Füdger

CSC318H1: The Design of Interactive Computational Media
Assignment 8- usability study report
Group X
Members: Yufeng Zhou, Michael Le, Kyle Osborne, John Oabel, Pratyush Kanwar, and Sharene Carleen Thio
TA: Zhicong Lu

Table of Contents

Executive Summary

Our prototype emerged from the idea of reducing food waste. Food waste is a threat to environmental and food sustainability. According to research by Schnieder (2008a), 25% of edible food is wasted each year. Bailey et al (2009a) showcased that majority of food waste occurs within consumer households, whereas two-thirds of this waste is preventable (Schneider and Obersteiner, 2007). An implication of food waste is the decomposing food releasing methane gas into the atmosphere, which contributes to global warming. Therefore, reducing domestic food wastage will reduce the need for landfills and decrease associated ecological impacts.

Furthermore, food can easily be replaced during the consumers next grocery run. This encourages passive purchasing habits and implications of food waste is not considered. Therefore, design interventions targeting behaviours during purchasing and storing of food could stimulate a reduction in expired household food waste. This problem of food wastage has been tackled in the report via a mobile application named Füdger, that builds on human computer interaction concepts to facilitate a shift towards behaviours that reduce household food waste.

From our literature review and research, we found out that food waste happens throughout the stages of food provisioning - including planning, shopping, storage, food preparation, cooking, gardening, dealing with leftovers and clearing up. Therefore, we narrowed the problem space to help reduce food waste within consumers by helping them reduce overbuying food during their grocery runs. After three iterations of the prototype, we found three main problems; First, users had concern with being able to discern how many items were oldest of they had multiple items; Second, users would like the ability to be able to change the unit for items; Third, quantity of items in the inventory page will not update if users do not use the +/- buttons, despite it changing on the item page.

However, there were also a few design implementations and ideas that did not need to be changed or the users enjoyed having. Two of the major implementations was the ability to move the items bought in the grocery list to the inventory list with the click of one button, the other is the ability to add items through a barcode scanner. Both of these implementations

was included to ensure that the process was quick and easy, as to allow busy people to use the application as well.

Methods

Our prototype journey consisted of three iteration stages. While some methods were used throughout all three iterations, there are minor differences.

Iteration I

The first iteration consisted of gathering data and performing literature review and performing literature review to understand the user's need. This involved the team conducting three types of research- resulting in 55 questionnaires, 5 interviews, and 7 field studies.

The literature review was used to understand the problem of food waste and narrow the problem space. Each researcher provided their most relevant article and we discussed the findings as a group in order to select the problem space we wanted to solve.

For interviews, we interviewed 5 participants of varying genders, ages (20-45) and geographic locations. Researchers conducted semi-structured interviews with the same questions. Participants were located in urban and suburban areas (Downtown Toronto, Scarborough, Vancouver and Brampton) and varied in terms of living situation (living with roommates and individuals with families). We asked participants questions regarding how they feel about food waste, their grocery shopping habits (making a list vs not, how often they go grocery shopping, etc.) and ways that they go about reducing their food waste already. Qualitative data were combined and examined to look for trends in an individual's dispositions towards food waste and their habits when grocery shopping.

For the field studies, participants of different backgrounds, age groups, gender and economic status were recruited at grocery stores. They were quickly briefed and then asked to do their groceries as they would normally. Researchers would then observe at a distance and note down any relevant actions that the participants performed. Afterwards, during the debriefing, if there were any need for clarification, participants were asked a few questions by the researchers regarding some of their actions, as well as asked if they had any

questions regarding the field study. The data between two researchers were then combined and read out to parse any relevant, and converging information.

For questionnaires, participants were recruited among classmates, friends and on the internet. They were given a link to a google form and were asked to complete it.
The results analyzed from the questionnaire are as follows:

1. 67 percent of the participants do not make a grocery list before going to the grocery store.
2. Only 6 percent of the participants are fully aware of their food expiry date.
3. 87 percent of the participants have experienced throwing away of expired food.
4. 36 percent of the participants claim they are overbuying food.

Iteration II

For the second iteration, there were five participants testing the prototype. These participants consisted of three experts in the UX field and the other two were students from the CSC318H1 class at the University of Toronto. They were read a test script that has been carefully constructed and asked to perform tasks to complete scenarios in the script. While one researcher went through the script, two were timekeeping and another two were jotting down observations on the participant's actions and thoughts throughout the testing session. The testing sessions itself of the participant trying to use all the major features of the prototype, this included tasks such as adding and changing quantities of items in the inventory page, and adding items to the grocery list. The data from this iteration were then combined and again, any relevant and converging information were parsed out. Any recurring problem were put in the spotlight and then fixed for the next iteration.

Iteration III

After iteration II, the test script and prototype was modified. With the modified prototype, each researcher recruited at least two participants by any means, where most participants were in the social circle of the researcher. The modified script was then used during the test sessions and similar tasks were performed by both the participants and researcher.

Findings can be found in the Finding and Design Implication section.

Participant Demographics

Gender	Age	Occupation	Makes Grocery List (yes/no)	Living situation (alone/family/roommates)
Female	22	Student (Biology and Health Studies)	Yes	Family
Female	22	Student (Linguistics and Psychology)	No	Family
Female	23	Student (Cognitive Science and Buddhism)	Yes	Roommates
Female	24	Backend Developer	Yes	Alone
Male	22	Student (Filming)	No	Family
Male	21	Student (Computer Science and Statistics)	No	Roommate
Female	52	Retired teacher, mother of two	Yes	Family
Male	21	Student (Engineering Science)	No	Roommate
Male	53	Self Employed	No	Family

Female	17	Student (High School)	Yes	Family
Male	70	Retired Doctor	Yes	Family
Male	22	Student (University)	No	Family
Male	25	Employed	Yes	Alone

Table 1: Information of participant

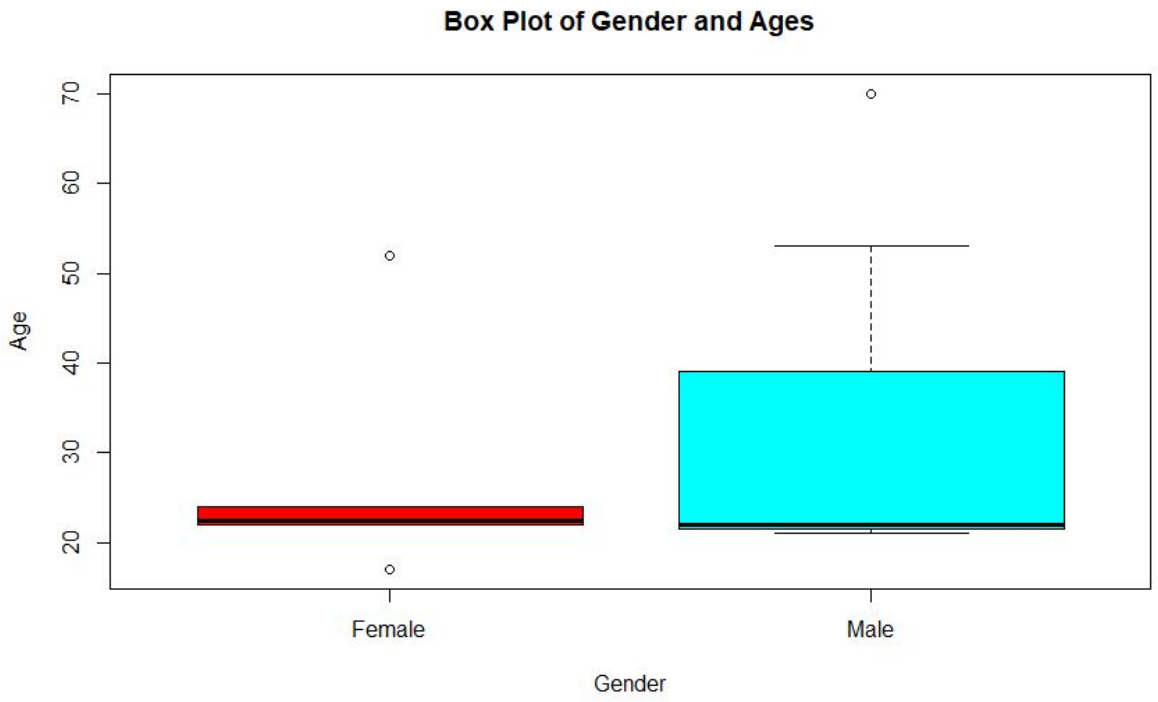


Figure 1 - Gender vs Age

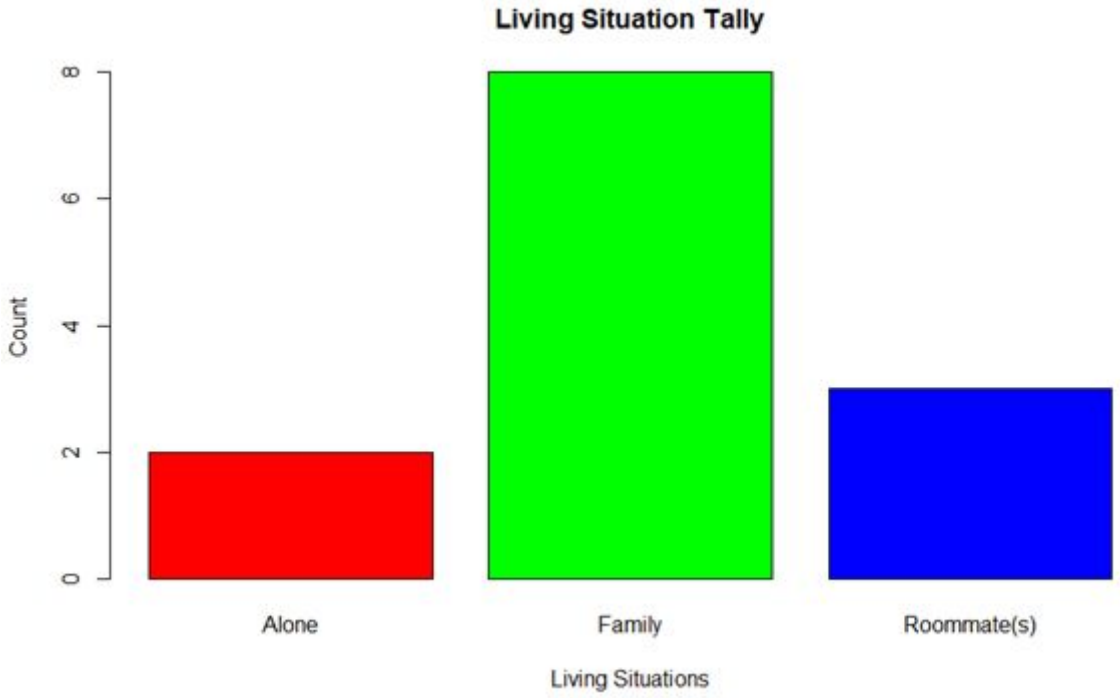


Figure 2 - Living Situation of Participants

Findings and Design Implications

Successful Designs

After all the prototype testing, we have identified a few areas that out prototype was successful at. Overall, users reacted very positively to the ability to add checked items in the grocery list into the inventory list as it eliminated the need to manually add them.

