Team Leaf it to Us!

Steven Yong, Emily Uthoff, Betsy Todaro, Keristian Farra

P7: Experience Evaluation Plan & Simple Evaluation

Gardeners currently do not have a way to visualize their garden layout before they begin planting. If they don't like how it looks, they will have to go through the tedious task of digging plants back up and relocating them. With augmented reality (AR) set to burst onto the technology scene in the coming years, it will be increasingly important to find innovative applications. Our project utilizes AR to help gardeners by providing them a way to "sketch" out or rapidly prototype how their garden will look before investing in actual plants, and will save them the time and effort of moving plants around in real life if things do not turn out to be satisfactory.

Part 1: Evaluation Plan

We will ask four potential participants to test the prototype of our system. Each member of the group will find a participant for the usability test, and are responsible for facilitating the test with the person they bring. The facilitator is responsible for providing background of the project to the participant, asking the participant to perform the tasks, and altering which "screen" is showing in response to what actions the participant takes. The participants we found are female college students in their 20s attending the University of Washington. Our participants are well-versed in interaction patterns in technology such as tapping, holding down, and dragging, although none of them have used AR before.

Task 1: Create a Garden
The first task that participants will be asked to do is create a garden. To complete the action, the participant will need to recognize that one of the two icons (a plus icon and a folder icon) on the screen are to create a garden. Once they have registered which is the correct icon, they have to decide how to execute the action. Since our group recognized the established design metaphor for selecting is **tapping**, we chose this method of action. Participants need to tap the **plus icon** in order to be shown the next screen which is their primary workspace to build their garden layout. It will include a scrollable plant inventory on the righthand side that can be collapsed.

Task 2: Edit the Garden

The second task that participants will be asked to do is to edit the garden. This includes adding and deleting plants. The aforementioned plant inventory on the right side of the AR will facilitate the adding of plants. Participants will **hold down** on the plant of their choice and then **drag** it to the desired spot. After they hold down the specific plant and start dragging, the selected plant will be shaded in the plant inventory to show that it has been selected, and a floating version of the plant will pop up underneath the finger of the participant. We explain as the participants are taking the action that this behavior would exist in the final version of the system.

To delete a plant, we will rely on the same metaphor of holding down a plant to maintain continuity. When the participant is asked to delete a plant, they will have to **press down with their finger on a placed plant**. As they are doing so, a trash can icon will appear on the lower lefthand side. As per established design conventions, participants will have to **drag** the plant to the **trash can icon** to delete it. This task will be considered completed once the participant makes the motion of dragging the image of the plant they would like to remove over to the **trash can icon**. After they have deleted the plant, they will have to option to undo their actions in case they have made a mistake. The trash can icon will turn into an undo button once they have deleted a plant, but will disappear once they execute another action such as adding in another plant from the plant inventory. We will ask the participant to undo moving a plant to the trash, as if they made a mistake.

Task 3: Save a Garden

The third task that participants will be asked to perform is to save a garden. A button is underneath the plant inventory that simply says "save." Once a participant has completed their garden, they will be asked by us to save their work. To do so, participants will have to **tap** on the **save button**, prompting a popup asking them to confirm their decision to save their garden. If they decide to go back to working on their garden, they can simply press the "go back" button underneath the "okay" button. After tapping on "okay," the participant will be taken back to the main screen with the two icons on the upper right side.

A subtask of saving a garden is to **view** their **saved garden**. Participants will have to **tap** on the **folder icon**, which will open up their saved garden inventory, which is similar in design to the plant inventory. From there, their timestamped garden will appear in their scrollable saved garden inventory. To view it, the participant will have to **tap** on the **specific saved garden** they wish to view. At that point, the saved garden they selected appears in front of them and the participant has finished all the tasks.

Part 2: Simple Evaluation

Finding 1: Many participants do not have previous experience with AR and need assistance with interactions.
Upon bringing in the participants, we asked them about their experience with augmented reality (AR). Many said they weren't familiar with what AR is, so we explained using Pokemon Go as an example for what augmented reality is. Due to them being unfamiliar with augmented reality, we had to explain the action of tapping on icons and buttons the same way one might use a physical screen. This was more assistance than we would usually give in a usability test, but we think it was important to provide the context for how AR works so they could use our device to its full potential.

