

plantr.

TEAM

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PROBLEM AND SOLUTION

Many people want to have plants in their home or workplace, but struggle with caring for their plants. Many plant owners know basic or even advanced plant care, but have trouble remembering to water and fertilize their plants.

Plantr is a smartphone application that encourages proper plant care by facilitating fun interaction between plants and plant owners. Plantr anthropomorphizes plants, letting them talk to their user like a person would, by displaying messages on the owner's phone. Plants within the same household can also 'talk' to each other in entertaining conversations that are shown on the user's smartphone.

A feedback system between sensors in the plant's soil and the owner's smartphone would allow the plant to 'talk' to its owner when it needs care. Sensors track the plant's

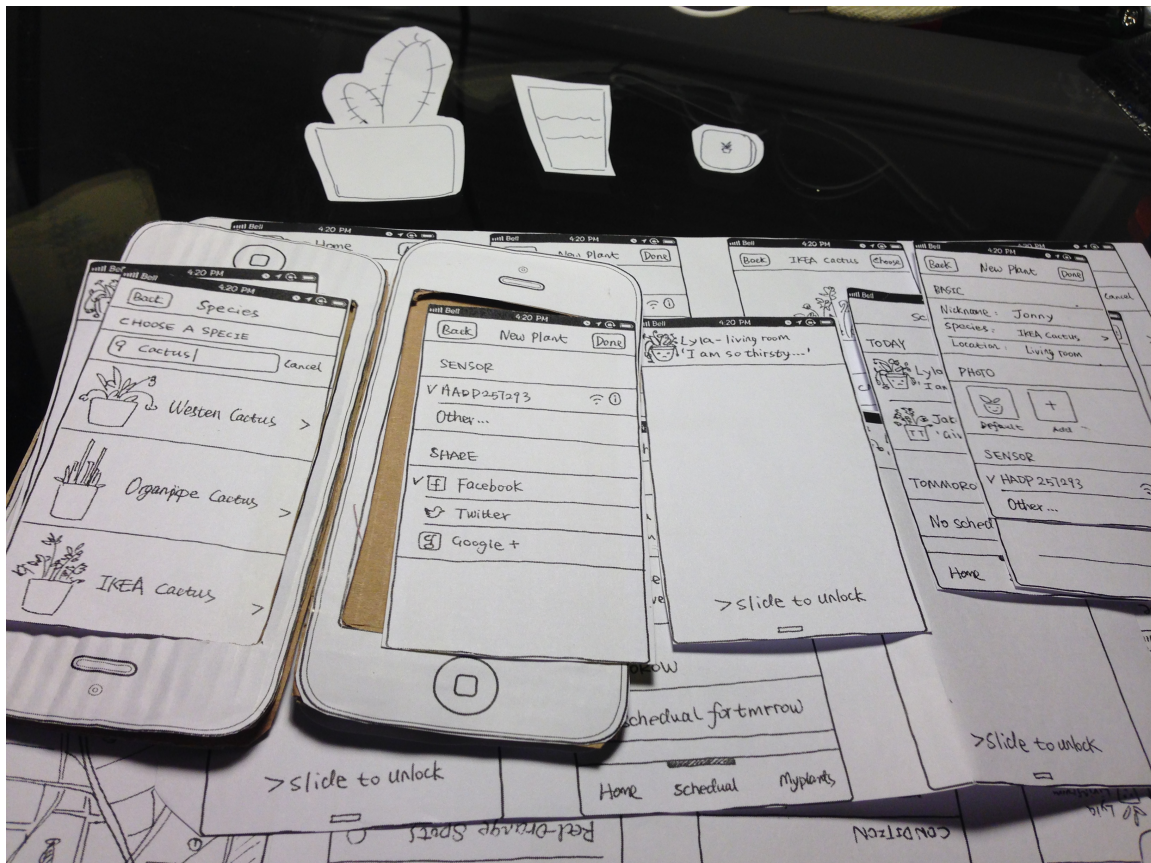
basic conditions, like temperature and soil moisture. Users can view their plant's basic condition from their phones. Plantr also has a plant care and disease database, and supports contacting nearby nurseries.