Here's what one user said:

Link 4: *"I like the integration of the grocery list and stuff you have in your inventory. So as soon as you buy something your inventory keeps track of like - - cause I actually thought that when I was using the app I would have to delete from the list and then manually add it to the inventory myself but it manages it all for you so it's really easy to use."*

Moreover, they also enjoyed having the ability to add items into the inventory list using a barcode scanner as opposed to manually adding each item individually.

While those were the main things people enjoyed, after an update to the grocery list page, users found the page a lot easier to use, in terms of adding items and editing the list. While most of the previous participants had to ask for help, the current design made it very seamless and quick to use.

In addition, there were some designs that did not to be changed aside from a new colour scheme. This includes the tips and tricks slide in the homepage, and the layout of the items and the search bar in the inventory page.

Challenges and Recommendation of Changes

However, even after three iterations, there are still some problems that participants encountered. These problems are listed below from the highest severity rating to the lowest. A solution to each of them will also be provided.

Problem 1: High Severity

Users cited it was difficult to discern which items were oldest if they had multiple apples. They were worried that they would be unable to tell which apples they'd had for 10 days and which ones they've had for fewer days.

Proposed solution: Creating a detailed display of the total time an individual item stays in the inventory

Before	After
Only the longest time of one type of items stays in the food inventory will be displayed to the users.	The users now have full access to days every item stays in the food inventory.

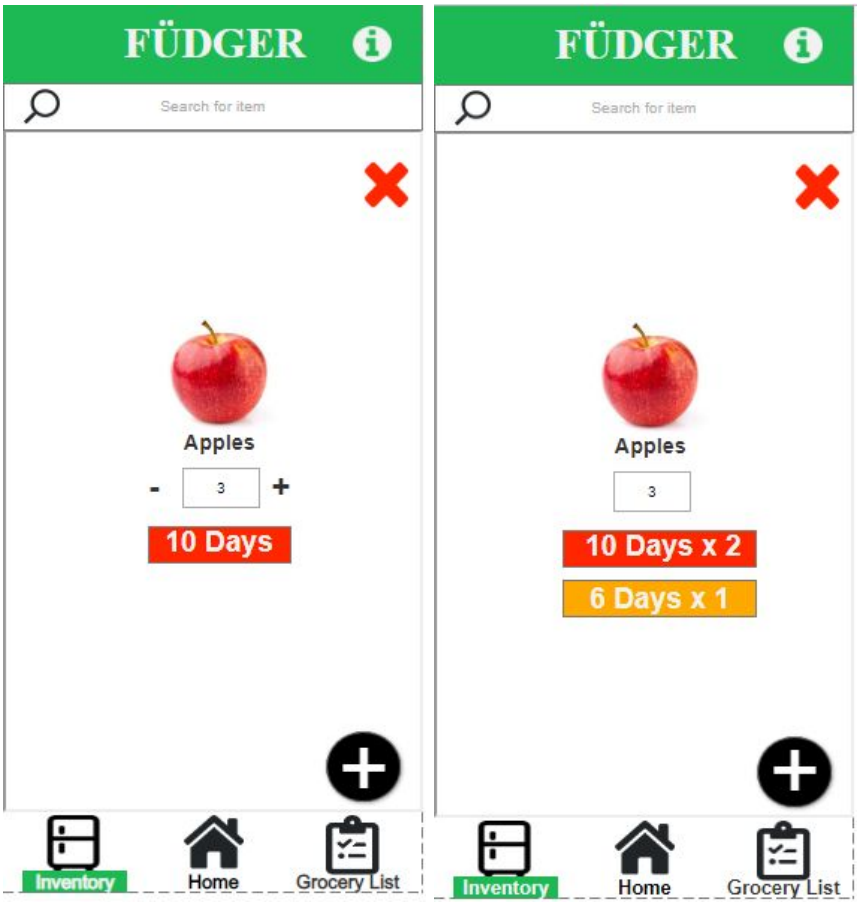


Figure 4: Before and After, Adding Detailed Display of Days Stays in the Inventory

Problem 2: High Severity

Users found it troublesome that they couldn't specify units, such ml, grams, etc, since it creates the possibility of users forgetting what the exact quantity of the item they should purchase. (example: buying a bottle of milk or buying a bag of milk cannot be told in figure 6 below)

Proposed solution: Adding units to item quantity

Before	After
There is no unit displayed for the quantity of items	Different units can be selected by the users.

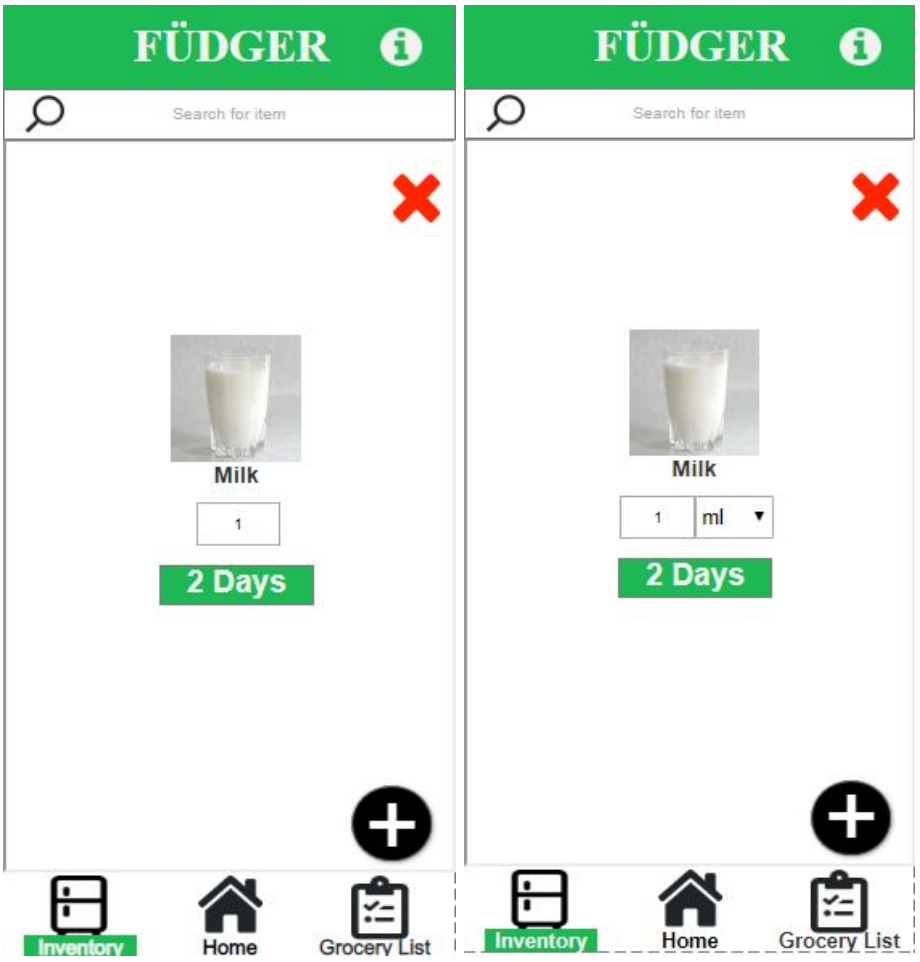


Figure 6: Before and After, Changing Units for Item

Problem 3: High Severity

Users did not know how to commit changes when changing quantities of an item in the inventory page as there was only an exit button and nothing to confirm their changes. Moreover, unless users changed the quantity using the +/- button, while the items quantity will change on the item's page, it will not change on the inventory page.

Proposed solution: Create a "confirm" button when users are changing item quantity in the inventory.

Before	After
Changes to the quantity is instantaneous, the red cancel button is designed only for closing the window.	Users can now confirm the update by with the checkmark or leave the page with the red cancel button, which is now on the left.

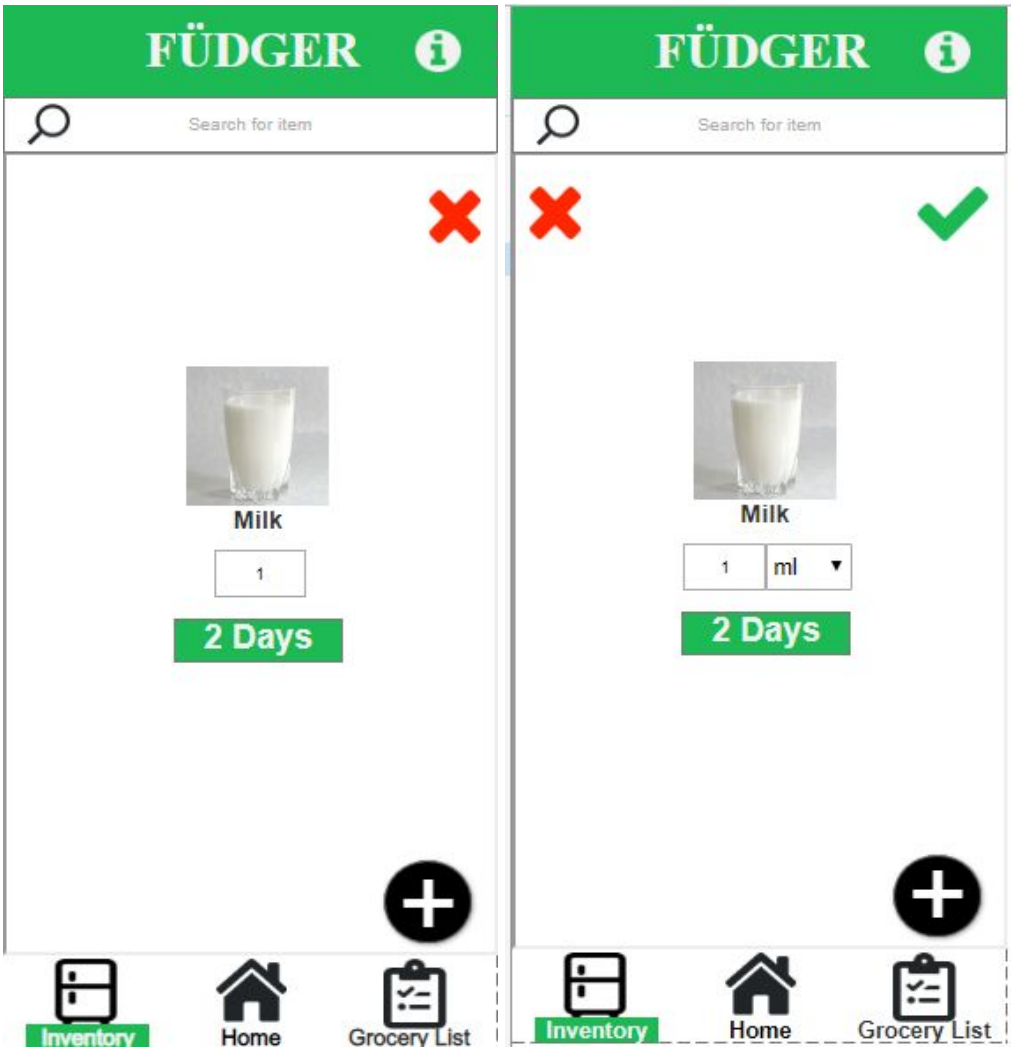


Figure 8: Before and After, Adding a Green Confirm Button

Problem 4: Moderate Severity

Users asked how they can delete items they consumed or disposed of in the inventory page.