Throughout every one of our tests, the action of clicking and dragging or tapping remained confusing for the participants. Also, we found our design was somewhat inconsistent with these actions. For example, one of our tests revealed to us that the 'Saved Gardens' menu has the participant tap the saved garden to display it where the 'Create Garden' menu has the participant click and drag items to the garden to view them.

Solution:
In the process of creating our wireframes, we decided to change the action for the participant when creating a garden. Now, our plan is to have the participant tap on a plant they want to add to their garden and the plant will appear in the middle of the screen. From there, the participant can drag the item to the location they desire.

Finding 2: participants found the iconography familiar and intuitive.
Once participants understood how to interact with our prototype, they generally understood how to navigate the interfaces we provided. From the home screen, participants understood to click on the plus sign (+) to create a new garden. We guess this is because the plus sign is used to indicate creating something new in many common interfaces. Additionally, participants understood to click the other icon on the home screen to look at their previously saved gardens. The icon looks roughly like a file or folder icon which is commonly seen when opening something saved. The design was inspired by the icon commonly used to indicate looking at a mobile phone's camera roll as opposed to taking a new photo. This was combined with the previously mentioned idea of the file folder icon used on computers to open up saved files.

One concern we have, which is extremely difficult to test in the type of usability test we conducted, is if this icon is useful if participants aren't being specifically asked to look at their saved gardens. We can guess that participants would be curious as to what the button does, so they click on it as a method of information gathering. Additionally, participants may be looking for where their newly created gardens are being saved.

When we asked participants to complete the task of removing a plant from their inventory, we had to explain that the trash can icon would appear when they have a

plant selected. Once we explained that behavior, people understood to drag the plant over the trash can icon. This is a type of action repeated from desktops of computers where participants can drag desktop shortcuts to files and programs to a "recycle bin".

Solution:
We will continue to use informative iconography in our designs. With our other main findings from the usability tests, we need to alter our interfaces to allow more functionality for our participants. Since the design of the simple icons has worked and allowed the participants to perform the requested tasks, we will continue adding these simple icons.

Finding 3: Some of the functions in our design do not allow for repeated use.
One particular participant asked particularly interesting and helpful questions about repeating certain actions in our design. For instance, when deleting an item from the garden, after the participant drags the plant into the trash can the trash can is replaced by an "undo" button. The participant asked, "what if I want to delete another plant?," which is something we hadn't considered when we were creating our prototype. If the trash can does not reappear the participant only has the option to "undo."

Solution:
To solve this flaw we considered many different options. Our first idea is to simply place the undo button below the trash can after the participant deletes something. This would mean the trash can would need to continuously be on the screen so the participant can undo a delete even after placing a new plant.

Another option is to include "undo" and "redo" arrows in the upper left or lower left corner of the interface to increase editability of the participant's arrangement. This would further improve our design because it not only lets participants delete multiple items whenever they choose, but will allow them to undo and redo placement changes of items to aid them in deciding a placement they prefer over another.

This participant also raised the question about placing multiples of the same plant. Our design currently grays out the image of the plant in the inventory once the participant places it in their garden. However, this can be confusing if the participant happens to have two or more of the same plant and want to arrange all of them in the garden. Once the inventory box is grayed out it appears that the participant cannot reselect this item even if they have more of the same plant.

Solution:
To solve the problem of participants not being able to place multiples of the same plant, we decided to include the quantity of each plant in the inventory. This will allow participants to select and place as many of a certain type of plant from their inventory

as they would like. The box will then gray out once the entire quantity of that kind of plant from their inventory has been placed.

Another option we may consider is to allow the participant to place as many of a certain plant as they would like even if they do not have it in their inventory. This will allow them to arrange their garden to their exact liking and then they can know the items they will need to order to make the garden possible.