PAPER PROTOTYPE

Our low fidelity prototype consisted of a cardboard and paper iPhone frame and a series screen-sized pieces of paper. The pieces of paper were swapped out of the cardboard iPhone depending on what screen the user was viewing. Users interacted with the prototype by tapping different areas of the paper screens. Our goal was to simulate the experience a user might have if they were interacting with Plantr on a touchscreen smartphone. A paper sketch of a plant, a Plantr sensor, and a glass of water allowed participants to simulate putting a sensor in a plant and watering the plant.

The three tasks that we supported were:

1. Adding a new plant to Plantr.
2. Handling problems with a plant.
3. Watering a plant.



Cardboard iPhone frames, paper screens, plant, sensor, and water glass.

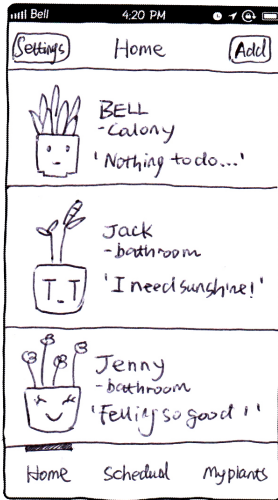


Figure 1

The 'Home' screen is displayed when the user first enters the application. It shows what some of the user's plants have to 'say'.

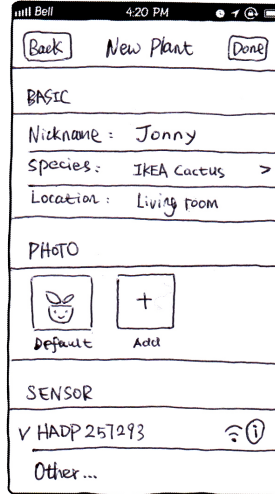
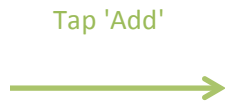


Figure 2

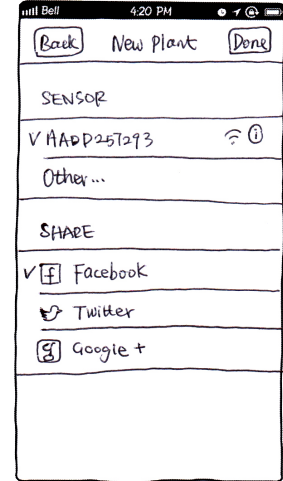
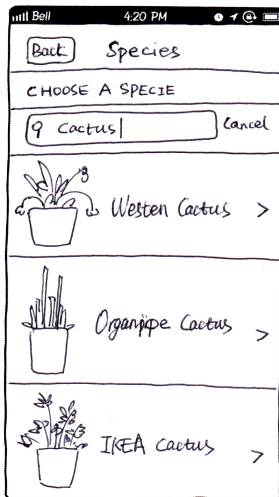
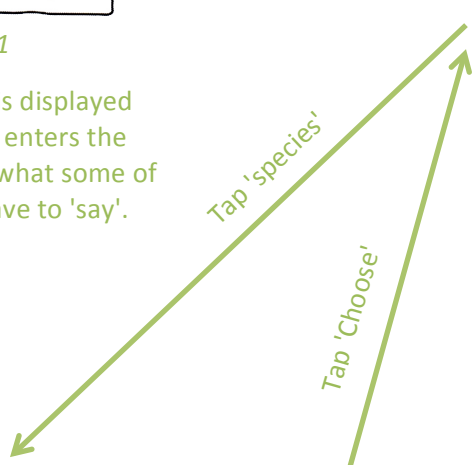


Figure 3

The 'New Plant' screen allows the user to add a new plant to Plantr. Scrolling down on the page (fig. 3) shows more information and the option to share your new plant on social networks.



Select a species

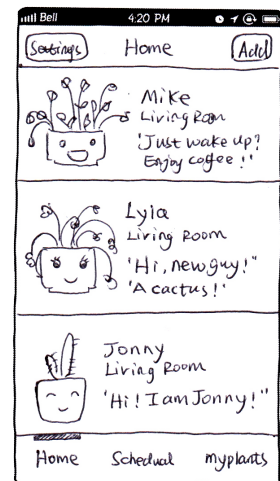
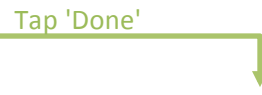


Figure 6

Figure 4
The user can search for the species of the plant being added on Plantr's database.