Proposed Solution: In addition to the solution for Problem 1, adding swipe gestures to the item's detailed timeline by completely removing that item's batch or by tapping on a specific batch to decrease its quantity.

Problem 5: Low Severity

Users were unable to click the arrow on the homepage to move to the next slide.

Proposed solution: Enable the buttons to allow users to switch through the slides

Problem 6: Low Severity

Some users did not notice the first field for the grocery list was already included so they pressed the "New Item" button first

Proposed solution: Find a way to make the input sections more obvious.

Problem 7: Low Severity

Some users only checked the homepage for the first task regarding the oldest items.

Proposed solution: Make it clearer that these are not the only items in the fridge by adding a small information section under the heading.

Problem 8: Low Severity

Participants would manually add items through the add item button, even if the item already existed. However, that is not implemented yet.

Proposed solution: Allow users to manually add another existing item and have the system automatically increase the quantity of the item.

Problem 9: Low Severity

Some users didn't notice the "do not show again" button the first time when the tutorial pop-up window shows up.

Proposed solution: Have the pop-up not show up again but add a button that allows users to access the tutorial if they ever need it again.

Research Limitations

When examining our methods, limitations in our research become apparent. Our pool of participants is extremely homogeneous, they span between the ages of 17-70, but the majority of our participants are in the range of 21-24 with a mean age of 30.3, a median of 22 and a standard deviation of 16.61. It should also be noted that most of our participants were students in STEM majors. Due to that, our demographic were more tech-savvy, and this gives us limited information on how our product fares with individuals of varying ages, occupations, and experience with technology.

Our prototype itself was extremely limited in that there were some bugs that affected the user flow and some functions were hard-coded requiring participants to follow the researcher's instructions very closely to get the desired results. We believe this may cause the user to behave differently further along in the study as they are then more hesitant to use certain features. This, coupled with the prototype loading slowly at times (quantities not loading properly because of server issues with Axure or slow internet leading to pages not changing despite buttons being clicked) led to some user confusion that may have skewed the results.

Moreover, two of the features that were implemented were rarely utilized by the participants. One of them is the search bar in the inventory page. While we tried to encourage users to use the search bar in the test script, the minimal amount of items in the prototype made it unnecessary to use. The other is the gamification feature. Due to its implementation in the later stages, there was no scenario in the test script that made use of it. While the majority of the users did not see the button, those who did or were later informed of the feature responded positively to the idea.

Reflections

We are aware that this intervention is, at its core foundation, an attempt at behavioral modification. We aim to change people's grocery shopping habits as a means for reducing food waste in the Western world, and on a greater scale, global food disparity. From the user's perspective, they want to make grocery lists and keep track of their food at home more effectively. In order for this app to meet our goal of reducing food waste, this app is extremely dependent on new user acquisition and user retention. So the question is, how do we design this in a way that makes people want to try and continue using it?

We found various opinions on food waste, with multiple people in the questionnaire that they did not cite food waste as an issue for them, but when interviewing respondents they said that wasting food creates feelings of guilt and they're reminded of people in impoverished countries without enough food. We have implemented a gamification aspect to our app that rewards users for consistent use, but it needs further work. Suggestions we have received regarding ways to improve user retention and new user acquisition included a socialization aspect where users may be able to see how much food their peers waste as a means to guilt them into wasting less food. The limitation to this is privacy as it is an ethical grey area to share someone's food waste on social media. Another possible improvement to user retention could be recipes recommendations based on what users have in their fridge and a way for users to share recipes with each other.

Our application is also limited in that we are aware of the setup time it may require for users to import all of their food inventory into the app. Suggestions we have received included a possible physical intervention to go hand in hand with the digital intervention - for example hotel fridges are able to keep track of their own inventory and when guests take items from them. This would further streamline the process if users were able to get a smart fridge and

use the app as a companion. Another way to streamline the intake process would be the use of AR technology to scan the fridge using the phone camera and use AI to automatically add items and quantities to the inventory section.

An important takeaway from user testing was the irrelevance of certain features we initially implemented such as creating multiple lists. When doing usability tests, users found it more confusing and unintuitive than useful, citing that they are more likely to just make one list rather than multiple different lists. This is in line with the reality of grocery shopping, most people go to the store with one singular list of items rather than multiple lists for different meals.

This application was a good exercise in seeing the power of the digital realm in terms of modifying a very implicit behavior. Seldom do people think of ways to streamline the most mundane and simple tasks in life such as grocery shopping, but because of this innate simplicity in the realm there are many opportunities to overcomplicate. The iterative design process and usability testing allowed us to see and rationalize our failures giving us opportunities to change our design to better fit our users need. Interactive design is deeply rooted in the user first and requires a product team to draw heavily from user feedback and exploration.

Link(s) to Curated Video/Audio Segments

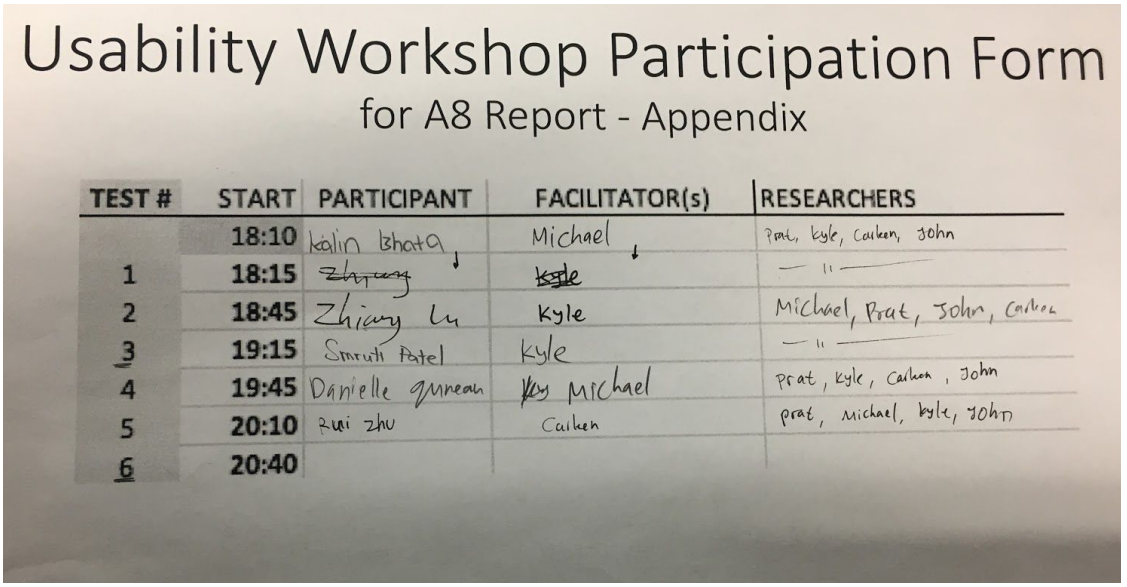
Link 1: https://youtu.be/d1bOgjU3NO0
Link 2: https://www.youtube.com/watch?v=nP5fA2Tvv5U&feature=youtu.be
Link 3: https://youtu.be/oMHMJjloKSs
Link 4: https://youtu.be/aEd00YFr0Rg

Appendix

Appendix 1: Assignment Work Attribution

Yufeng (Bob) Zhou	Contributed to the following part of the report: recommendation of changes, links to video segments, reflections, method (questionnaire)
Michael Le	Contributed to methods, successful design, challenges and recommendation of changes and reflections. Provided screenshots of improved designs and did a usability test with link of quote.
Sharene Carleen Thio	Wrote the methods, and findings and implications section. Contributed to the executive summary, and research limitations. Edited and formatted the document. Did the usability tests
Pratyush Kanwar	Worked on executive summary, did usability tests, proofread and edited the report.
Kyle Osborne	Wrote reflection, limitations, contributed to methods and findings and implications, made graphs for demographics, did usability tests
John Oabel	Worked on project poster. Edited and proofread the report. Contributed to recommended changes and updated graphs.

Appendix 2: Usability Workshop Participation Form



Usability Workshop Participation Form

for A8 Report - Appendix

TEST #	START	PARTICIPANT	FACILITATOR(s)	RESEARCHERS
	18:10	kalin bhatia	Michael	Prat, Kyle, Carleen, John
1	18:15	~~Zhiyang~~	~~Kyle~~	— " —
2	18:45	Zhiyang Lu	Kyle	Michael, Prat, John, Carleen
3	19:15	Smruti Patel	Kyle	— " —
4	19:45	Danielle gunean	~~Kyle~~ Michael	Prat, Kyle, Carleen, John
5	20:10	Rui zhu	Carleen	prat, Michael, kyle, John
6	20:40			

Appendix 3: Research Instrument

a. Briefing/Pre-study questionnaire to gather all relevant demographic data
Questions:

1. Do you make a grocery list before going to buy groceries?
2. On a scale of 1-10 (where 1 being never and 10 being always) how often does food go bad?
3. How do you feel when it comes to managing food (such as making a grocery list and keeping track of the expiry date of food)?

