USER RESEARCH REPORT

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Team I

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Project Repository:
https://github.com/zhichaodou/CPSC481_Project_Team I

Project Portfolio:
https://zhichaodou.github.io/CPSC481_Project_Portfolio/

Project description

Our mobile application called “Photo-synthesis”, is an AR application which would engage younger demographics with a fun and creative way to learn about plants. Cartoon-figures will assist the user with finding the best location to place their plants or, users can opt to scan-in a pre-determined one. Either way, cartoon-figures will provide step-by-step assistance, helpful tips and positive feedback when the user accomplishes a task, constructive feedback will be provided if something goes wrong to help the user learn. The app would have several features implemented that usually require accessing a web-browser, this would include research, explanations, product shopping, and so on. The application would be intended for children however would be an option to disable the cartoon filters for a baseline version (in terms of cartoon assistance, graphics, etc.).

Stakeholders

Stakeholders	Why they would be interested in this product?
Kids and students (Youth – novice)	The primarily target of our design is the younger demographic. From using our application, we hope that children and teens would develop a healthy understanding of nature and how to properly take care of plants, positively impacting their attitude towards the environment. The cartoony and intuitive design along with its gamified features will play an important role in attracting younger audiences and encouraging them to learn. These users are expected to have limited knowledge but learn fast via the application.
Parents (Mature – novice)	In typical households, family members can use the app to understand the responsibilities of owning plants. The parents would want their child to use the app as a learning tool, for instance learning the responsibility of ownership. This app would make teaching children about plants easier, manageable and convenient. Such a design could save

	them a lot of trouble in terms of finding the ‘best-way’ of teaching their kids about gardening and plant caring. Much like their kids, the parents are expected to have minimal knowledge of the subject.
Teachers (Mature – experienced)	In a school setting, our app can be used by instructors to teach about the nature of plants. In this case, the schools and teachers who integrate this app into their courses will be the stakeholders. Instructors are expected to have background knowledge to provide supporting information and deeper explanations
Plant enthusiast and researchers (Mature – experienced)	Casual plants-owners would have all the necessities to maintain their plants with this app. They can utilize the app to assist with their daily activities, impacting their productivity in a meaningful way. Gardeners can use the information presented on our app to achieve optimal growth of their garden. Plantsmen can use the built-in encyclopedia to discover fascinating plants as candidates for their collection. Botanists can use the app to aid in their research as it would make certain processes faster.
Sponsors and the development team (Internal)	The ones who fund and invest in the project will be the primary stakeholders, they will work closely with the development team who will be in-charge of the design, implementation, and testing; the team will be investing their time and effort into the project and share the vision of the financial investors. Additionally, some members from the development team may be required for the continuous upkeep of the system.

IDEO Methods:

Surveys and Questionnaires

Considering user interaction, surveys and questionnaires were a good place to start collecting user data. We developed a Google Forms survey, which covered topics like daily life, plant-caring, and experience with mobile and AR technologies. We focused on designing an app catered for the younger demographic yet appealing enough such that the older demographic won't be turned away by its look-and-feel being traditionally child-centered and cartoon-like. We requested all individuals taking the survey to imagine being a 10-year-old child, precisely when they were being asked about the app - and plant-related questions. While analyzing our results, we focused on two main categories - individuals 24 and under (younger/older youth) compared to individuals above 24 up to 50+ for the more 'experienced' and/or 'mature' set of users. Almost everyone who took the survey owned plants or had cared for plants before. However, as we analyzed daily life, mobile usage, and plant caring habits we had a wide domain of responses, with age as the determining factor.

Shadowing

Using the "Look" method of shadowing, we decided to follow a family member throughout their daily routine and analyze their interactions specifically attending to their plants. The collected data uncovered some common issues with regards to plant caring, mostly, a love-hate relationship was observed among the plant and owner. The desire to nourish and care for a plant comes with the realization that it's not necessary to do so. Recorded events include leaves falling, color change, or unprecedented dehydration; all these issues require time-consuming research on the Internet to solve. This method allowed us to extract more potential features that our design could provide, moreover additional flaws were revealed with our original designs that may need to be adjusted.

Error Analysis

It's vital to consider all the potential design flaws in the early stages. While researching, we already anticipated some things deviating from the plan and new issues arising as time went on. Most of the initial issues we considered were related to software issues, bugs, poor programming or poor optimization. Using the results from the survey in the first step used in combination with our notes from the shadowing sessions, we were able to identify some scenarios in which our design would lead to the user having a negative experience. All the data collected will be used during prototyping and heavily influence the final design.

