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Maia Miller: Design & Development
Jason Alexander Platt : Design & User Testing
Xin Jiang: Design & Development

Introduction and Mission Statement

We unknowingly consume over ⅔ of our total water usage through the groceries we buy. “Flood” is a mobile-based shopping app that calls to attention the environmental impact of food, encouraging users to make greener choices in their grocery shopping.

To get there, our team built a low-fi prototype to test the functionality and usability of the design. We performed usability tests with three participants who were unfamiliar with the concept of our product and our team members. After explaining the tasks, we asked them to run through those tasks and provide feedback on the UI. These results are valuable and will help improve our current design looking forward to the medium-fi prototype.

Sketches

The low-fi prototype used for usability testing was a combination of two ideas storyboarded(Fig 1 & Fig 2), selected and integrated from four alternate ideas sketched out by all members in our team.

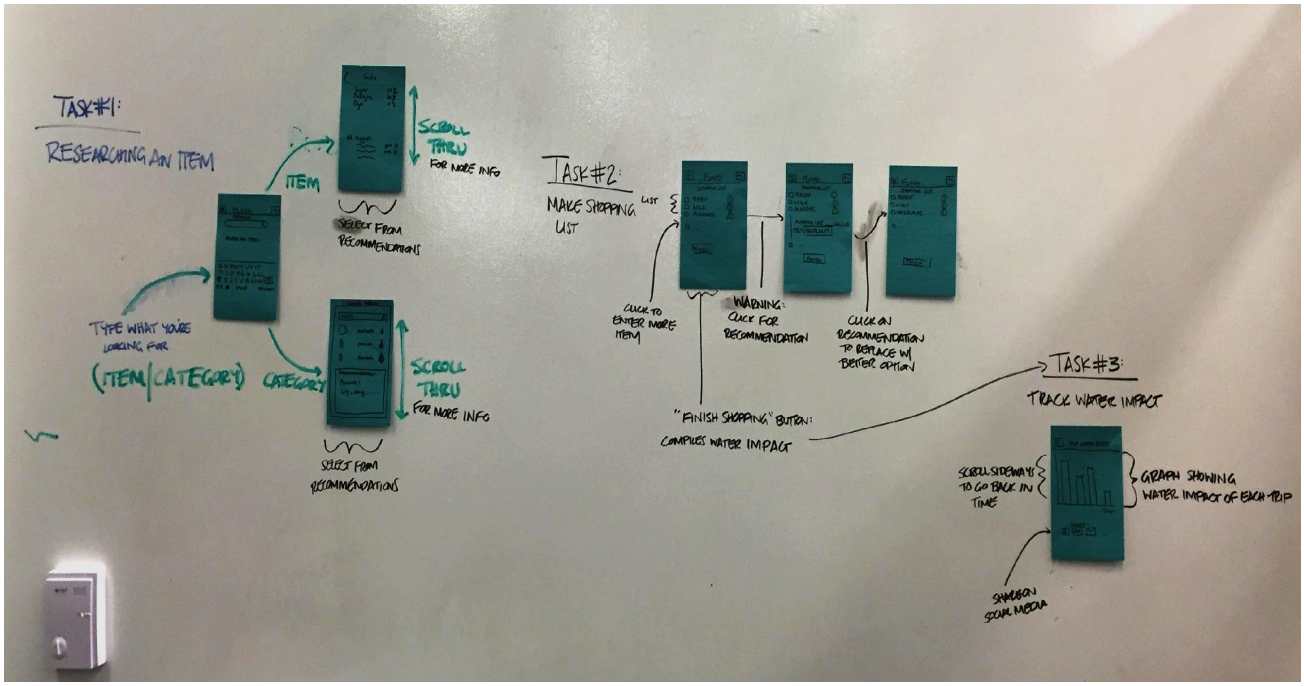


Fig 1

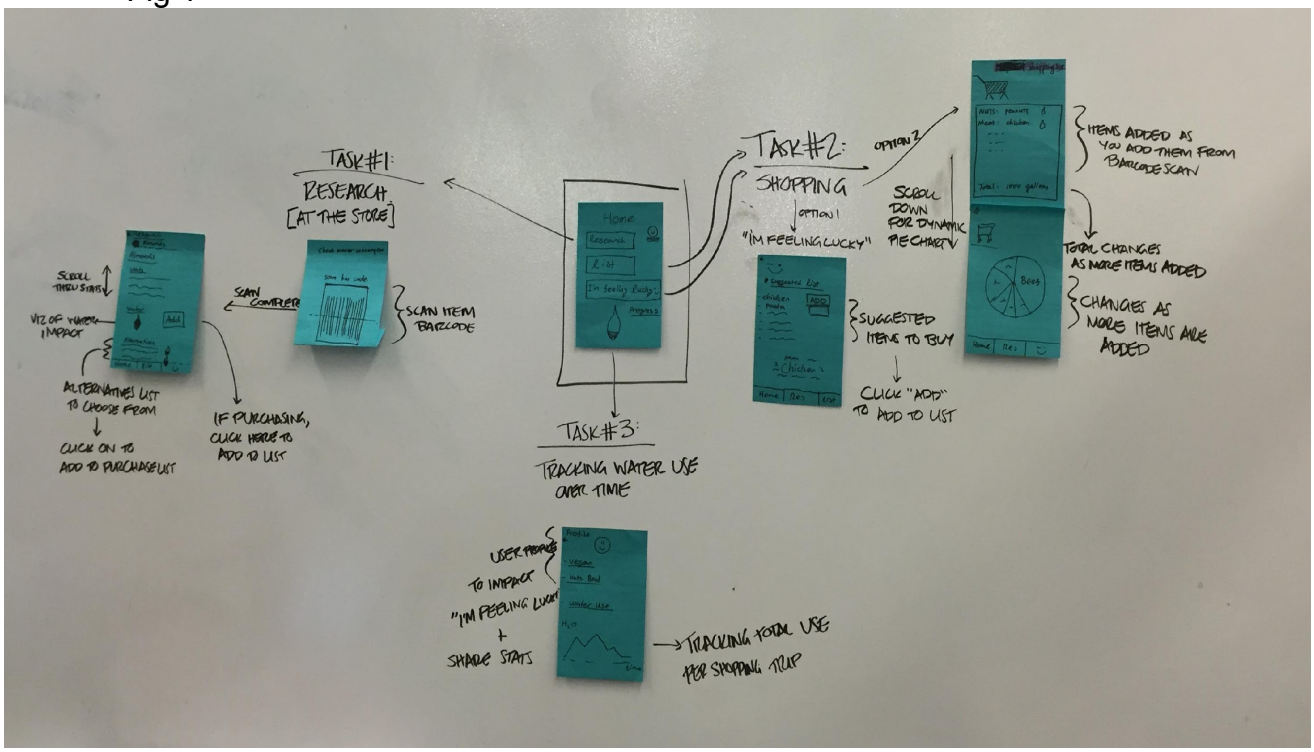


Fig 2

We designed three tasks for each sketch. The simplest task involved conducting water usage research on a particular food item. The main difference between the versions is how users can search for water consumption information. In our first design users perform a traditional search by typing items or categories into the search bar (Fig 3). The other design features a bar code scanner (Fig 4).