Before test script:
Before we start the test session, here is the app, tell us what you think while going through the tutorial.
After going through the tutorial, participants would be asked if they are comfortable using the application now.

b. Test scripts including detailed questions you will ask users (testing scenarios and tasks)
Scenario 1: Your friend has their hands full and gave you their phone to check what fruits they have had the longest. Show me how you would:

1. Look up all the fruits they have
2. Report back with the fruit they have had the longest

Scenario 2a: You have been using the app recently, and your friend just gave you a small gift basket containing 2 watermelons and a carton of milk. Show me how you would:

1. Keep track of these new items you obtained in the gift basket using the app

Scenario 2b: But then you ate one watermelon later during the day. Show me how you would:

1. Update the new amount of watermelon.

Scenario 3a: You decided that you need to make lunch the next day. So you looked up a recipe for carbonara (3 eggs, parmesan cheese, and an onion) and want to buy all the ingredients. Show me how you would:

1. Keep track of all these items you need to buy from the recipe

Scenario 3b: You went to the grocery store and found all the ingredients except the onion. Show me how you would:

1. Update what you own with the items you just bought.

Scenario 3c: You went to a shady supermarket and found some onions. Show me how you would:

1. Keep track of the new food item you just bought.

Scenario 3d: You finished cooking your carbonara and really enjoyed it. So you decided that you will make it again tomorrow, which means you have to buy the same ingredients again. Show me how you would:

1. Create/reuse the grocery list for carbonara.

c. Observation and performance measurement plans

Record users first focus of the app when they perform each task. (may not be observed every time)
Record the number of attempts tried before successfully achieved the task.
Record the time it takes for each task.
Criteria (Time measurement):

	Good	Acceptable	Bad
Scenario 1	Time < 20s	20s < Time < 50s	Time > 50s
Scenario 2a	Time < 1:00min	1:00< Time < 2:00	Time > 2:00
Scenario 2b	Time < 20s	20s < Time < 40s	Time > 40s
Scenario 3a	Time < 1:00min	1:00 < Time <2:00 min	Time > 2:00
Scenario 3b	Time < 30s	30s < Time < 50s	Time > 50s
Scenario 3c	Time < 20s	20s < Time < 40s	Time > 40s
Scenario 3d	Time < 20s	20s < Time < 30s	Time > 30s

d. Debriefing/Post-study questionnaire / interview
Questions:

1. What do you think this app is for now?
2. On a scale between 1-10 (1 being not useful, and 10 useful), where do you place this app in terms of food management?
3. On a scale between 1-10 (1 being not useful, and 10 useful), where do you place this app in terms of reducing food waste?
4. Is there any functions you would like to see in this app?
5. Do you have any other suggestions about how we can improve this app?
6. On a scale between 1-10 (1 being not important, and 10 being important), what is the value of keeping track of what you have to you?

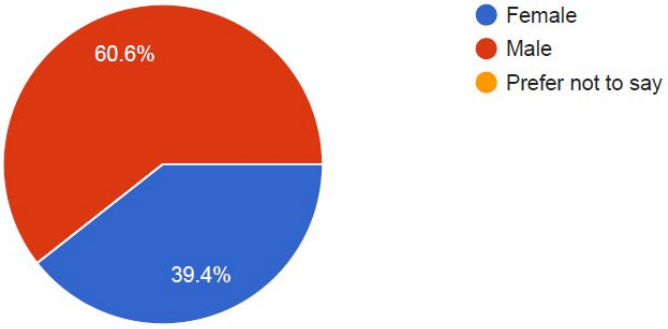
Appendix 4: Questionnaire Result Form

Questionnaire about grocery shopping experience

33 responses

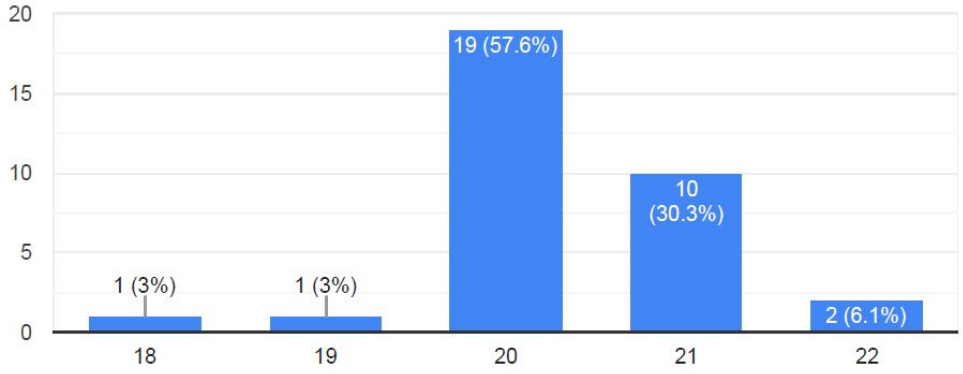
What is your gender?

33 responses



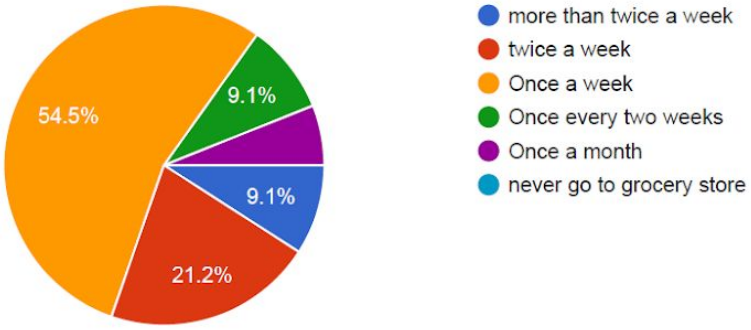
What is your age?

33 responses



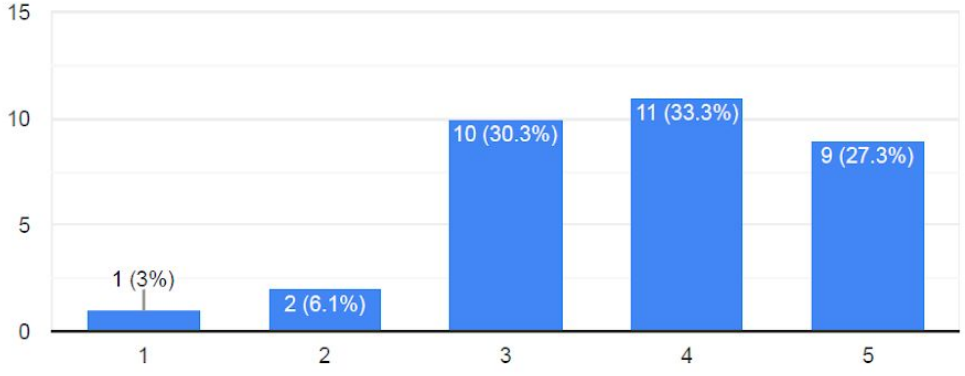
How often do you go to a grocery store?

33 responses



What is your willingness of going to a grocery store?

33 responses



Please give the reason for the above question.

26 responses

I go when I have to but it's not a terrible experience

I only go there when I feel I have to go

Boring, tedious

You need to go to but food to live. Nothing exciting going on but it's not torture either.

It's simply fun to look around for things I like to eat, picture what it like to eat them and then buy them.

I just like doing anything thats not studying, getting groceries is a great time compared to sitting in the library for 6 hours

Lazy and tired

I have no time but it is fun

Need to buy fruits

It gives a sense of family belonging. Which importantly, it is a basis of living.

There is a grocery store on my way back home so it takes nothing to go to a grocery store.

Food is good

Its relaxing, and I get to stock up on supplies for the week

Makes me feel like an adult.

I just don't like to do grocery

Do not want to go outside cuz Im lazy. But I like to buy food and eat.

i like to buy fresh foods, healthier and cheaper than buying food

some have the stuff i want with a higher price and some are less expensive, so i need to go to multiple stores

I get food so I like it

I don't feel strongly either way. I recognize that buying food is a necessity

Addicted to candy

I like to hunt for discounts

For living necessity

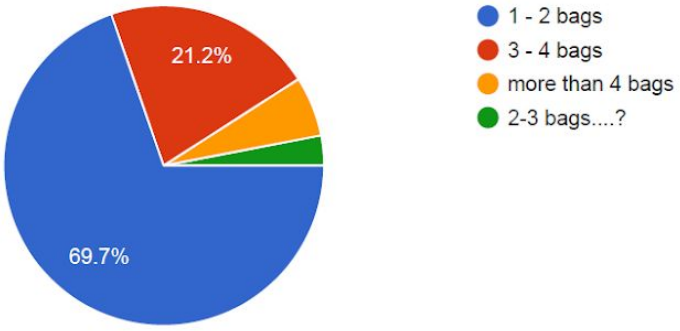
It's a bit of extra work, but I like the idea of having a lot of fresh stuff to cook with.

Walking to the store is good exercise and it makes me feel independent to shop for myself

I like shopping

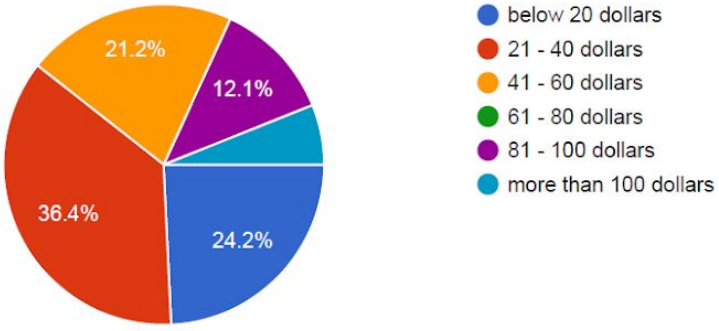
How many bags of food do you often buy at a grocery store?

33 responses



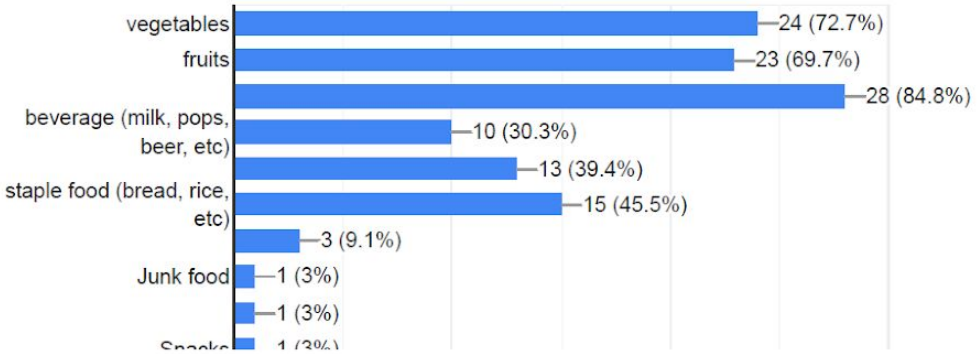
What is the average cost of your groceries every time you go to a grocery store?

33 responses



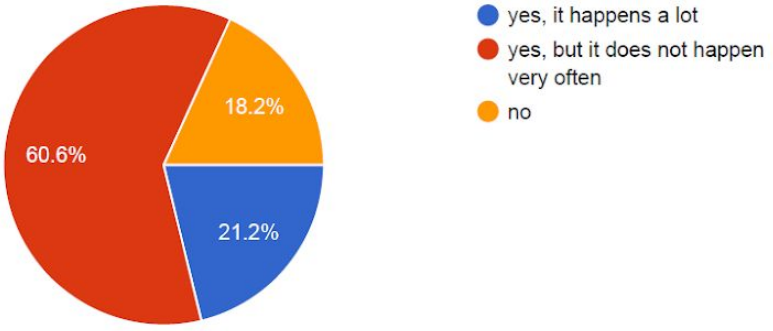
What are the major type of groceries you often buy at a grocery store?

33 responses



Do you have any experience when the grocery you want to buy is either too much or too little/few?