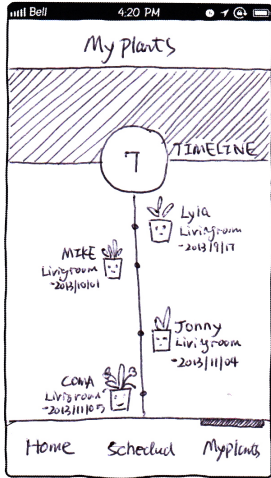


Figure 1

The MyPlants screen displays all the user's plants, in a timeline format.

Figure 5
When the user selects a species, more info about the species is displayed.

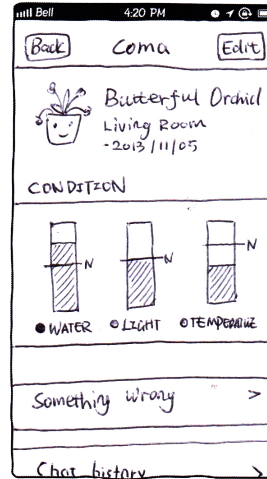


Figure 2

Each plant has its own screen, which displays its current condition and other plant-specific options. Scrolling down the page shows more options (fig. 3).

The homescreen now displays plants 'talking' about the new plant.

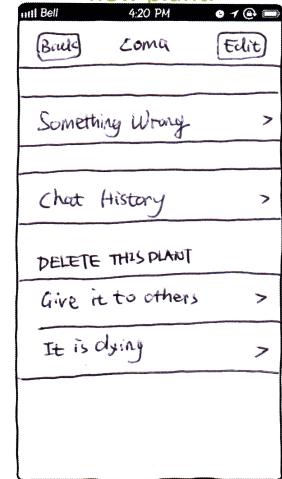


Figure 3

Tap on 'something is wrong'

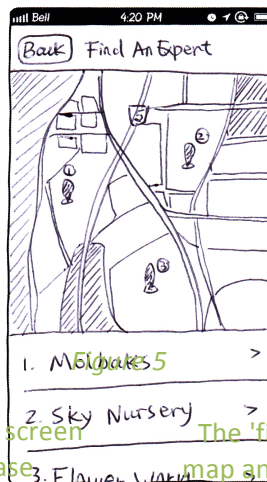
Tap on 'it is dying'



Tap on the 'Find an Expert'

Figure 4

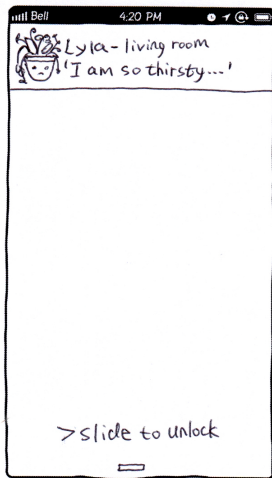
The 'something is wrong' screen displays a list of disease symptoms that allows the user to diagnose plant problems and the 'find an expert' button.



The 'find an expert' screen shows a map and list of nearby nursery stores. The user can tap a nursery store name or icon on the map to get the nursery's contact info (not shown).



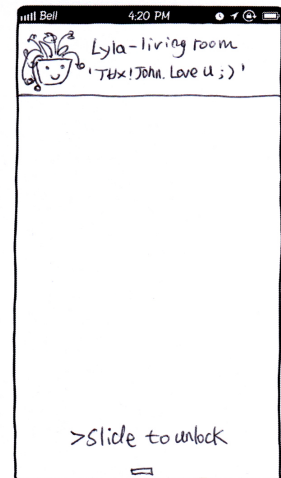
The 'delete' screen shows options for deleting a plant. The user can choose to share the plant died and choose whether or not to have the plant remain on the MyPlants screen.



The user receives alerts when walking by a plant that needs care.