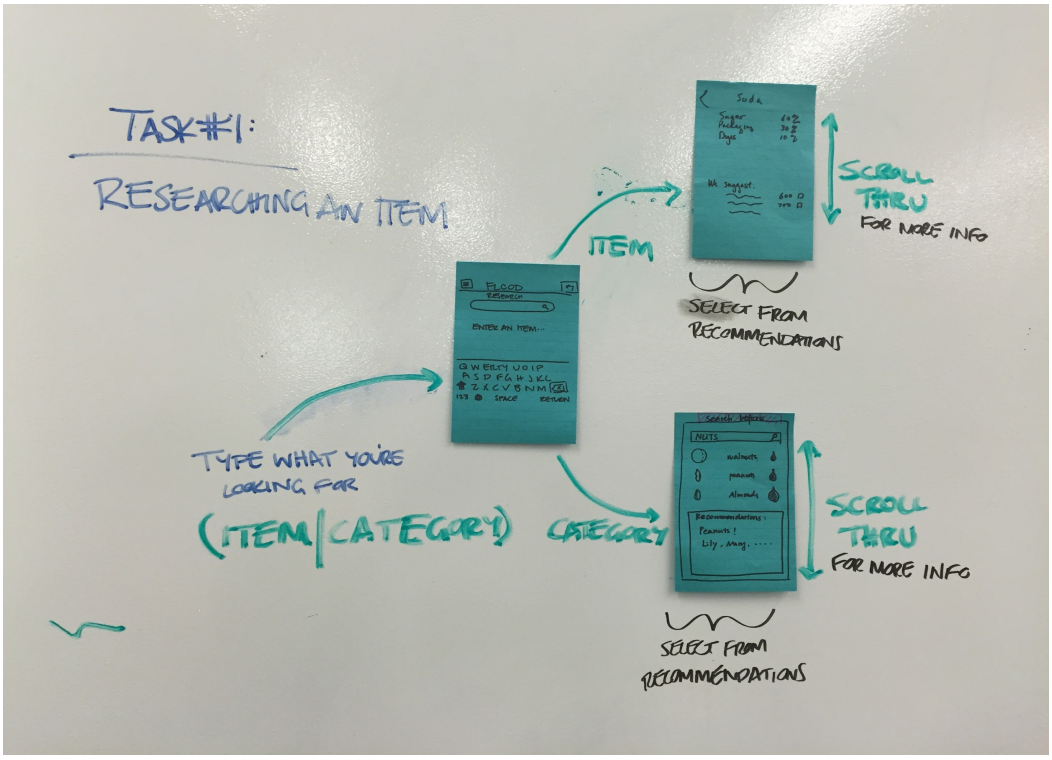


Fig 3

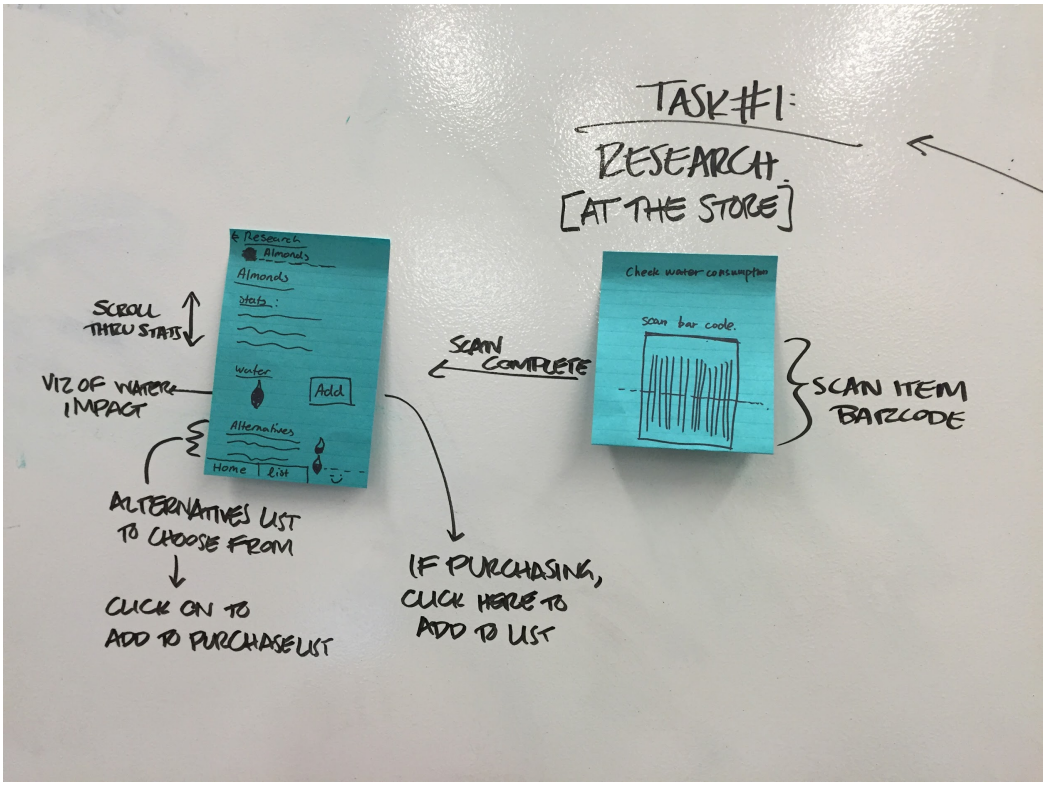
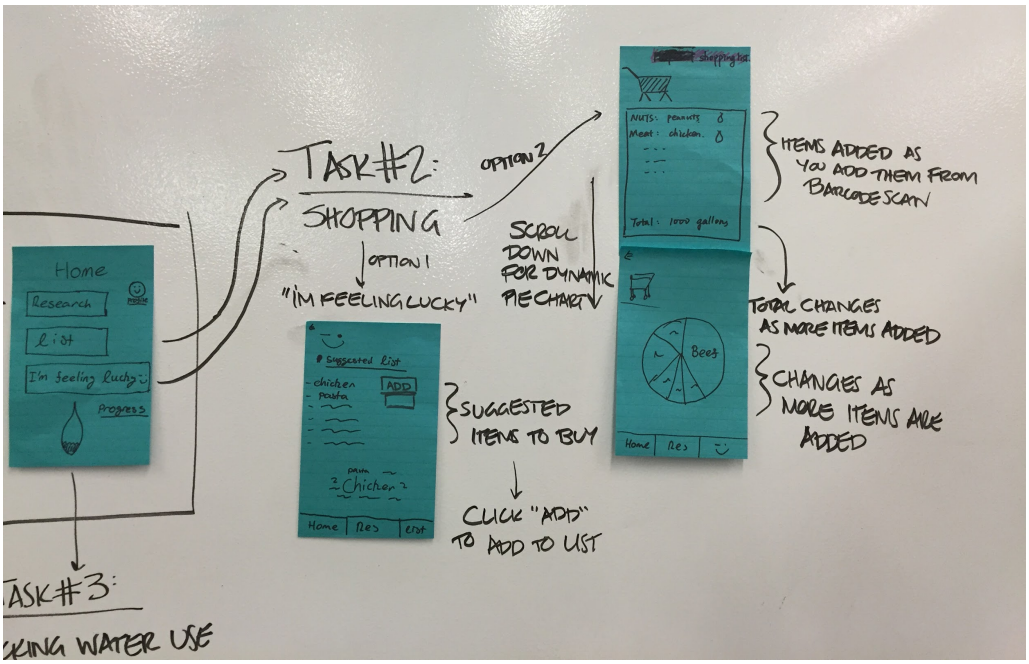


Fig 4

Our second, more complicated task, was to make a shopping list. The main difference between the versions is the form of the shopping list. One features a list with warning symbols that flag items with a high water footprint (Fig 6). When a user clicks on one of these flags, the app will recommend a

greener item. The second design features a dynamic pie chart that tracks the water consumption of each item (Fig 5). Furthermore, a separate recommendation page can be accessed by clicking the “I’m feeling lucky”button on the home screen. Users can add/delete items, and finalize their shopping lists by clicking on the “DONE” button at the bottom for both versions.



