	1
Found "Add Custom Task" button quickly	0
Wanted to select difficulty first before entering in a title for the task	2
Did not know where to press after putting in title and difficulty "Oh wait"	2
Did not understand Points Quiz, "What's the difference between these" did not know how to answer quiz on his own	4
"Now what? Is that it?" could not tell when creating task was completed	3