The user can open Plantr and go the 'Schedule' screen to see what type of care plants need.



The user receives a thank-you alert after caring for a plant.

TESTING METHOD

Participants:

We recruited three participants in two separate locations. Our first participant was a 20-year-old UW student who currently owns a cactus. He explained that the reason he owns a cactus is that he doesn't want to spend time caring for his plants. We ran through the user test while we were all in the Paul Allen Center atrium. Our next two participants were recruited at a local nursery store. Both were middle-aged women who had plants in their houses and frequently care for them. Both of these participants had children and were at the nursery with their families. None of the group members had a relationship with any of the other users. While the first participant had quite a bit of experience using a smartphone, the other two participants had minimal experience using a smartphone. Our participants covered several different types of potential Plantr users: experienced smartphone users, inexperienced smartphone users, high-frequency carers, and low-frequency carers.

Environment

The user testing occurred in the Paul Allen Center atrium and outside of Ravenna Gardens at University Village. The participants sat at a table with all of the group members. One group member took notes, while another read the script (Appendix A) and a third acted as the computer and moved around the pieces of the paper prototype. The group member who read the script also took video footage of the testing sessions. None of the videos included any personally identifiable parts of the subjects.

Tasks

We wanted our tasks to test the important features of our application while also providing the user with a genuine experience. Our tasks were based on the tasks from our contextual inquiry and task analysis, and tested most of the features our application supports. We also included a small exploratory portion at the end of each user test. We started out with a clear narrative for the user so that they could understand our envisioned use case.

The first task was adding a plant to the app so it could be tracked. The script explained that the user had just bought a new cactus from IKEA and had to add it to Plantr, name it correctly, pair a sensor with the plant and post this to Facebook. We expected this task to be relatively straightforward, but some small pieces of our design proved hard for the subjects to understand.

The second task was to diagnose a plant's 'ailment' and if the 'ailment' was 'terminal', the user was supposed to remove the plant from Plantr. In our prototype, we returned no results when the user tried to 'diagnose' an 'ailment' and suggested that the user try the 'Contact and Expert' feature. The user was told that the plant care expert said their plant was a lost cause and that they should remove it from Plantr.

The third task, watering a plant, was our easy task. To make the experience more realistic, we provided the user with a paper “plant” and “glass” to water the plant with. This task started with the user receiving a notification and then watering the paper plant with the paper glass of water. After successfully watering the plant, the user received a push notification from their plant thanking them for the water. Some users were somewhat confused by the interface and unsure what a notification was.

Procedure

We recruited people at a local nursery, explaining that we are designing an app to help people water their plants and that we were looking for volunteers to test our user interface for 15 minutes. First, we introduced each of our group members to the participant, letting them know that Paul would act as the facilitator, Jen the computer, and Jory the note-taker. We let each participant know that their participation was completely voluntary and that they could stop at any time. We also stressed that we were testing the interface and not the participant’s technical knowledge. Then, we spent some more time introducing the project and went over each of the tasks. During each of the tasks, we gave the user as little feedback as possible in order to get an idea of how they would use the interface without help.

Test Measures

Our main measures were in the form of verbal and visual feedback from the subject. If they seemed confused by something, we wrote it down in our notes. For the case where a user could not find a feature, we sometimes gave them a vague hint like “try and scroll”. We also considered the amount of time it took a subject to complete a given task in comparison to our ideas of how simple the task should be. Since we asked the users to think out loud, they provided a lot of very helpful verbal feedback as to what was confusing or hard to understand. Additionally a short comment period at the end of testing helped us understand any other issues the user ran into. We read from a script, which is included in Appendix A.