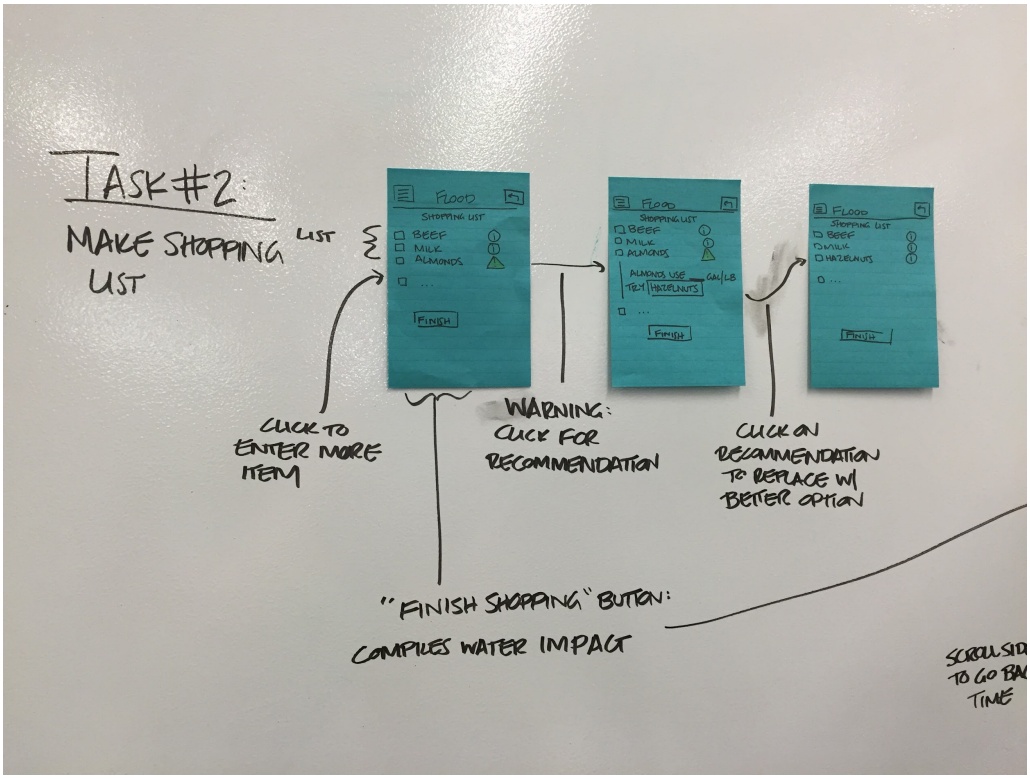
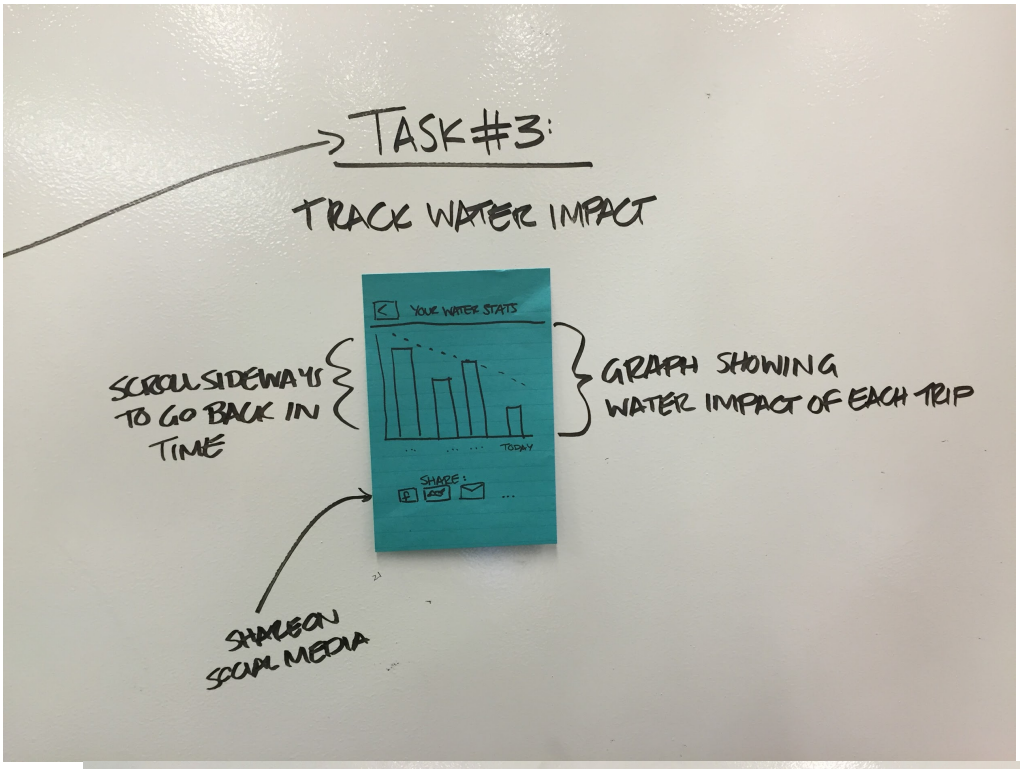


Fig 5
Fig 6

Our last (moderate) task is allowing the user to track their progress. One uses a bar chart showing the water impact of each trip (Fig 7) while the

other builds up a unique user profile and uses a line graph to track the total water consumed over time (Fig8). Users can share their green shopping list on social media for both versions by clicking on the “SHARE” button at the bottom of the screen.