Justification of research methods

To select IDEO methods, we determined that the best first action was to obtain as much user information as possible. We decided on surveys and questionnaires as our first method; it helped us identify some common annoyances with plant ownership among users, along with analyzing their daily routine and opinions of mobile applications. We still needed more user-data, thus we opted for shadowing as our second IDEO method. Some group members observed their family taking care of plants, noting any frustrations, problems and potential solutions in their plant caring routines. This method allowed us to witness the interactions experienced and challenges faced by plant owners first-hand. Finally, we used all the information collected in the first two methods to produce several scenarios where things may go wrong and analyzed them. This method revealed issues previously not visible to us, it was very helpful in determining what could go wrong from the user's perspective.

Method reflection

We had some trouble collecting data or proposing ideas while performing the three methods. We see that the combination works relatively well, which is a mix between two data collections and one list of potential flaws. This set of data gave us healthy foundation for us to work off and ensure that our design meets the user expectations. However, one thing that we realized was that our selection of questions could have been more refined, as some of them were not necessary nor valuable in terms of collecting data and instead just resulted in making the survey longer than required.

Users tasks

Three categories: Youth- Novice, Mature – Novice, Mature – Experienced

Must include:

- Scan the plant to find out its species. (Youth/Mature - Novice):
  By using the scanner, they would be able to detect what the plant is; it's species, and type, etc.

- Scan the plant to find out its current condition. (Youth/Mature - Novice):

What its current condition is; it's hydration level, what type of soil it's using, or what types of problems are arise from the plant.

- Game-like plant caring process. (Youth – Novice):
  People who use the cartoony graphical-gamified version would experience something like 'Tamagotchi' or 'Cooking Mama' making it a fun and enjoyable experience.

- Game-like plant care learning experience. (Youth – Novice.)
  While having a good experience, the user is likely able to also develop valuable knowledge with regards to plants, which would then be beneficial in the long run.

Important:

- Guidance through setting up a healthy plant environment (Youth/Mature - Novice):
  Step by step and easy-to-understand instructions for plant environment setup, like sunlight, soil, choosing a pot, etc.

- Guidance through successfully raising a plant with good instructions and reminders. (Youth/Mature - Novice):
  Step-by-step and easy-to-understand instructions would be provided throughout all steps of setup and maintenance of the plant, additional complex explanations and justifications for actions would be offered, if wanted.

- See solutions to plant problems. (Youth/Mature - Novice):
  After scanning the plant and determining the problem, users will be provided with a step-by-step solution to the problem, while recommending products that may help where appropriate.

Could include:

- Buy products recommended through plant problem solutions. (Mature – Novice/Experienced):
  When the user is given the option to buy a product, they will be offered an easy, quick and clean microtransaction system, which would contain common online payment methods; e.g. debit, visa, PayPal, Alipay, etc.

- Read information on plants other than the ones that they scan. (Mature – Experienced):
  If users are looking for a plant index or more information on plant species, soil, or tools, the user interface would contain a convenience wiki-like glossary.

Appendix

Survey Link: https://forms.gle/35LknXTN1fbERFes9

Survey

Basic questions:

What is your actual age?
Do you have any plants in your house?
Do you/would you help to take care of house plants?

Background Questions:

Do you like playing games on your phone or on a similar device (iPad/Tablet)?
What is your favorite mobile game? (Enter none if you don't play)
What is your favorite past-time?
Rate how much of your day do you spend on the following activities:

App Related Questions:

Have you ever used an AR app (augmented reality on a phone/tablet)? Example: Pokemon Go
Do you like descriptions to be straight-forward or detail-oriented? (former/latter/both - explain) - Answer N/A if unsure
Do you believe that graphics or cartoons can help you learn better? (yes/no explain) - Answer N/A if unsure
Do you like being provided with suggestions of different product options when you are in need of obtaining one? (yes/no - explain) - Answer N/A if unsure

Plant Related Questions:

How easy/hard do you find it to identify plants (without research, only based on observation.)
What is one frustration to managing a plant? Answer N/A if unsure
Rate the level of difficulty you experience with the following aspects of plant care:
If there was an app that helped you manage plant care would you use it?
If yes, what is a feature you would like to see? Answer N/A if answered no or unsure.
If no, why not? Answer N/A if answered yes or unsure.