RESULTS

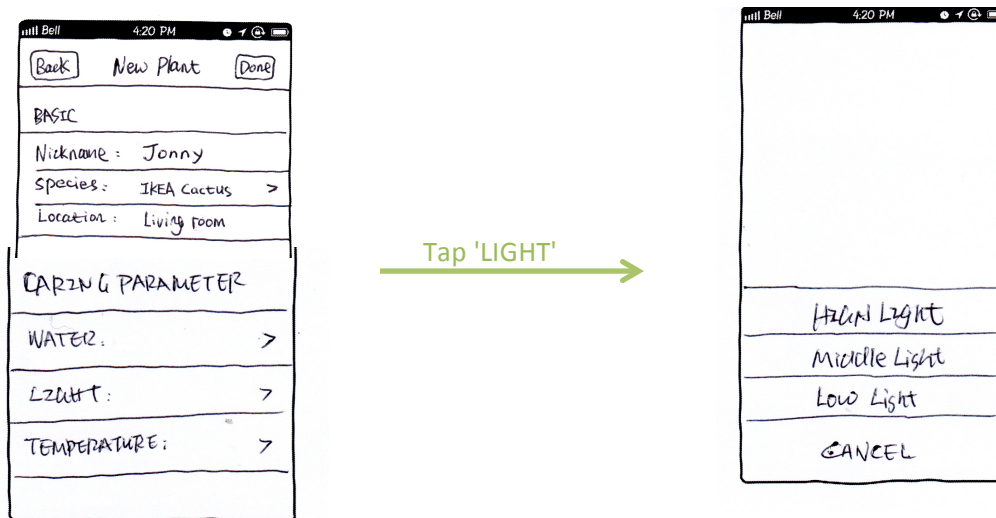
Participants completed the first task easily, but there were some minor difficulties that uncovered problems with the interface. The participants navigated to the add screen from the home screen quickly. In order to complete the add screen, the users had to scroll down to sync with the sensor and view social network sharing options, but none of our participants scrolled down. This was probably because we were using paper screens that did not appear to be scrollable - our screens did not have a scroll bar. Some participants were hesitant to finish the process because they felt the need to enter more information. Two participants expected to be prompted to input care information specific to their plant, such as lighting conditions in the room where the plant was

placed. One of them tried to type in this information on the species details page, until the participant realized she didn't need to do that. Aside from these issues, participants completed the task successfully and understood that their plant had been added when they returned to the home screen.

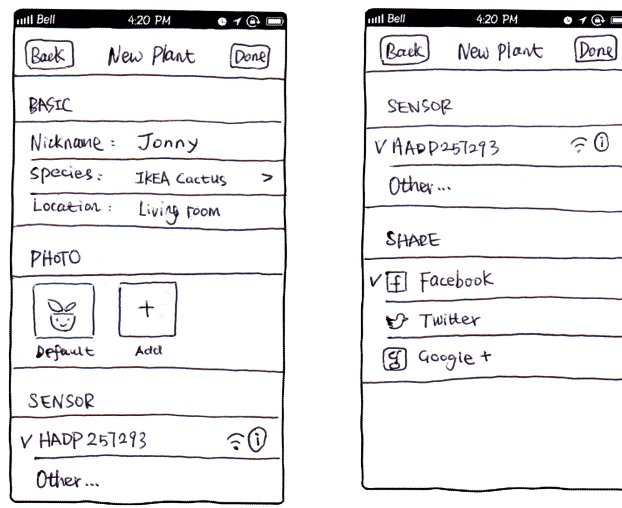
Participants completed the second task without too much trouble, but several mentioned some minor problems with the interface. They thought the process was somewhat tedious, and one participant remarked that finding an expert was "too much work." This participant also thought the delete functionality was handled poorly. He suggested the option for deleting a plant be put in the edit screen to be consistent with common conventions. Another participant, however, said they appreciated the ability to find an expert and had no trouble with deleting the plant. One participant was unsure what clicking on a nursery would do on the "find an expert" screen. Participants were also a little confused about the delete screen, and they either clicked a wrong button or hesitated to delete their plant. Furthermore, the participants made comments about wanting to refrain from sharing on Facebook. After deleting her plant, one participant said she wanted to keep that event to herself. Overall, there were some flaws in the UI but the participants were able complete the task without any assistance.

The third task went very smoothly. Participants seemed to understand the schedule screen easily. For the most part, each participant watered his or her plants quickly after receiving a notification. One participant noticed that the plants displayed different messages for the same need, such as "I'm so thirsty" and "give me water, please," which both indicate a need for water. The participant was unsure if this indicated varying levels of need or not, but it did not stop them from watering their plants.