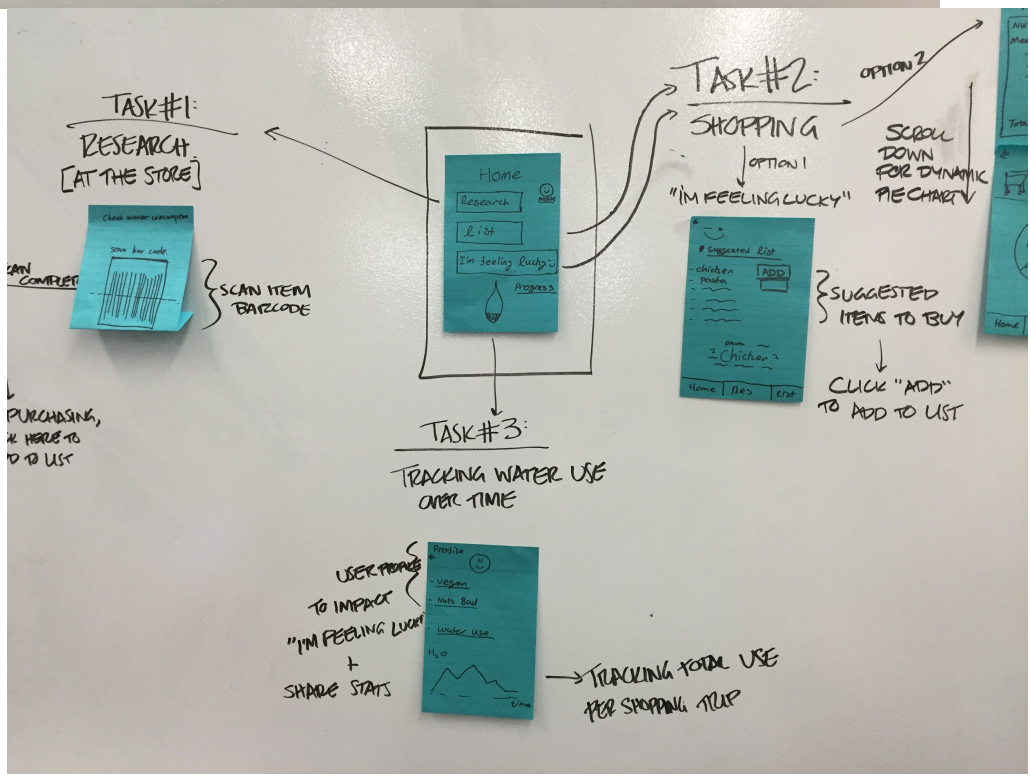


Fig 7

Fig 8

Selected Interface Design

The interface design being tested (Fig 9) supports the same three tasks: research for items (simple task), creating a shopping list (complicated

task), and tracking progress (moderate task). The final low-fi design is a combination of the two versions. Considerations in making the design decision include:

1) Exposure effect: people prefer to do something that they are familiar with. Use established UI techniques such as swiping.
2) Data visualization makes numbers more intuitive and forces user to see their environmental impact.
3) Easy switching between different tasks helps users navigate the app.
4) Keeping the app focused on the core idea, a shopping list, helps usability.

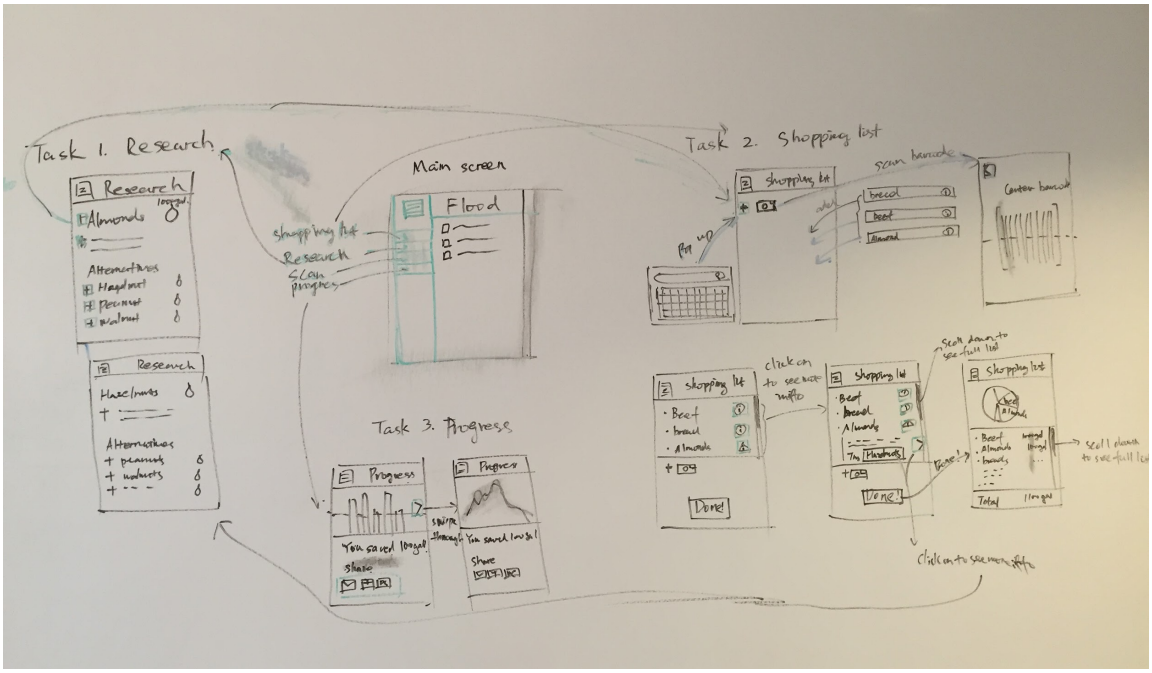


Fig 9

For the research task (Task 1), we selected a combination of the traditional search bar and the bar code scanner. Users can click on “research” and type in the items or categories to get water consumption statistics. Otherwise from the shopping list tab they can scan an item to look it up and then add it to their list. A list of green alternatives is presented to the user.

For the “create shopping list” task (Task 2) users add items to the shopping cart by either typing in the items or scanning the barcode on the items at the store. The list of items contains warning symbols in case a product is deemed environmentally harmful. Clicking on the warning sign produces a list of alternatives.

A dynamic pie chart appears after users finalize their shopping list allowing users to easily visualise their own water footprint (Task 3). Users can also edit their shopping cart after reviewing their shopping list and the pie chart. Finally users can see their progress, which is shown in both bar chart and line chart. They can also share their shopping list with friends on social media.

Interaction Summary

Description of tasks	**Functionality**	**Interface**	**Operation**
Task 1: Research for items (simple)	type in items in the search bar	main screen, search bar	click on the search bar
		pop up keyboard	type in items
	look at water impact	show water impact of items	click on the water drop
	add items to shopping list	“+” button on the side	click on “+” button
Task 2: Create shopping list (complicated)	add items to the shopping list by searching	“+”, camera buttons	click on “+” button
		pop up keyboard	type in the search bar
	add items to the shopping list by scanning barcode	“+” and camera buttons	click on the camera button
		scan screen	wait for the app to scan barcode and get info
	look at water impact of items	items on the list, with a warning symbol aside	click on the warning symbol
	search for info of alternatives	extension fields show up with detailed info of water impact of selected item and recommended alternatives	click on the alternative item, or swipe through the extension field to get more info of alternatives
	finalize shopping list	a list of items, scroll bar, “+” and camera buttons, “Done” button	click on the “Done” button
		summary of shopping list: pie chart, shopping list(scrollable), total water	

		impact	
Task 3: Track progress (moderate)	track progress	bar chart showing water impact of each trip	swipe through the graph
		line chart showing water impact of each trip	
	share on social media	share buttons at the bottom	click on share buttons

