User and Domain Analysis
Product: Auto-Medicine Dispensary

Executive Summary

The Auto-Medicine Dispensary is a product intended to make the organization and accessibility of medicine easier. It will allow people to keep track of their medications as well as others' through an interface designed to be simple to use and for anyone around the world. While creating this product, one big design constraint we have to keep in mind is making the product "friction-free", or simple enough for anyone to use and understand.

The research phase of our development included multiple methods. These methods were a focus group interview, stakeholder interview, five individual interviews, a survey with 89 responses, affinity diagram, and research of competitive companies. These research methods were each used with different purposes to overall get many age group opinions, emotional feelings, and likeable characteristics of an interactive product. The interview questions proved to be of most value in gaging people's emotional responses to the product idea and what they did or didn't feel comfortable with. The survey results gave us valuable information on design constraints such as peoples' physical preferences when using an interface, organizational skills, and importance of bilingualism. From these results we were able to create an affinity diagram to clearly organize our main design ideas. Finally the competitive company research was important to us in seeing what would make our product stand out amongst others.

The personas we created utilized all of the information we gathered from our research methods to create stories of how one might need this product in their life. The three personas were each of a different role that the product could require, caregiver, parent, and elderly. By writing out these personas we were able to clearly recognize the main issues people could encounter that would lead them into buying this product.
These personas then were helpful in furthering the idea of someone using the product, by actually creating scenarios of the personas using the product and how their lives could improve. Based on the scenarios, we were able to pull out important requirements, both physical and emotional, that the Auto-Medicine Dispensary would need. A few of the most important being manageable, mobility, compactness, and safety.

Finally, the experience attributes outlined design qualities that came out of all the previous research done. The main takeaways were navigable, advanced, reliable, and accessible.

Introduction

The Auto-Medicine Dispensary is a product to change the way people keep track of as well as access their medicine. By using an app interface with an easily navigable product itself, the Auto-Medicine Dispensary can be used at any age all around the world. The app and instructions on the product can be in any language to widen the range of people that can use this product. The ability to compartmentalize multiple medications and for multiple people creates a whole new realm of organization. With the addition of child safety passcodes, the worry for children getting into dangerous medication is no longer a problem. By using the app, one will be able to set specific times for when the medication should be dispensed and an alarm plus a visual light will alert the person that the medication has been dispensed. The app will also be easy to manage to switch from person to person and adjust settings as needed. The compact nature of the Dispensary also makes it easy for short travel so that there is no issue of how to pack your medication when traveling. This product is especially helpful to health care workers who have multiple patients to keep track of medications, as well as travelling to different homes.

One of our early concerns when designing this product was how willing people would allow a machine to keep track of their daily medication. What was reassuring however was that people most commonly set alarms on their phones to remind them to take medication, so changing over to a product that would actually dispense the medication as well does not seem much more intimidating to let a machine do work for you. Another design concern that was brought up and also a constraint from a stakeholder was that the product needs to be “friction-free”. In other words, the product has to be mindlessly easy so that either children or elderly people and any age in between will be able to use this product efficiently. This was also a design concern to make the app and the product simple enough that people who are not very fluent in technology can follow simple instructions to get started and continue using the product.

Research Methods and Rationale

For the research stage of our design, we held focus group interviews as well as one-to-one interviews, conducted research on competitive products and services, and surveyed our target audience. We started our focus groups to be able to get an initial grasp on how people might interact with our solution in mind and the viability of our original idea. With carefully designed questions, we wanted to understand the emotional and behavioral connection between potential users and the purpose of the products. We followed up with individual interviews, recognizing that being in a group might lead people to feel intimidated and respond to our questions in a different way than how they normally would. As a third way to gather data from potential users, we created an online survey to get raw data about the pattern people take medicine on as well as descriptive

information on our target audience. Since our design goal tackles a medical situation, quantitative information was useful. Lastly, we gathered information about competitive products and services by examining the design language and the point of view the designers of these products embraced. The aim was to understand the vulnerabilities of competitor products and figure out what can be improved or changed.