INTERFACE REVISION SKETCHES

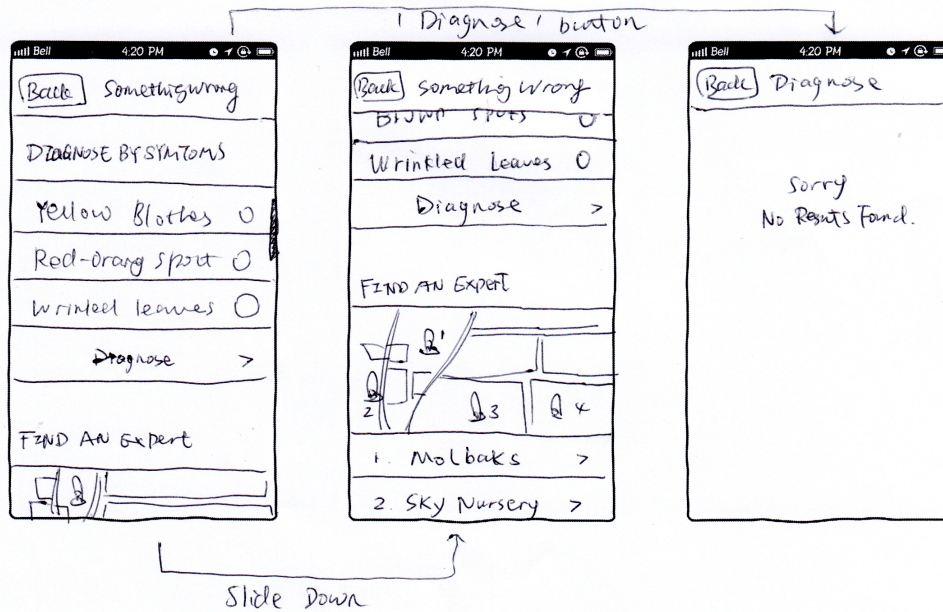


Revised 'New Plant' screens: These screens allow users to customize the care information for a plant. The user can choose the amount of water, light and the plant's ideal temperature from the 'Add a Plant' screen. We added this feature because two of the users assumed or wanted to be able to enter in custom care info, instead of using the information given by selecting a plant species. This is also a good design choice because it affords the user more control. Scrolling down on the screen reveals the same information that scrolling down on the original prototype revealed.

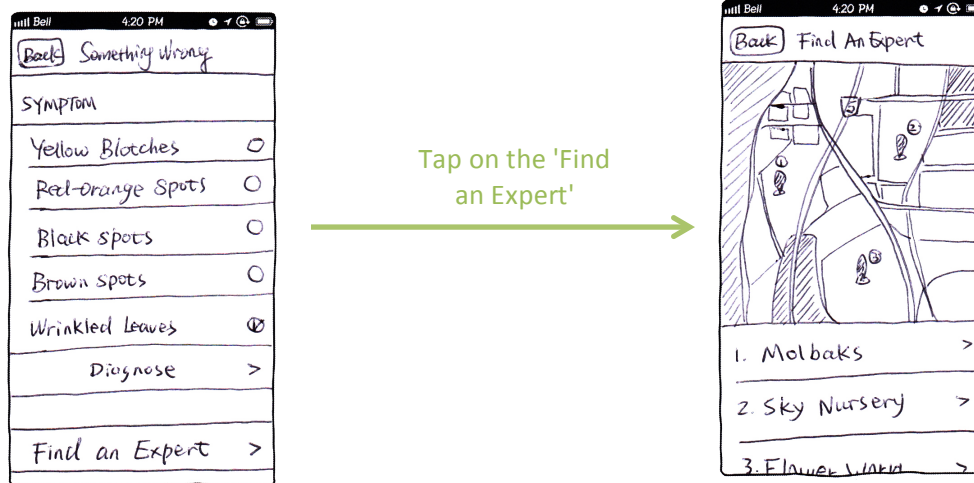


Old 'New Plant' screen: Does not allow user to customize plant care info. This screen does not even display the ideal care conditions of the plant. The screen scrolls down to reveal more options on the 'New Plant' screen, these were retained in the revised version.