Prototype Description

We used index cards as the interface screens. The index card is slightly

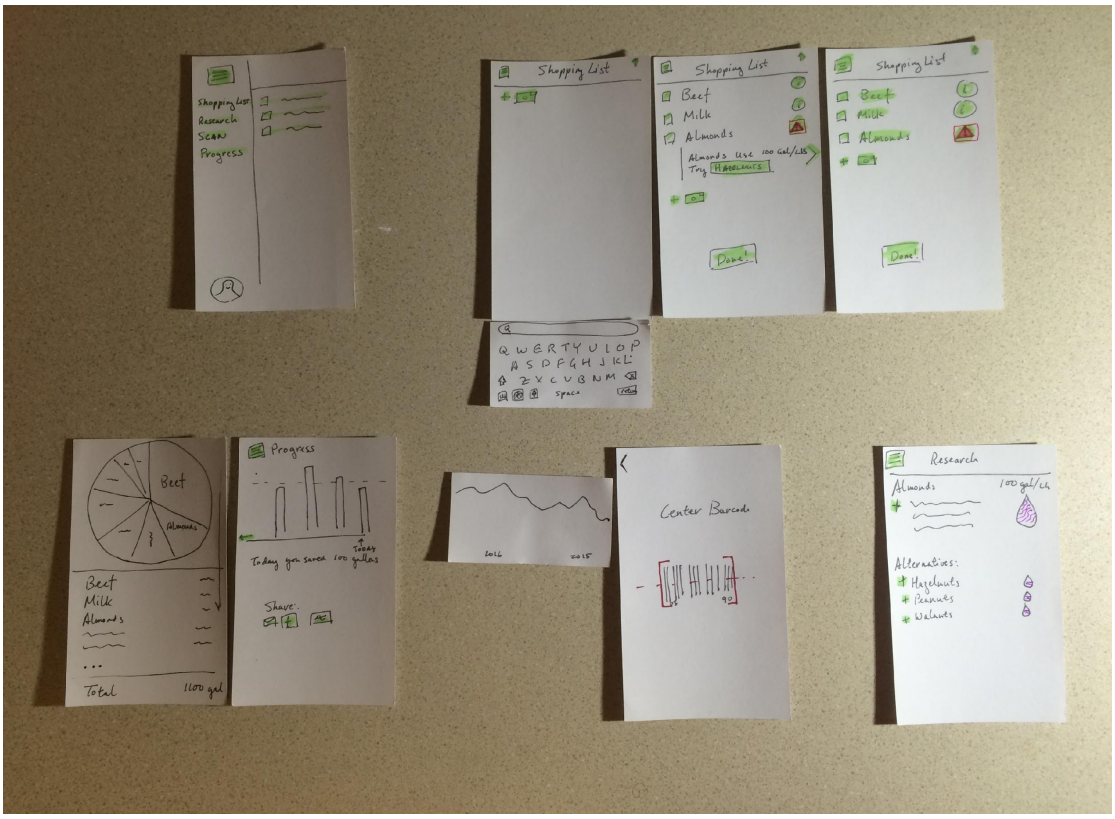


Fig 10

larger than an actual iPhone, but can still be held in one hand. The paper prototype includes a main screen, a research screen, a blank shopping list screen, two shopping list screens with water consumption information at different detail levels, a bar code scan screen, a final shopping list screen, and a progress screen (Fig 10). A mockup of the iPhone's keyboard was

created for input. Index card slices were made to help simulate the dynamic changes of the shopping list. Buttons that support interaction with the interface are highlighted in green.

The main screen has a hamburger menu on the left side, containing “Research”, “Shopping list”, “Progress”, and “Scan” buttons linking to the corresponding screens (Fig 11). The hamburger menu is hidden automatically,, but shows up when users click on the hamburger icon on the top left corner of every screen.

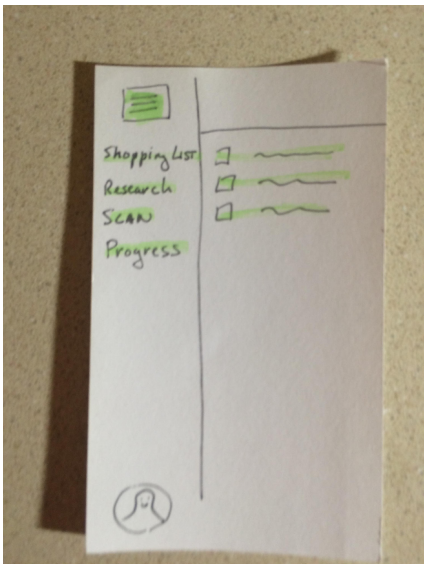


Fig 11

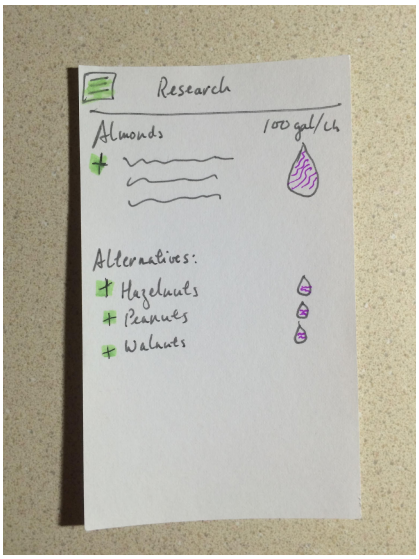


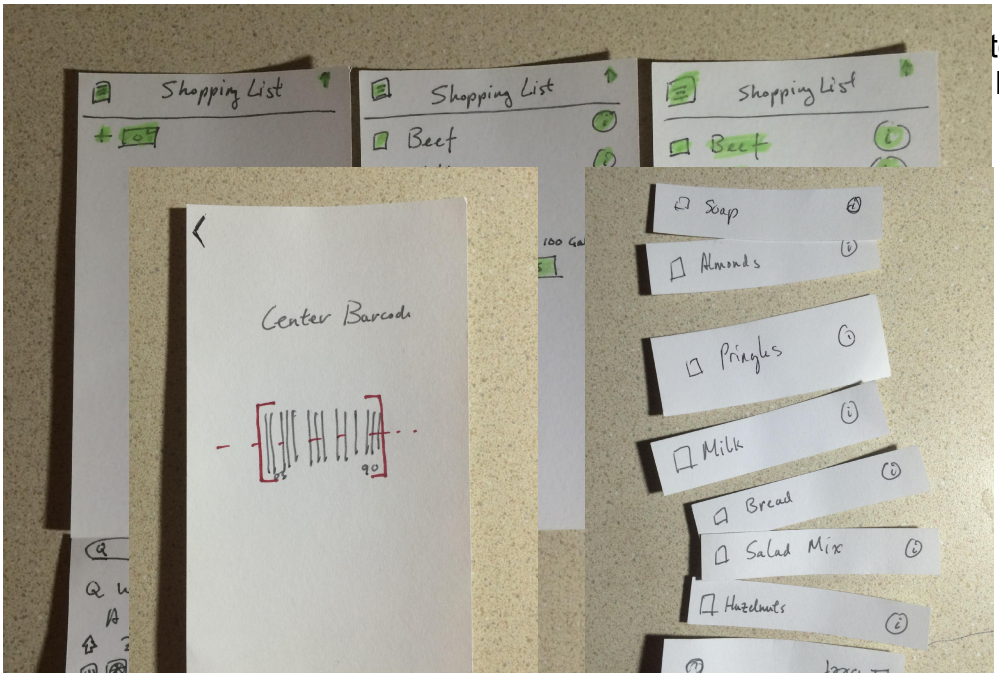
Fig 12

Users can type in the items or categories in the search bar to find water consumption information about the items. On the research screen (Fig 12), the water drop on the right shows the water consumption of each item. For this version, the size of the water drop represents the amount of water used for production of the item. In addition, recommendations are listed at the bottom of the screen. Users can add the item to their shopping cart by clicking on the “+” button on the left.