33 responses

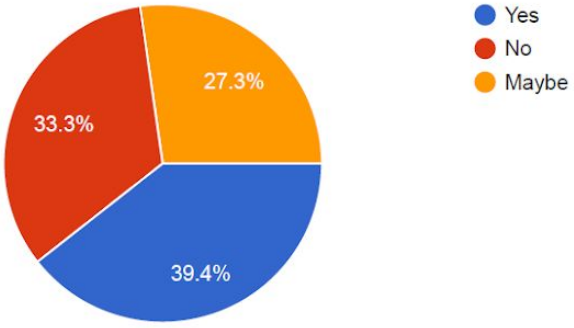


Do you often look at grocery flyers?

33 responses

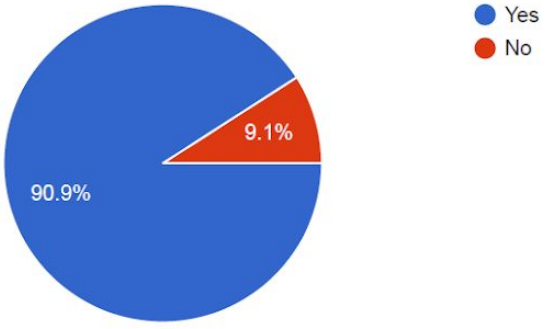
Do you make a list of grocery to buy before going to a grocery store?

33 responses



Do you have any experience that you buy groceries you did not plan to before going to a grocery store?

33 responses



Briefly describe the experience from the above question. (What are the reasons that make you buy groceries that you didn't plan to buy?)

26 responses

Waiting in line and spots chocolate

On sale, good price, looks tasty

I didn't think of them until I saw them/I forgot about them.

I have my meals at the residence cafeteria, so I buy groceries mainly for my fruits and snacks supply. On one hand, it is impossible to predict what they have at the store I usually go to; on the other hand, any snack or fruit usually works for me, so I rarely make a list and plan specifically what to buy.

well i walked past this isle of chocolates and went hmm i could really use some chocolates right about now

Just wanna shopping

On sale

Maybe suddenly I want to get some fruits....

See something on sale.

Remembering, get a new idea, looks good

Things I didn't notice were on sale, or I felt like treating myself

Cheap prices

Some snacks that I didn't know before and want to try after seeing them

Cravings; realizing I need the unlisted item

it looks tasty

Because the one that i want might not be fresh or they do not have it. As a substitute, i buy stuff not as planned

Stuff on sale

If something is on sale I might buy it

I see something that looks good. I take.

The desire to try new things

1 it was cheap
2 I was hungry and the packaging looked good
3 my roommate wanted it

In-store Promotions

It wasn't on sale or something else was on sale

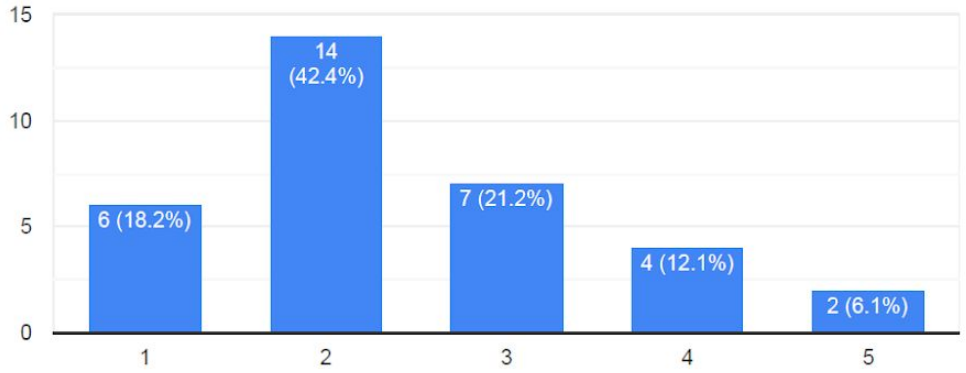
Item was on sale. Impulse desire to try.

on sale

When I happen to see something I like but didnt plan to buy on sale

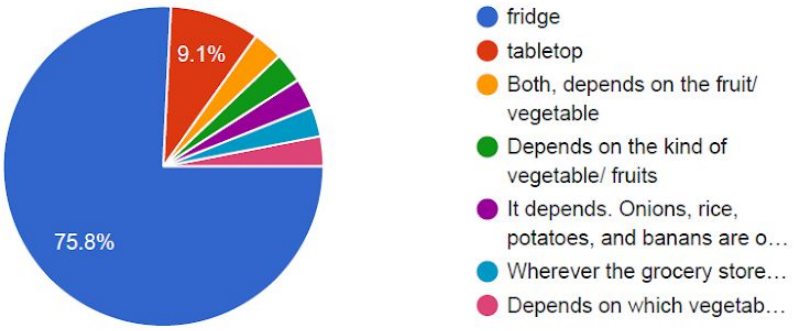
What is your awareness of the food expiry date?

33 responses



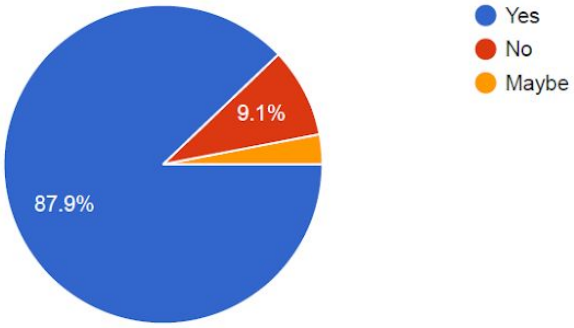
Where do you store your vegetables and fruits?

33 responses



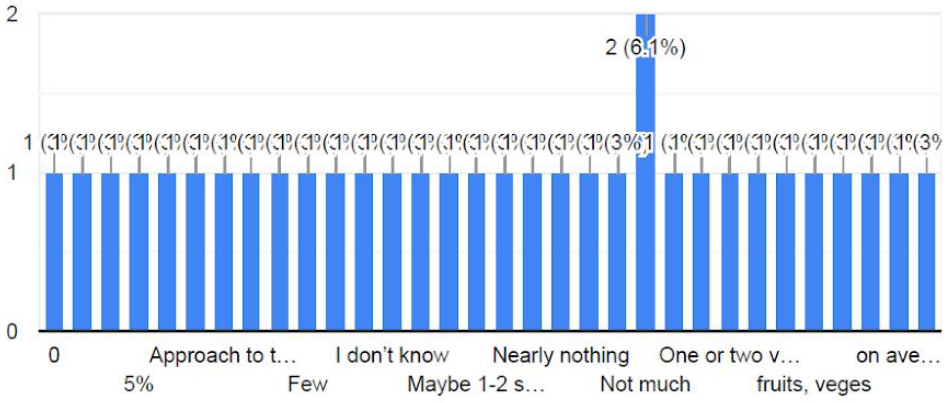
Do you have experience when you have to throw any food that goes bad?

33 responses



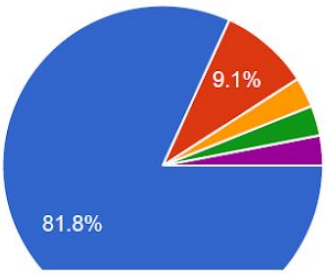
What is the amount of food you have to throw away on a weekly basis?

33 responses



What is your feeling when you throw away food that goes bad?

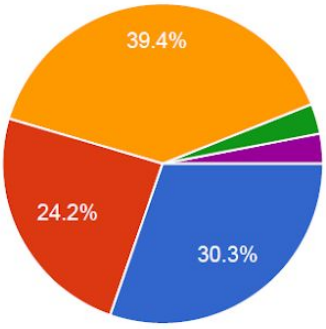
33 responses



- sad
- no feeling
- Bob can eat them all
- Sad but also relieved that I don't need to deal with it anymore
- Guilty for unsophisticated spending habit

Do you sometime realize that you are overbuying food?

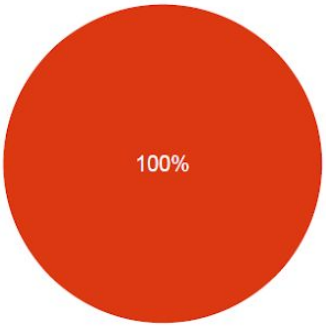
33 responses



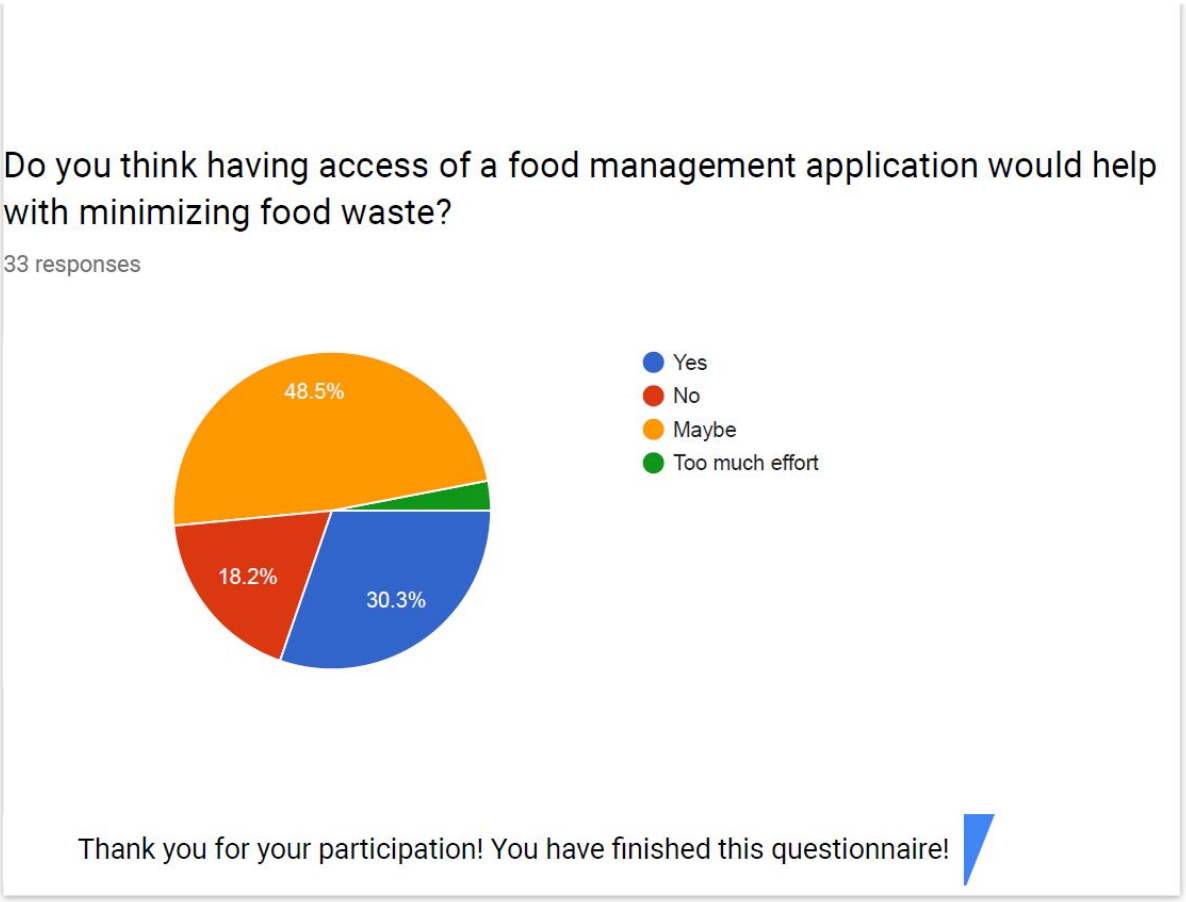
- Yes
- No
- Maybe
- My parents sometimes buy things that no one actually eats so it gets wasted
- I know I am overbuying, but I would rather let some food go bad than having to go to the store overly often, especiall…

Have you use any mobile apps to keep track of your food management?