Find/Search for help - Something wrong



Revised 'Something is Wrong' screen: The 'Find an Expert' function is no longer a separate screen; the map is displayed on the bottom half of the 'Something is Wrong' screen. We changed this feature because a participant commented that the process of to 'Find an Expert' was tedious, and we agreed with him.



New 'Something is Wrong' screen: Users have to tap the 'Find an Expert' button to get to the map displaying nearby nurseries and their names.

SUMMARY DISCUSSION

In general, the user testing works smoothly as people worked well during the three tasks. There is some user interface problems existed in the user interfaces that confused the participants

People found the social aspect of Plantr interesting. They laughed when they saw the plants talking. Participants said they loved the emotions on the faces of the plants. Since this is a good way to get users to pay attention to their plants, this will be the main way that Plantr encourages plant care.

Participants suggested that we allow users to add their own plants by inputting the light, water and other related information about the plants themselves. There are two reasons for this. One is that it is hard to remember the exact name of the plants, so it will be hard to find the right species of plants by just using 'search'. The other reason is that people sometimes have expert knowledge about how to take care of their plants, so they don't want to care for their plants according to the database's information. We will add UI which allows users to customize adding plants - users will be able to edit the parameters of pH, humidity, temperature and light. Participants also mentioned wanting a fertilizer sensor for their plants.

Participants like the idea of reminders. They liked that the plants could speak like humans and say 'thirsty' and 'thanks'.

Participants complained about multiple screens on the something wrong task. They said getting information on how to deal with a plant problem from an expert was a good feature, but it took too much time. We plan to cut 1-2 steps for the something wrong UI. The UI for 'find an expert', 'nearby nursery store information' and 'diagnose' pages can be merged into one page showing something wrong. Participants loved the idea of a map which listed the nearby nursery stores.

APPENDIX A: SCRIPT

1. Describe the Purpose of the Observation

We are students from the University of Washington taking a class on Human Computer Interaction. Our project this quarter is designing an app to help people take care of their plants. A User test will take about 15 to 20 min.

Thank you for your willingness to participate in this usability test.

You'll be helping me work out the bugs of a smartphone plant care app.

The interface is in the early stages of testing.

I'll be getting your feedback to help improve the usability of the interface.

Any difficulties you encounter will help us improve the interface and make it more user-friendly.

I'm testing the product, not you, so don't feel pressured to "pass the test" or complete all the tasks quickly.

We would like your permission to videotape this testing session. We will not record anything which can be used identify you, in other words, you will be anonymous.

2. Tell the User That It's OK to Quit at Any Time

If you feel the need to take a break from testing or stop at any point during testing, feel free to do so.

Remember, this is completely voluntary.

3. Talk About Testing Equipment/Materials

The white cardboard cutout will represent a touchscreen smartphone that will have our app on it.

You may tap different areas of the paper screens just as if you were using a real touchscreen.

Jen will act as the computer and change each screen when it becomes time. If you click on a screen we were not expecting, we will tell you.

4. Explain how to "Think Aloud"

As you're completing tasks, please think out loud.

Talk through what you're trying to do and how you think you might do it.

I know that this can be awkward at first, but it helps me get more information about the interface and how I can improve it.

If you forget to think out loud, I will remind you to talk.

Would you like a demonstration?

5. Explain that You Will Not Provide Help

I'd like to provide a realistic situation so that I can gauge how users will interact with the interface when they're on their own.

This means that I will not be answering questions or helping you work through tasks.

Despite this, please voice any questions you may have about the product, and I'll write them down so that I can answer them after the task-based portion of the testing process is finished.

6. Describe the Tasks and Introduce the Product

Task 1:

You just bought a new cactus at IKEA and you want to add it to Plantr to be tracked. You have already named your cactus Johnny and placed it in your living room. You need to select a sensor and put it next to your cactus. Please let your Facebook friends know about your new cactus. You may need to scroll down if you cannot find the feature you are looking for.

Task 2:

Another feature is a way to remind you to water your plant. Imagine that you are forgetful and can't remember on your own to take care of your plant.