Fig 13

Fig 14

Fig 15



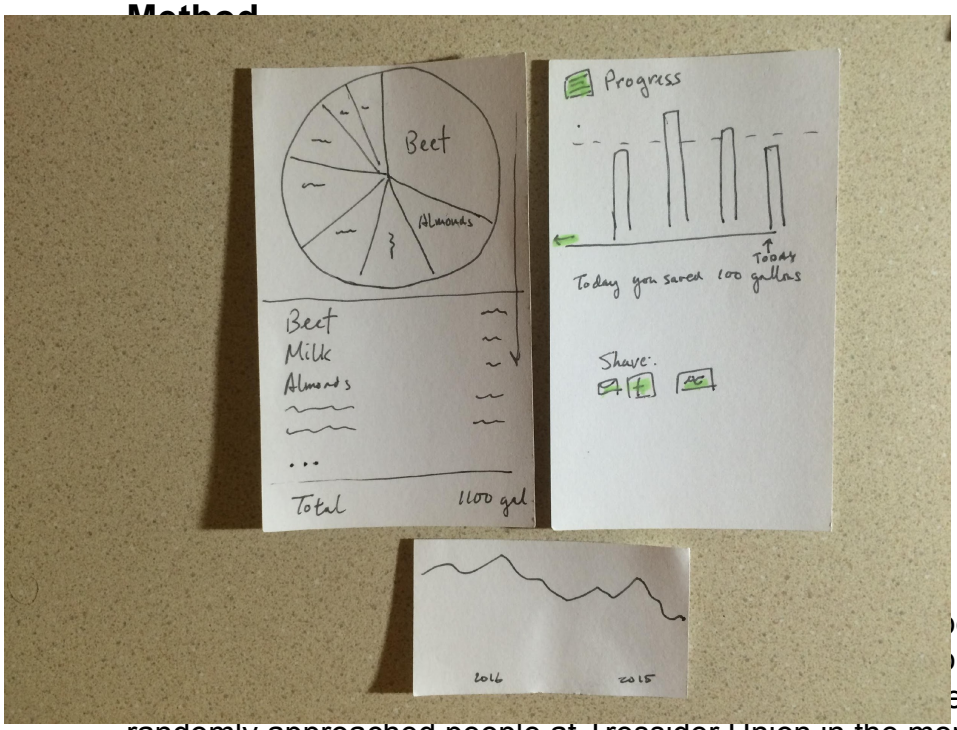
ted with a “+”
list either

by clicking on the “+” and typing in the items they want, or by clicking on the camera button and scanning the barcode on the item (Fig 14). When users click on the “+” button, a mockup iPhone keyboard will pop up. Series of index card cut-ups were generated to be added or deleted in the shopping list, simulating the dynamic interaction (Fig 15). Different warning symbols next to each item suggest differing amounts of water consumption. The round symbol represents the item consumes little water, while the triangle symbol represents the item consumes a lot water. When users click on the warning symbol, extension fields show up with more detailed information and list of alternatives. To get more water consumption statistics of the alternatives, users could click on the arrow. Users could finalize their shopping list by clicking on the “DONE” button at the bottom part of the screen (Fig 13).

When users click on the “DONE” button, they will proceed to a finalized shopping list screen which shows water consumption of each item in a pie chart and the total water consumption at the bottom (Fig 16). Users scroll down to see the complete list if they have a long shopping list.

Finally, users can access the progress screen through the hamburger menu. On the progress screen, users could track their water footprint over time. Water impact of each trip is visualized in the bar chart. Users could also scroll right to a line chart, making the track of progress more intuitive.

Fig 16



Method

e the potential user
ple who were
embers. We randomly approached people at Tressider Union in the morning, and got three volunteers, two of whom are between 20-30, and the other one is over 30. The participation was completely voluntary, and participants didn't receive any compensation for being involved in the test.

Before testing our product, we crafted a script, assigned team

members to the four tasks, greeter, facilitator, computer, and observer, and practiced the test within our team. After meeting the participants, we gave them a quick overview of the purpose of **Flood**- “help people make informed decisions about their water consumption”- and introduced the basic ways of interacting with the prototype (“by clicking on the button highlighted in green, you can interact with the prototype”).

Procedure

First the “greeter” gave a brief explanation of the project and the test. Then the facilitator gave brief instructions on the basic interactions and the three tasks to accomplish. The user would then start interacting with the prototype while the “computer” manipulated the index cards as if the participant was interacting with a real app. Instructions were purposefully vague to see if the UI was intuitive to use. After accomplishing the tasks, participants were asked to comment on what they like about the prototype and what part need to be improved. We recorded the test on video while participants interacting with the prototype so we could review the test later.

Test Measures

We designed our test measures with a goal to measure functionality and usability. We made sure that the design of the task flow was logical and made sense to participants. We took notes on whether participants could proceed towards the accomplishment of the task, at which step they were stuck and got confused, and whether they could finally accomplish the tasks. We also collected the time they used to perform each task, and the number of places they were stuck or got confused from the video.

Results

We received some good feedback from the tests we conducted. Most people expressed interest in the app and overall had generally positive things to say. All of them enjoyed the barcode scanner option with one of them exclaiming “so cool!” when the screen appeared. The graphs were found to be “interesting and useful” by the majority of participants and the app straightforward and intuitive. The hamburger button especially was a big success since many people had seen a similar UI before and knew exactly how to navigate around with it.

Having said that, many of the users felt “stuck” on certain screens, especially in the research tab. One of them suggested an extra button to add the item they were viewing onto the shopping list. Other issues we noticed were that no one ever went to the progress bar. Either they weren’t interested or it wasn’t easy enough to get to from the other parts of the app.

The last piece of feedback we received was that the icons for our buttons were confusing. One person thought the barcode scanner icon, which was in the shape of a camera, was a way for the user to take pictures of the items they were adding to their shopping list. Also the + button to bring up the keyboard was not obvious enough for many people. A better idea would be to have the keyboard pop up automatically and have people type their list right away.

Appendices

Interview Script

Introduction

We are conducting a short test to evaluate the prototype interfaces of our product “Flood”. “Flood” is a mobile-based app that helps you create greener shopping list, track the water impact of your groceries, and make informed decisions.

Direction

What you see is a very early stage prototype. It is not a real app, but paper sketches simulating the interfaces of the app. You will be asked to interact with the interfaces and finish three tasks: research for items, create shopping list, and track progress. You could interact with all the buttons highlighted in green, and here is the main page you could start from. Please let us know if you have any questions or comments.

Feedback

What you like about this app? Is there anything you feel confused about, or anything that you think need to be improved?

Consent Forms

Consent Form

The FLOOD application is being produced as part of the coursework for Computer Science course CS 147 at Stanford University. Participants in experimental evaluation of the application provide data that is used to evaluate and modify the interface of Flood. Data will 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 (Xin Jiang, Maia Miller, Jason Platt, and Mark Xue) 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 provided 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 experiment and my participation in it. I give my consent to have data collected on my behavior and opinions in relation to the FLOOD experiment. I also give permission for images/video of me using the application to be used in presentations or publications as long as I am not personally identifiable in the images/video. I understand I may withdraw my permission at any time