33 responses

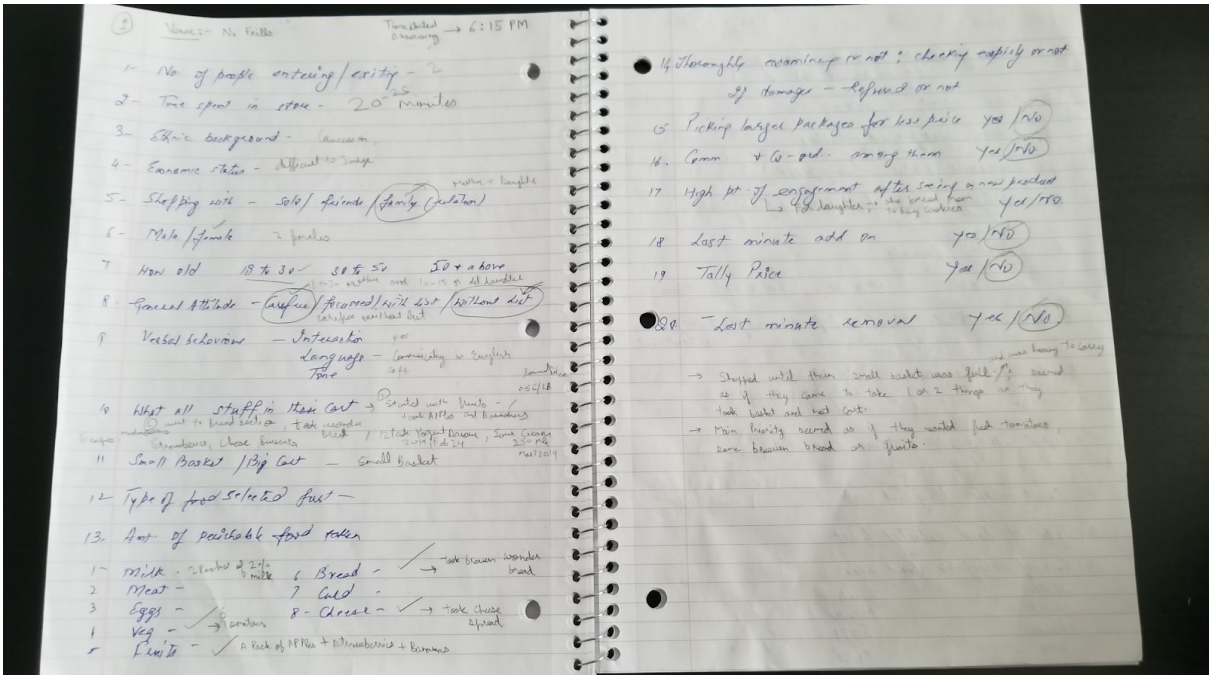


- Yes
- No

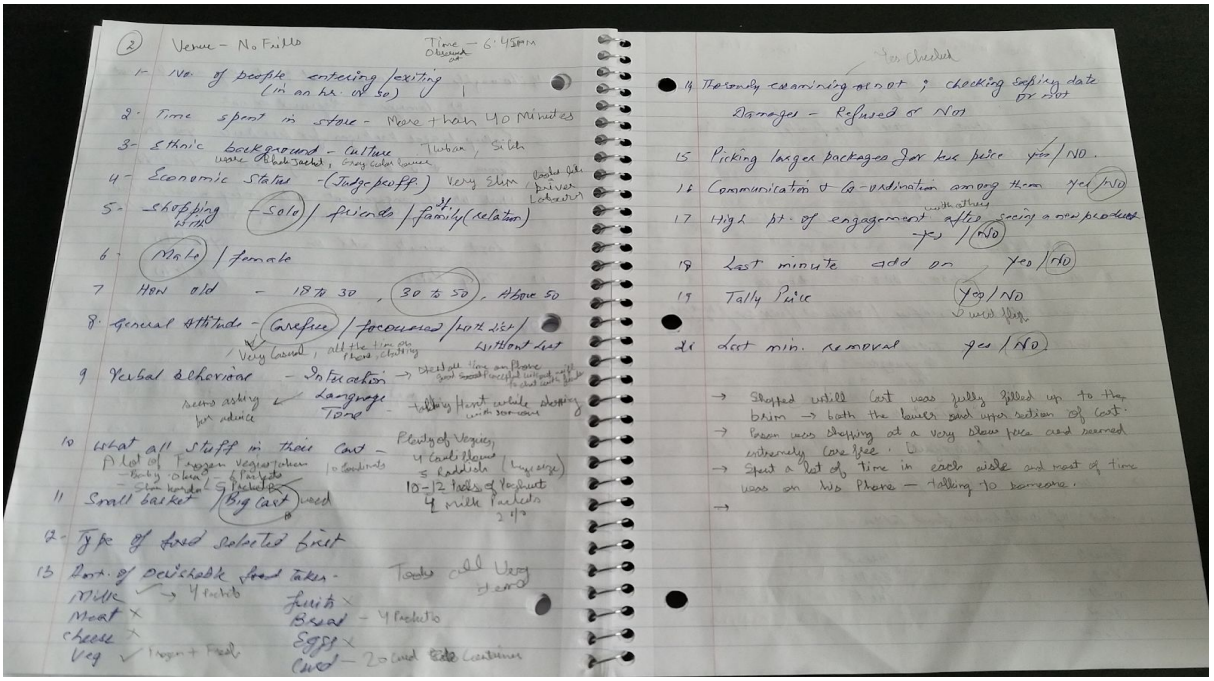


Appendix 5: Rough Field Study Notes of Grocery Shoppers

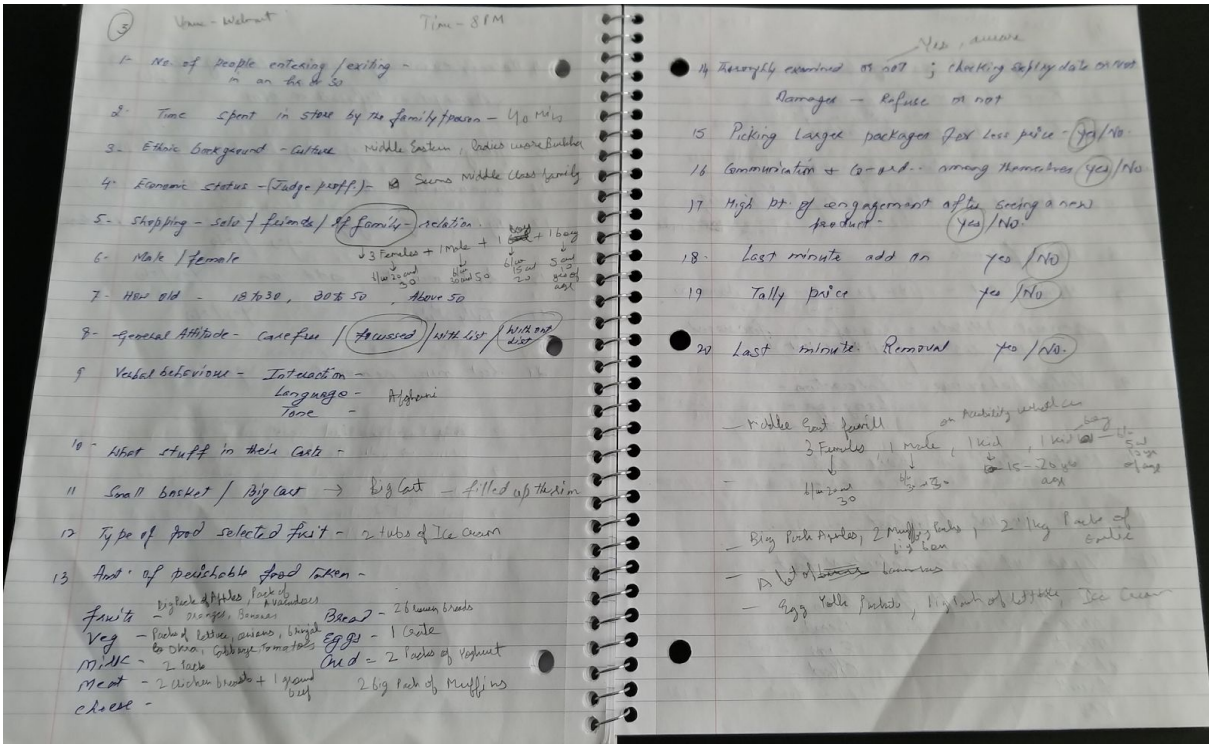
Observation #1 -



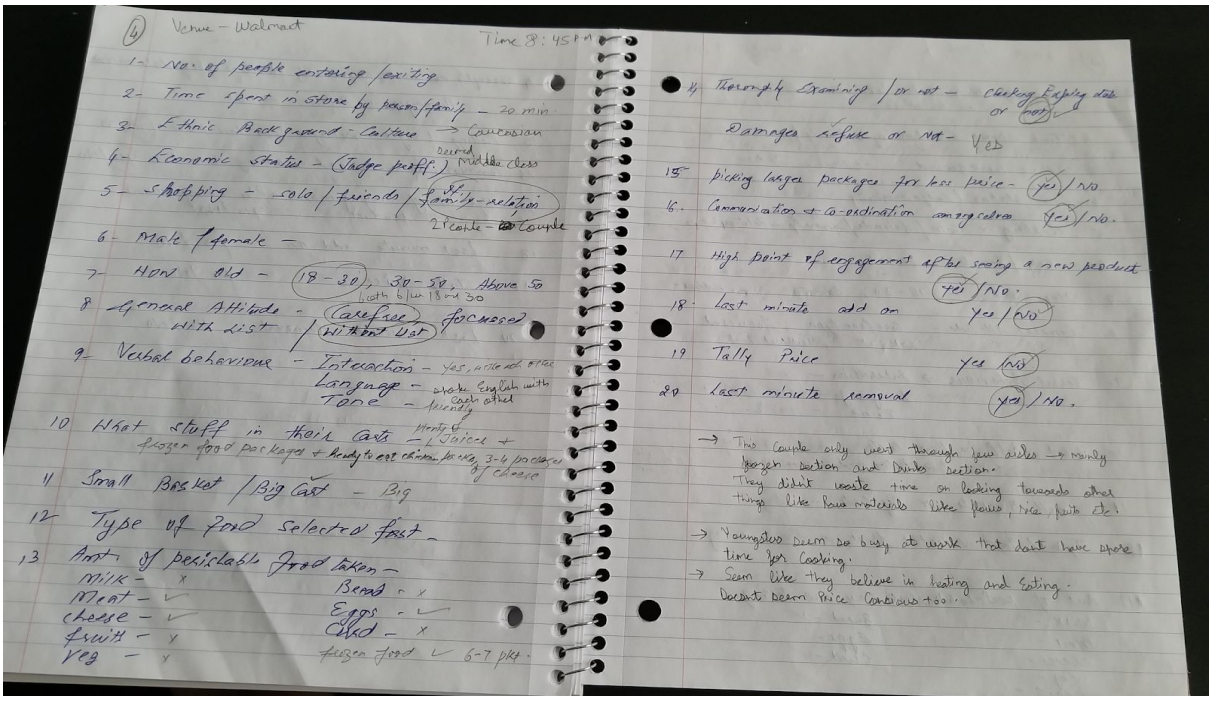
Observation #2 -



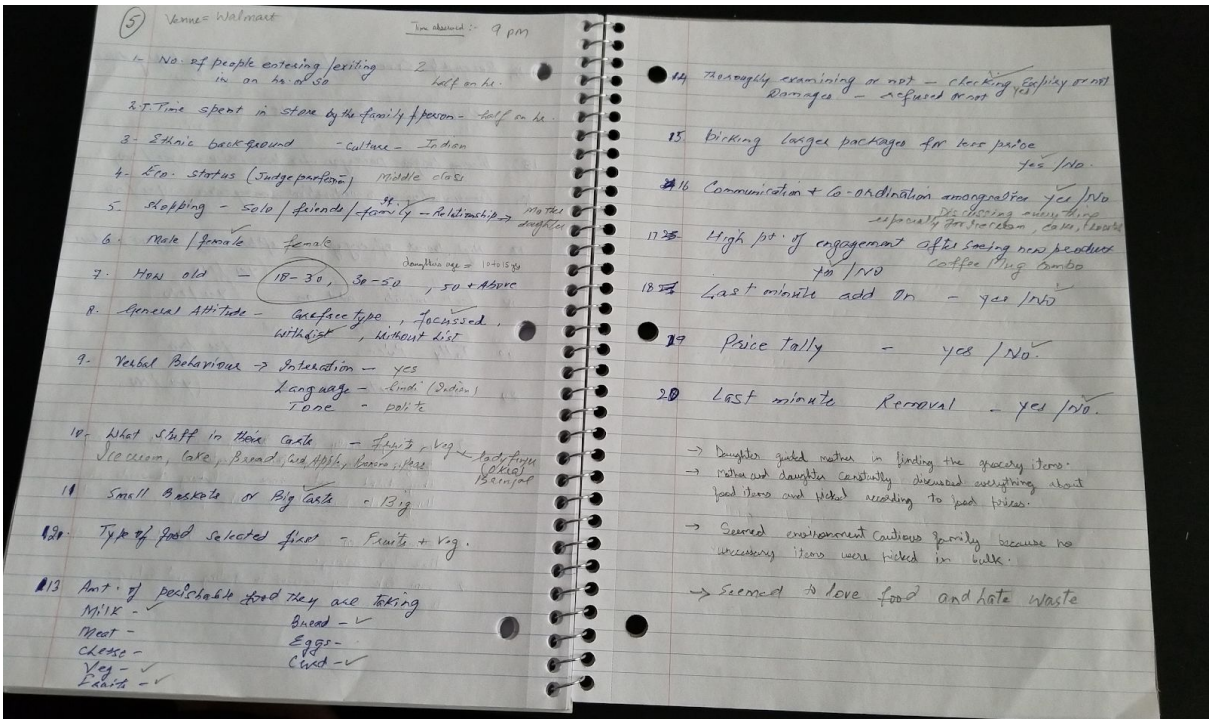
Observation #3 -



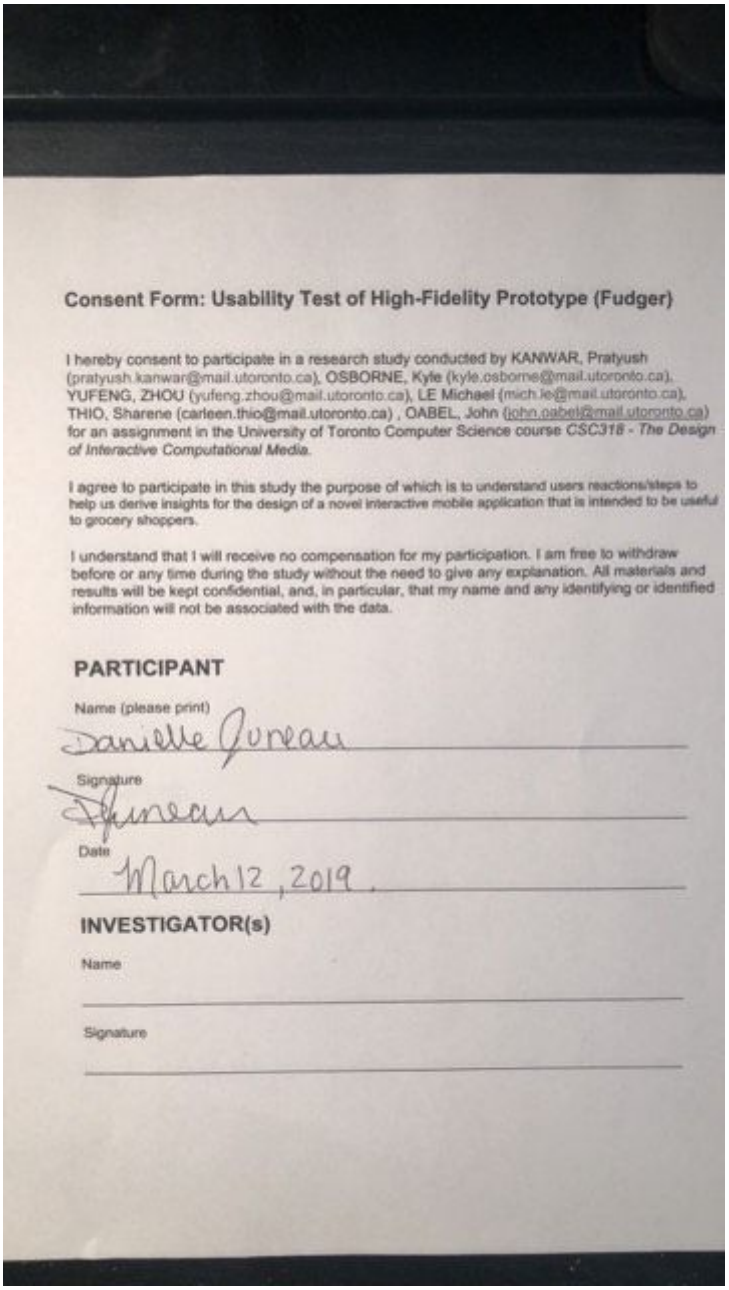
Observation #4 -



Observation #5 -



Appendix 6: Consent Forms



Consent Form: Usability Test of High-Fidelity Prototype (Fudger)

I hereby consent to participate in a research study conducted by KANWAR, Pratyush (pratyush.kanwar@mail.utoronto.ca), OSBORNE, Kyle (kyle.osborne@mail.utoronto.ca), YUFENG, ZHOU (yufeng.zhou@mail.utoronto.ca), LE Michael (mich.le@mail.utoronto.ca), THIO, Sharene (carleen.thio@mail.utoronto.ca) , OABEL, John (john.oabel@mail.utoronto.ca) for an assignment in the University of Toronto Computer Science course *CSC318 - The Design of Interactive Computational Media*.

I agree to participate in this study the purpose of which is to understand users reactions/steps to help us derive insights for the design of a novel interactive mobile application that is intended to be useful to grocery shoppers.

I understand that I will receive no compensation for my participation. I am free to withdraw before or any time during the study without the need to give any explanation. All materials and results will be kept confidential, and, in particular, that my name and any identifying or identified information will not be associated with the data.

PARTICIPANT

Name (please print)
Danielle Jureau

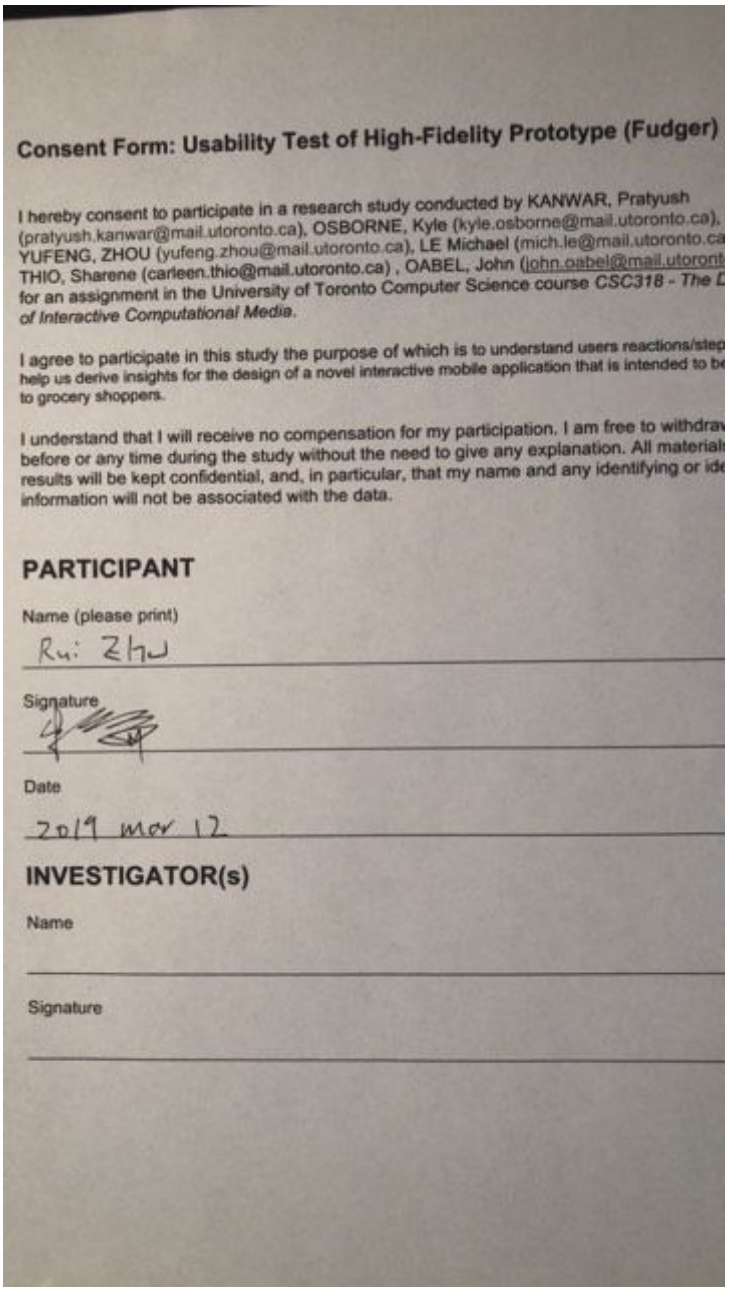
Signature
Djureau

Date
March 12, 2019.