Below are some sample graphic representations of the of the data we collected (other pieces of data were a bit harder to provide graphs due to the way we formatted out answer-choices):

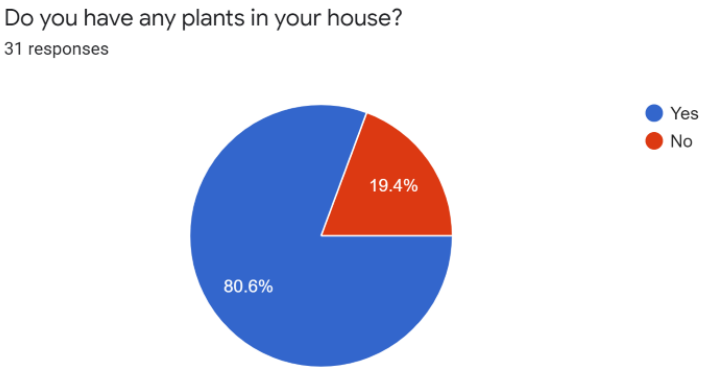

Figure 1: (This ~80% matched up pretty well with the next question being "Do you take care of plants?", which was a solid 77% - Yes)

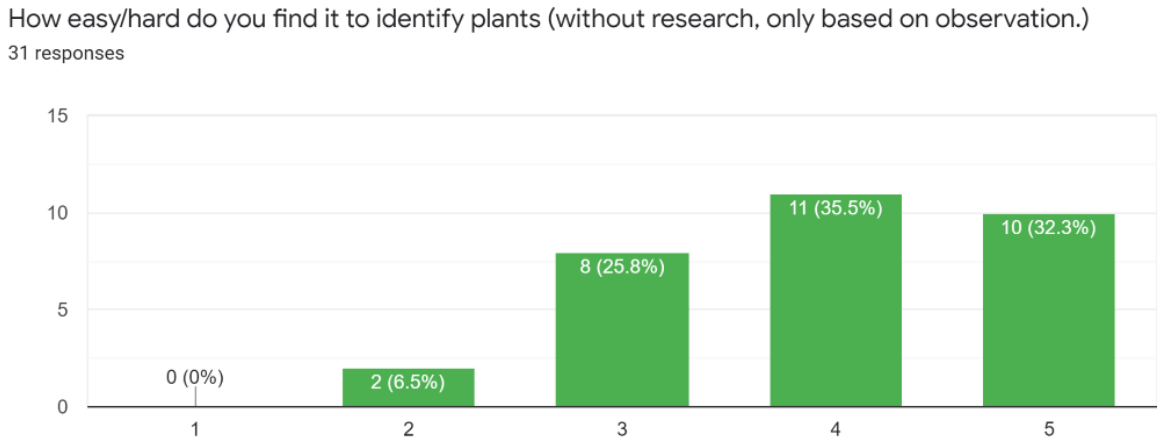

Figure 2

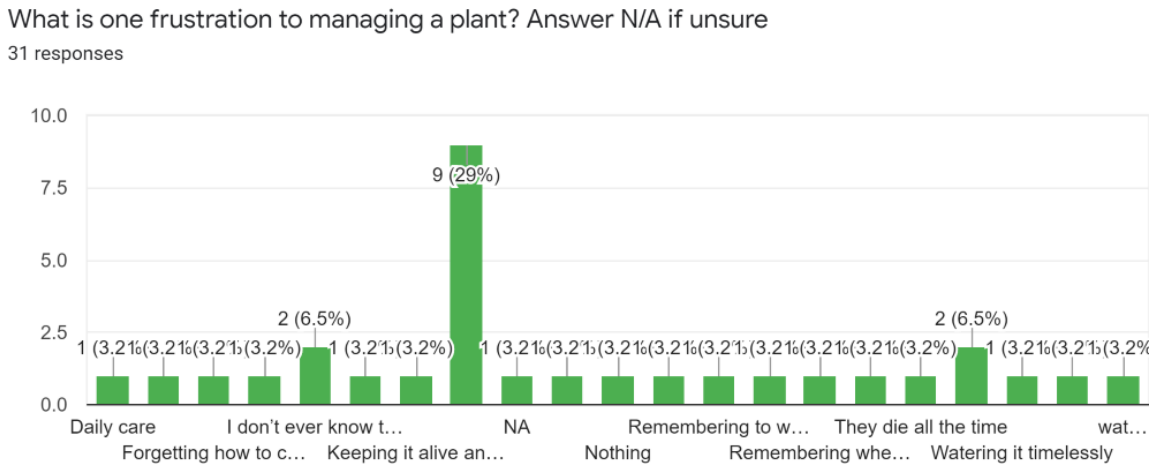

Figure 3: (However, despite most of our surveyors having taken care of plants, most of them cannot answer the question as to what the most frustrating aspect of is managing their plant.)