Name Julio Chavez

Participant Number _____

Date 10/20/2015

Signature _____

Witness name Mark Xue

Witness signature _____

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Name Stephone Christian

Participant Number _____

Date 10/20/15

Signature Stephone C

Witness name Mark Xue

Witness signature

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Name MIKE CRESCIBENE

Participant Number _____

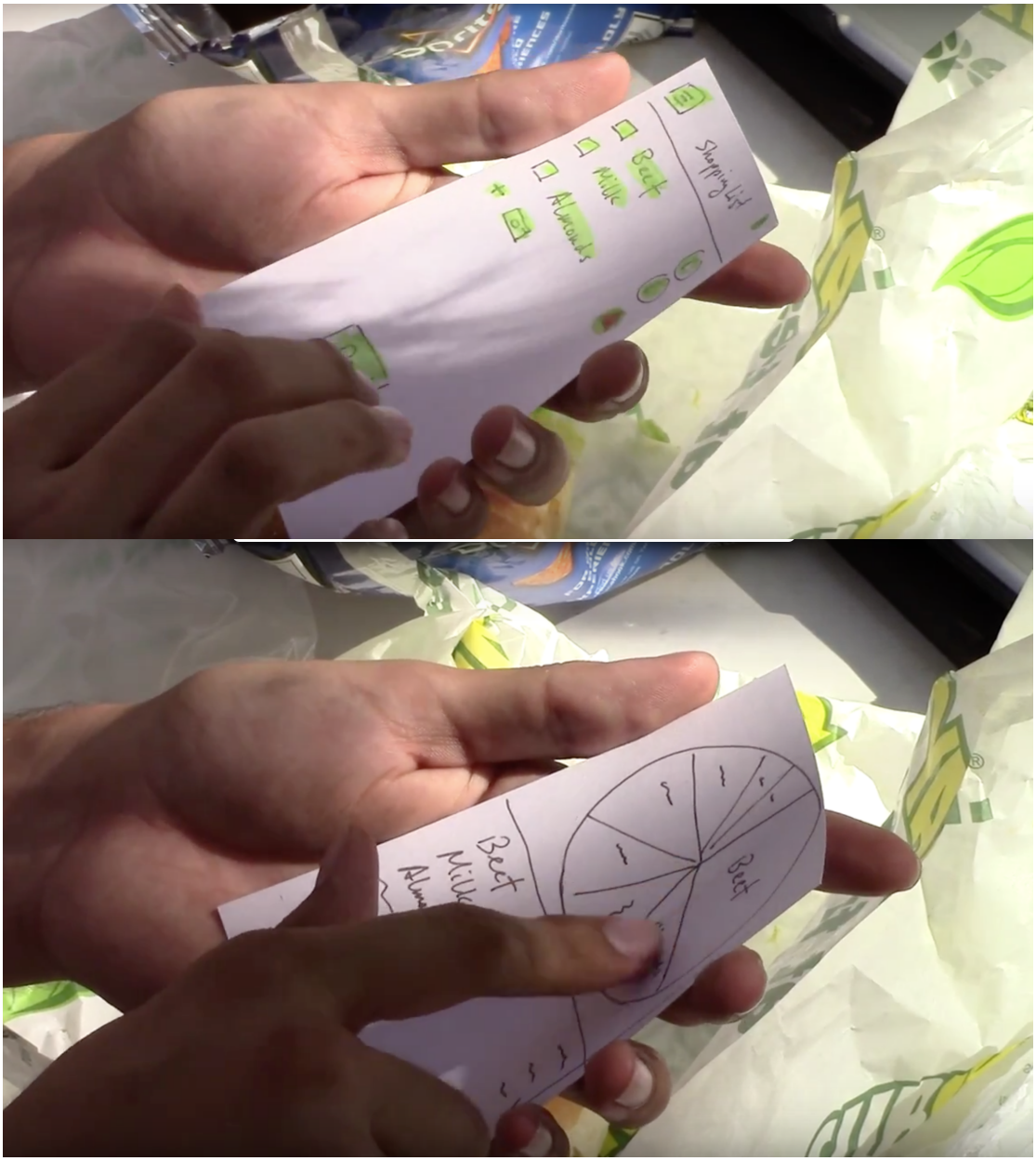
Date 10/20/15

Signature _____

Witness name Mark Xue

Witness signature _____

Interview-Notes & Raw Data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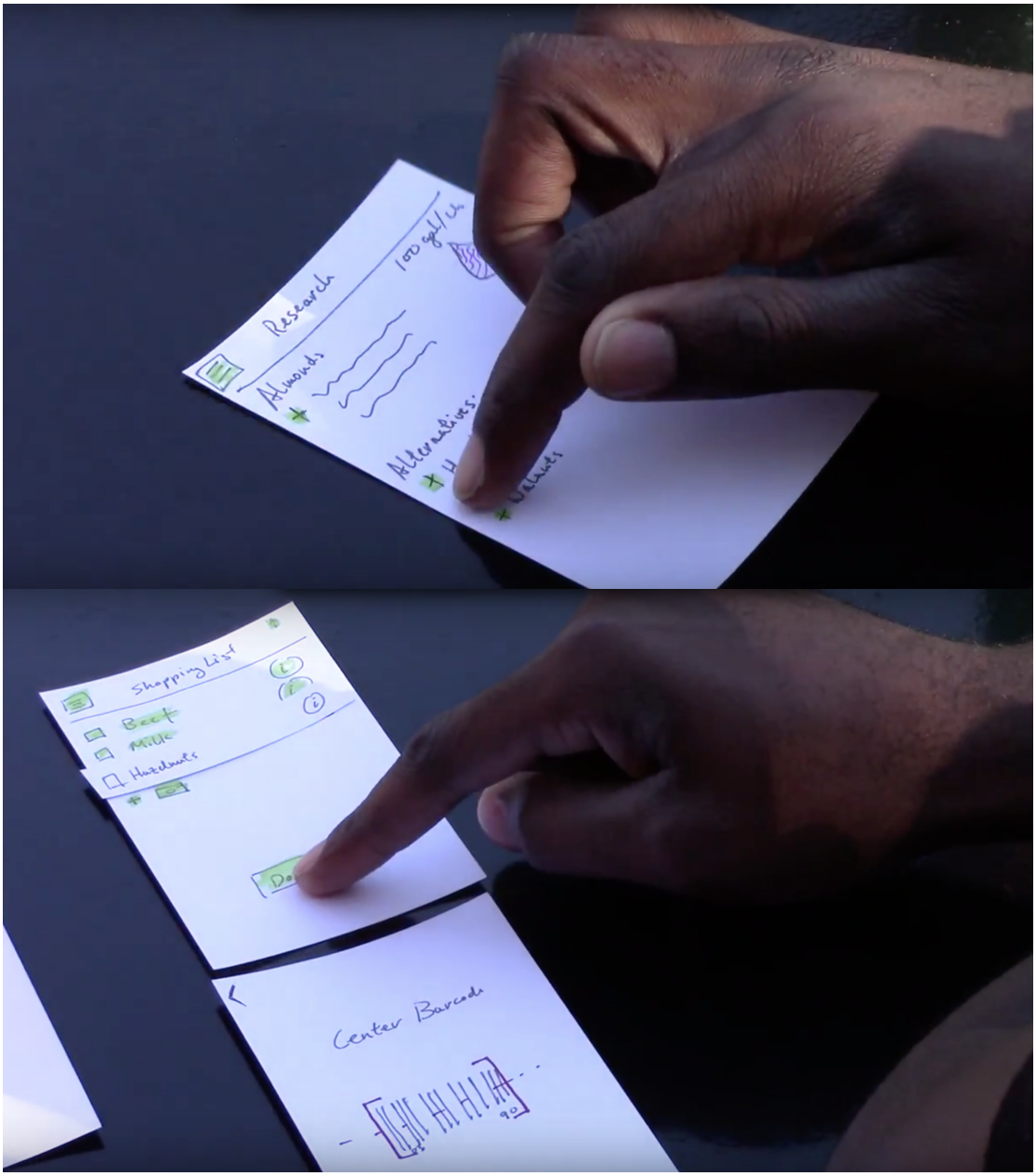
Almonds
Beet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Shopping List