INVESTIGATOR(s)

Name

Signature



Consent Form: Usability Test of High-Fidelity Prototype (Fudger)

I hereby consent to participate in a research study conducted by KANWAR, Pratyush (pratyush.kanwar@mail.utoronto.ca), OSBORNE, Kyle (kyle.osborne@mail.utoronto.ca), YUFENG, ZHOU (yufeng.zhou@mail.utoronto.ca), LE Michael (mich.le@mail.utoronto.ca) THIO, Sharene (carleen.thio@mail.utoronto.ca) , OABEL, John (john.oabel@mail.utoront for an assignment in the University of Toronto Computer Science course *CSC318 - The D of Interactive Computational Media*.

I agree to participate in this study the purpose of which is to understand users reactions/step help us derive insights for the design of a novel interactive mobile application that is intended to be to grocery shoppers.

I understand that I will receive no compensation for my participation. I am free to withdraw before or any time during the study without the need to give any explanation. All material results will be kept confidential, and, in particular, that my name and any identifying or ide information will not be associated with the data.

PARTICIPANT

Name (please print)

Rui Zhu

Signature

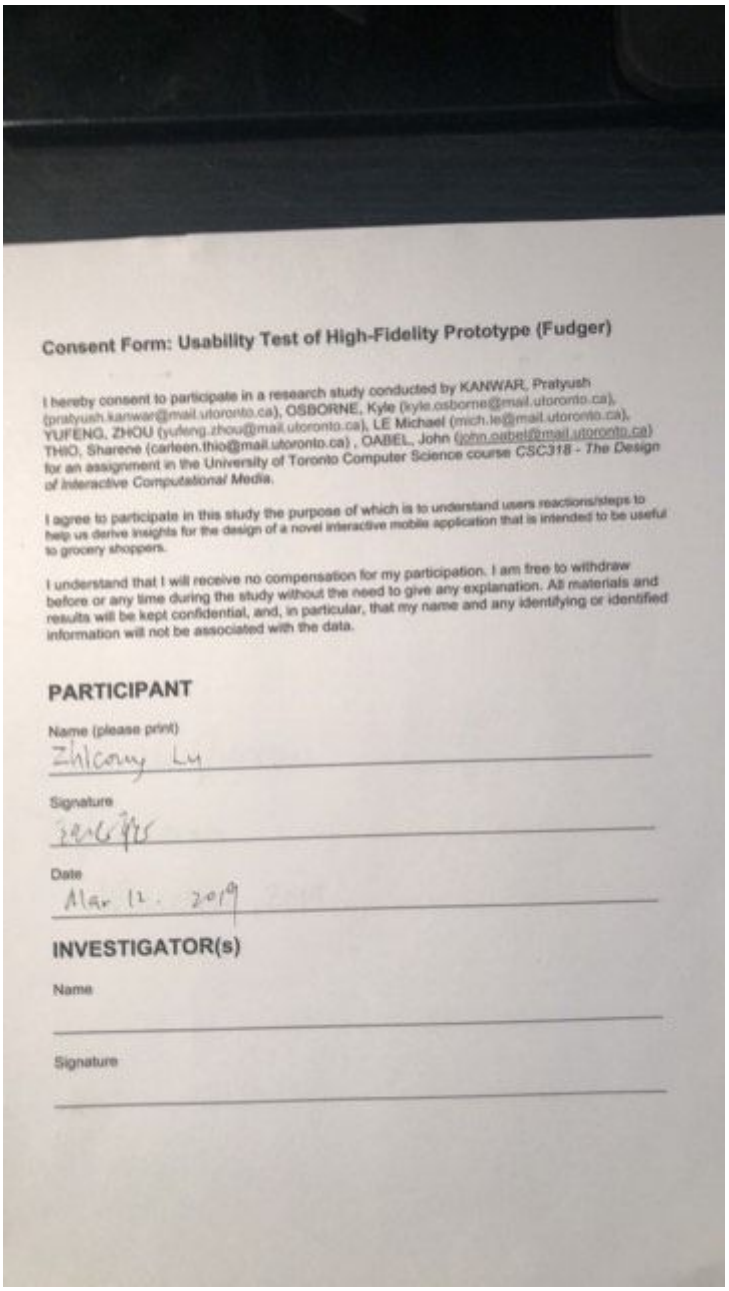
Date

2019 mar 12

INVESTIGATOR(s)

Name

Signature



Consent Form: Usability Test of High-Fidelity Prototype (Fudger)

I hereby consent to participate in a research study conducted by KANWAR, Pratyush (pratyush.kanwar@mail.utoronto.ca), OSBORNE, Kyle (kyle.osborne@mail.utoronto.ca), YUFENG, ZHOU (yufeng.zhou@mail.utoronto.ca), LE Michael (mich.le@mail.utoronto.ca), THIO, Shareee (carleen.thio@mail.utoronto.ca) , OABEL, John (john.oabel@mail.utoronto.ca) for an assignment in the University of Toronto Computer Science course CSC318 - *The Design of Interactive Computational Media*.

I agree to participate in this study the purpose of which is to understand users reactions/steps to help us derive insights for the design of a novel interactive mobile application that is intended to be useful to grocery shoppers.

I understand that I will receive no compensation for my participation. I am free to withdraw before or any time during the study without the need to give any explanation. All materials and results will be kept confidential, and, in particular, that my name and any identifying or identified information will not be associated with the data.

PARTICIPANT

Name (please print)

Zhicong Lu

Signature

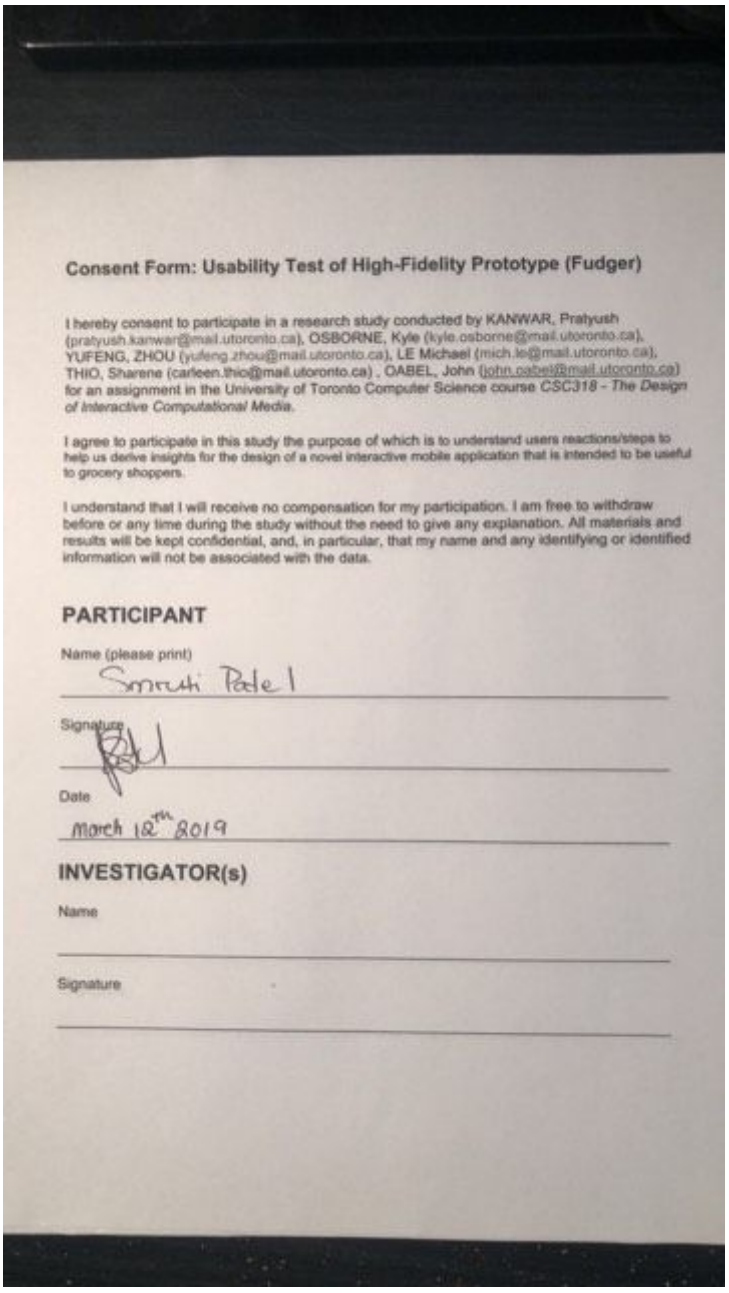
Date

Mar 12. 2019

INVESTIGATOR(s)

Name

Signature



Consent Form: Usability Test of High-Fidelity Prototype (Fudger)

I hereby consent to participate in a research study conducted by KANWAR, Pratyush (pratyush.kanwar@mail.utoronto.ca), OSBORNE, Kyle (kyle.osborne@mail.utoronto.ca), YUFENG, ZHOU (yufeng.zhou@mail.utoronto.ca), LE Michael (mich.le@mail.utoronto.ca), THIO, Sharene (carleen.thio@mail.utoronto.ca) , OABEL, John (john.oabel@mail.utoronto.ca) for an assignment in the University of Toronto Computer Science course *CSC318 - The Design of Interactive Computational Media*.

I agree to participate in this study the purpose of which is to understand users reactions/steps to help us derive insights for the design of a novel interactive mobile application that is intended to be useful to grocery shoppers.

I understand that I will receive no compensation for my participation. I am free to withdraw before or any time during the study without the need to give any explanation. All materials and results will be kept confidential, and, in particular, that my name and any identifying or identified information will not be associated with the data.

PARTICIPANT

Name (please print)

Samruthi Patel

Signature

Date

March 12th 2019

INVESTIGATOR(s)

Name

Signature

References

(1) Schneider, F. Wasting Food – An Insistent Behaviour.In Proc. Proceedings of Waste - The Social Context,International Conference (2008).

(2) Schneider, F. and Obersteiner, G. Food waste in residual waste of households–regional and socioeconomic differences. In Proc. 11th International Waste Management and Landfill Symposium (2007),469-470.

(3) Ambler-Edwards, S., Bailey, K., Kiff, A., Lang, T., Lee, R., Marsden, T., Simons, D. and Tibbs, H. Food futures: Rethinking UK strategy, Chatham House (2009).