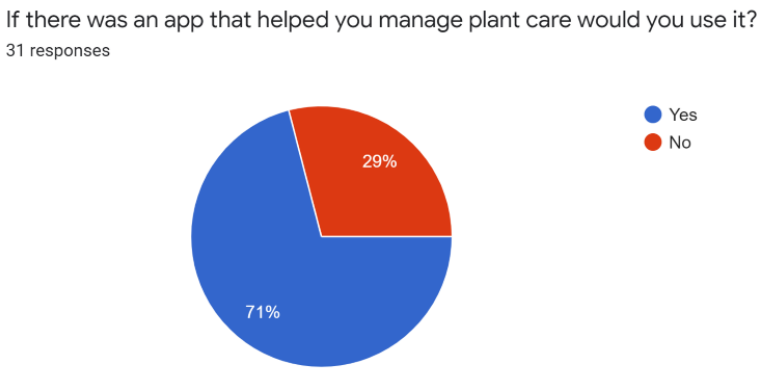

Figure 4

Other Important Survey and Questionnaire Takeaways:

- Analyzing answers from the younger to older youth demographics on questions about mobile games and amount of time spent on various activities in life, we were not surprised to find a gradual increase in “busyness” with age. Youth had significantly more time for their hobbies whereas older youth and individuals from the 'mature' set were shown to have little time for leisure (including time spent on mobile devices).
- One surprising factor was that, when asked their favorite mobile game, many people in the early-youth group selected ‘Pokémon Go’ as their choice, whereas individuals in the older youth group went for games like “Minecraft” or “Among Us.” In the most mature demographic, more mundane games like “Candy Crush” started to appear.
- It seems that late youth face increased gaming expectations, since most (despite being busier than the younger youth) would choose to play a game that requires investing a consecutive chunk of time into it. For example, whereas a game like Candy Crush or Pokémon Go are on-the-run games, a game like Minecraft would have sessions that could go for 30 minutes up to a few hours.
- Another good thing to notice was the separation between wanting straightforward explanation/instructions amongst the younger crowd and the shift towards straight-forward/both to a full detailed-oriented description amongst the mature group.
- Comparatively, almost everyone liked the idea of graphical assistance and the concept of product recommendations.
- When talking about plants, most people found themselves in the “alright-to-tough” range in terms of fully managing a plant. (See Figure 1.2)
- Younger people found it harder to “learn how to take care of a plant” versus “remembering how to take care of a plant.” This, in turn, matched up well with the youth wanting a step-by-step guide feature compared to the more in-depth “why is my plant dying” feature that the mature group wanted.

Shadowing:

Zhi chao (Max)'s Log:

"I spent a day on Friday examining my mother's daily routine and more specifically her attention to the flower she has been growing in our living room. Days like today are the ones where my mother doesn't go to work, and instead stays at home, hence I got plenty of data to record. Since two months ago, my mother has begun taking online art class and when she's at home this is her primary hobby. However, from what I can tell; to her, the flowers still seem to be a necessity. I know this because, she asked me on four occasions throughout the day for me to remind her to water them. In one of these occasions she also asked me if it was still worth keeping this plant in the house? When I asked her why she told me to look at the plants condition. Indeed, the plant was dying, or at the very least, it looked very unhealthy. Precisely that was the weird part, because neither me nor my mother could tell what the problem was. There was no accurate data on our water habits (memory wasn't detailed enough) and despite it "visually" getting a decent amount of sunlight there was no scientific proof that our location was the best choice. Thought this examination, they only thing I could think of what how much easier it would have been if we just had a device which would detected what the plant was 'lacking'. "

Anastasiya's Log:

"My mother waters her plants every weekend, but she doesn't have a set time. Sometimes she forgets to water them during the weekend, in which case she has to water on Monday. She prefers to water them in the morning instead of the evening because she had heard that the water won't evaporate well at night, with the sun down. I shadowed her watering activity on a Sunday. First, she added fertilizer to the big watering can. The watering can already had water in it from before, which is important because my mother believes that the water used to water plants needs to have sat still for a while to let the chloride settle to the bottom. While doing this task, she mentioned how one of her plants' leaves was turning yellow, which was unfortunate. Her watering routine is to first water the plants in the living room, then the plants by the entrance door, then the plants on the staircase, which is what she did this time as well. She said she tried to avoid getting water on the leaves of the plants because fertilizer is bad for the leaves. After watering all the plants, she also sprayed the roots of the orchid with a spray-bottle. She typically checks on her plants every day to every other day to see how they are doing – whether any leaves had turned yellow or withered, or any flowering plants have new or withered buds."

Error Analysis:

Pre-survey/shadowing issues:

- The plant doesn’t get scanned in properly.
- The app recommends the wrong product (fertilizer, soil, etc.)
- The UI is slow and unoptimized
- The production transaction/order fails or doesn’t work properly

Additional post-method testing issue:

- The app ends up being too “simplistic” or becomes a “cartoonish”-annoyance, making it unappealing to a mature demographic. In reverse, it becomes too serious such that is does not seems intuitive for younger people.
- The UI is too messy to navigate through and it comes tedious or unappealing.
- The product suggestions are unrelatable or non-convincing.