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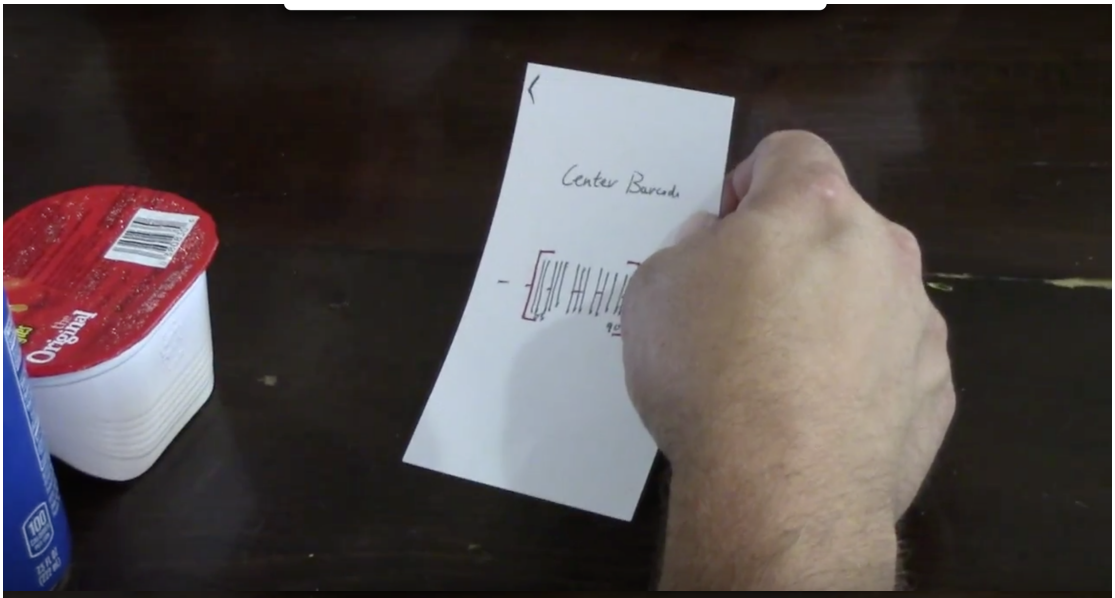
Center Barcode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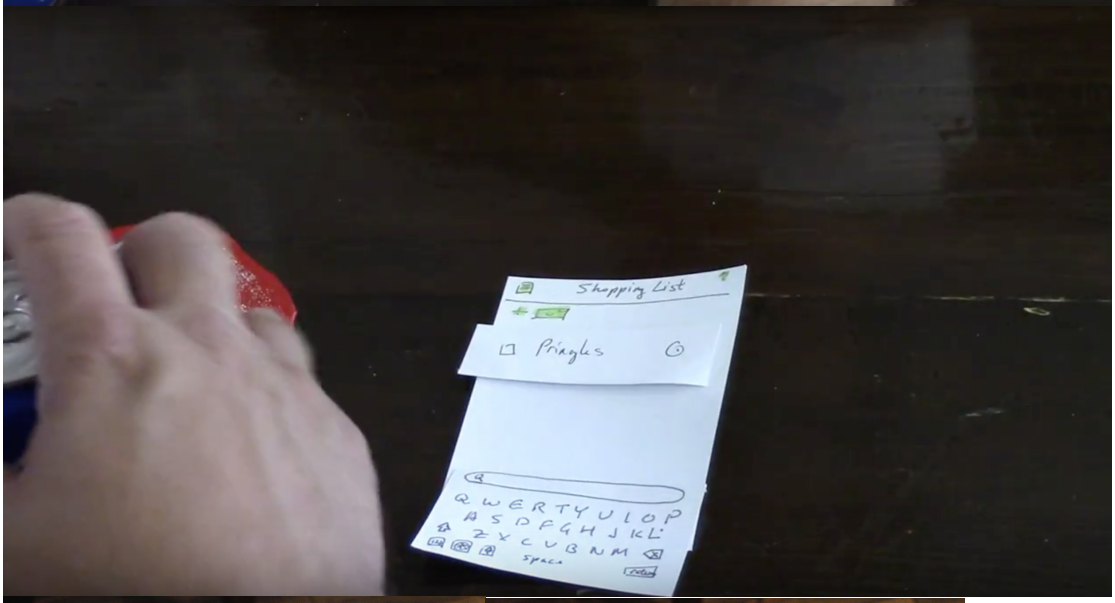
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QWERTYUIOP
ASDFGHJKL
ZXCVBNM
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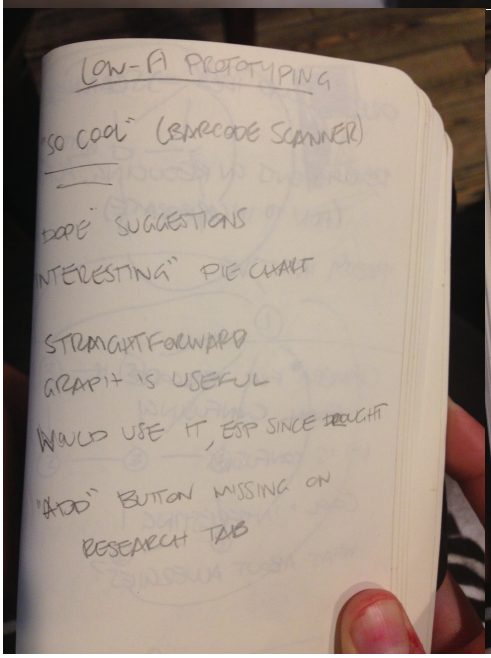
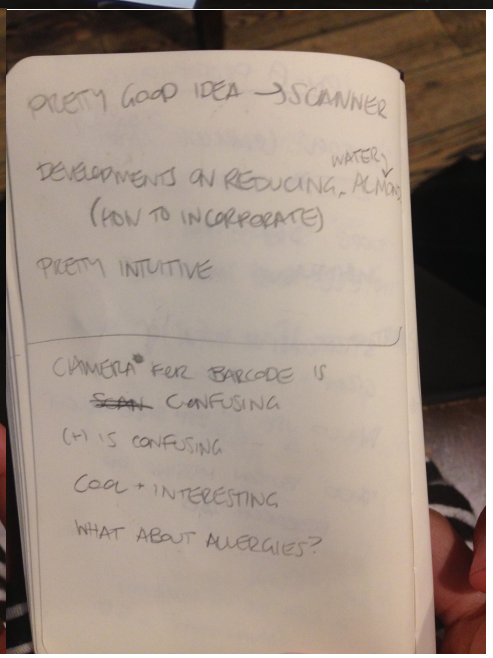

LOW-FI PROTOTYPING
SO COOL (BARCODE SCANNER)
DOPE SUGGESTIONS
INTERESTING PIE CHART
STRAIGHTFORWARD
GRAPH IS USEFUL
WOULD USE IT, ESP SINCE BROUGHT
"ADD" BUTTON MISSING ON RESEARCH TAB


PRETTY GOOD IDEA → SCANNER
DEVELOPMENTS ON REDUCING, WATER, ALMOND
(HOW TO INCORPORATE)
PRETTY INTUITIVE
CAMERA FOR BARCODE IS CONFUSING
(H) IS CONFUSING
COOL + INTERESTING
WHAT ABOUT ALLERGIES?