5 Minutes pass between watering and sensor

Please use the app to discover which plants need care and provide the mock-plants with water.

Task 3:

You walk by one of your Orchids named "Coma" and notice that it doesn't look so good. It's leaves are wrinkled and you want to know what's wrong and how you can help it recover.

If you find out the plant isn't recoverable, please remove the plant from Plantr.

8. Ask if the Participant has Any Questions, Start the Testing Process

Do you have any questions before we get started on the first task?

Alright, let's get started.

9. Conclude the Observation

OK, we have concluded the task-based segment of this usability test.

Are there any questions that you'd like to ask me about the interface or the testing process?

Discuss interesting behaviors you would like to the participant to explain:

- I noticed that...
- What were you thinking when you...
- What were you trying to do when...
- When you were thinking out loud, you said...could you go into more detail about...?

How do you feel about the interface now that you've tried it out?

Is there anything else about the interface that you'd like to discuss or ask?

Thank you for your participation, I appreciate your willingness and help with the development process.

APPENDIX B: RAW NOTES

User test 1 - Jared (CSE building)

Task 1

Put the sensor in Johnny

Click add "just guessing"

"Basic what?"

Add a new picture?

Click Done, did not scroll down

(back to home screen)

"Johnny is in there"

"I guess I forgot to share to facebook"

Click Johnny

Add again

"Oh I didn't realize this had a slider"

Click species

Click Western cactus

Click facebook "share on facebook"

Click done

Task 2

Click Notification

"Lila is so thirsty and jake is thirsty as well"

Click on Lila
“Does this not water plants for me?!”
Watered Lila and Jake
Notification
“Did I exit the app?”
Jen: yes, time passed
“I think I watered my plant now”

Task 3

Click my plants
click coma
“Looks like I have a plant timeline”
“Coma is a butterfly orchid in my living room, it has water light and temperature”
Click Something wrong
“It has this stuff”
Diagnose
Click back
Click find an expert
“Yeah thats too much work”
Click Molbaks
Jen: you’re told your plant is dying, there is nothing you can do”
Jen: ‘You want to delete”
Click back
click edit
“I think edit should delete also”
Scroll down
Click delete
“I dont want to share”

Comments

Delete in edit, for consistency with Contacts and stuff
I don’t know what SCHEDULE represents
I don’t care about the plant timeline, just a list of plants would be awesome
I like the location (living room, etc) though, won’t remember names
Can I specify a watering schedule, because I might know my preference better
What about

User test 2 - Woman at the nursery

Task 1

Click add

"Then I would type in the name"

Type johnny

"i would type in species"

Click species

click ikea cactus

"So here I type in the directions?" - plant info section

Click choose

put sensor in plant

Scroll down

click facebook

"Don't use facebook, don't know what to do"

Click done

Task 2

Slide to unlock

"Lila is thirsty"

click lila

Water

notification pops up

"oh my god hahaha" lol at notification

Task 3

"hit lila or timeline?"

"oh hit coma"

click coma

click something wrong

click wrinkled leaves

click diagnose

Click find an expert

call

scroll down

click delete

"so if i hit delete this plant it says "dying"?"

click done

Comments

Include food (fertilizer) sensor! Then I would buy it

I like the diagnose/call feature

This wouldn't help "plant people". Plant people wouldn't take better care, they already take good care
I like being able to name plants

User 3 - Woman in nursery with daughter

Task 1

Click add "hit add?"
"looks like im entering basic info"
"what is basic?" "oh its the title"
enter johnny, etc
click species
click ikea cactus
click done
click sensor
"so i physically put a sensor on the plant?" "ok"
click done
"oh share on facebook"
scroll down
click facebook
"So it shares for me?"
click done
"do i need to enter light info for my room?"
"how does it know the light?"

Task 2

unlock
"are the different water me messages different degrees of need? or just different messages for same thing?"
water

Task 3

Click My plants
click something wrong
"i pick one?"
click wrinkled
click diagnose
click back
click find an expert

"so i just click one?"

click molbaks

call

click delete this plant

"can i choose not to share to fb? i want to keep that to myself"