Summary of Research Findings

Our focus group interview led us to the initial ideas that the main group of potential users would consist of elderly people who would rely on someone else for their care, people living alone who would not have the support of another person in terms of caregiving, and caregivers of a person with sickness. The users responded well to the idea of trusting a machine and stated that “they already do that by managing their medicine routine on their phone”. Our interviewees also stated that being busy or away from home were the main reasons why they skip their medicine, and that they are not likely to invest a significant amount in a possible solution to this issue.
In our individual interviews, we wanted to see the emotional responses to certain ideas. We learned from our interviewees that bulky products wouldn’t be preferred, but also that the size of the texts and display are preferred to be big. Some older interviewees expressed some concern over trustworthiness of a machine, and most mentioned that developing a habit is what keeps them on track to take their medicines.

When it comes to the survey, we learned that most people preferred touch screens over buttons, most people consider themselves occasionally organized. The results shown below in figure 1 and figure 2 show that most have a way to keep track their medicine and that multilingual texts are important for survey takers. This data is extremely important when we begin to design more fully our product.

Fig 1:

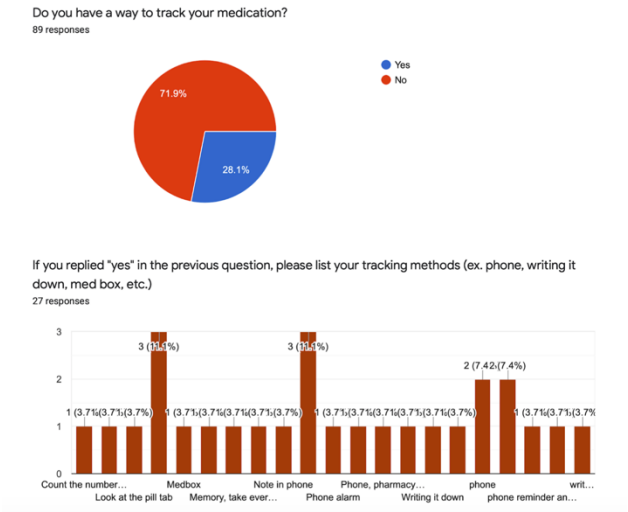
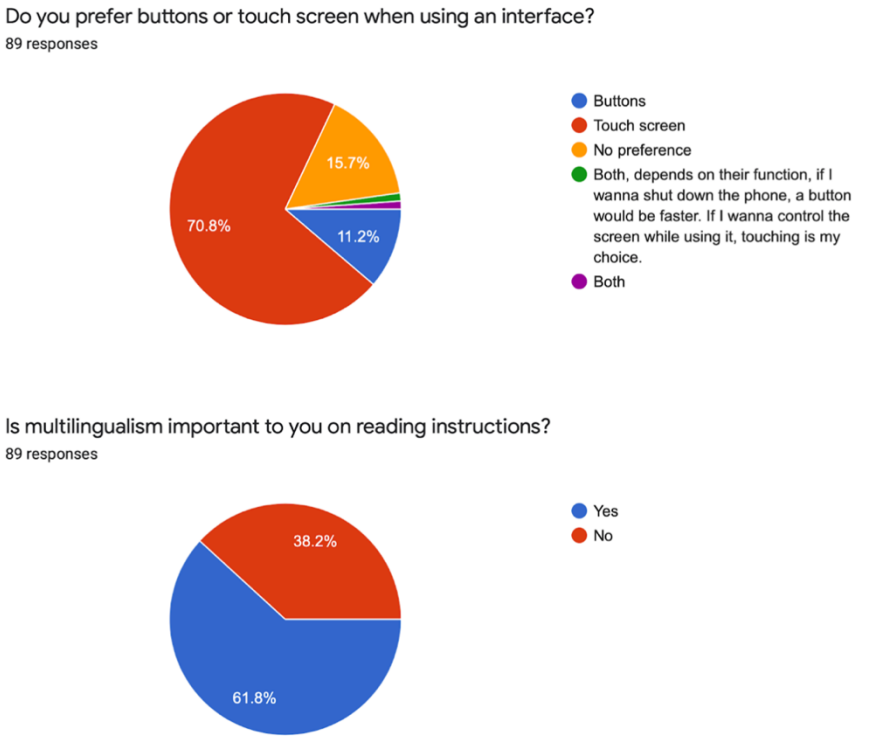
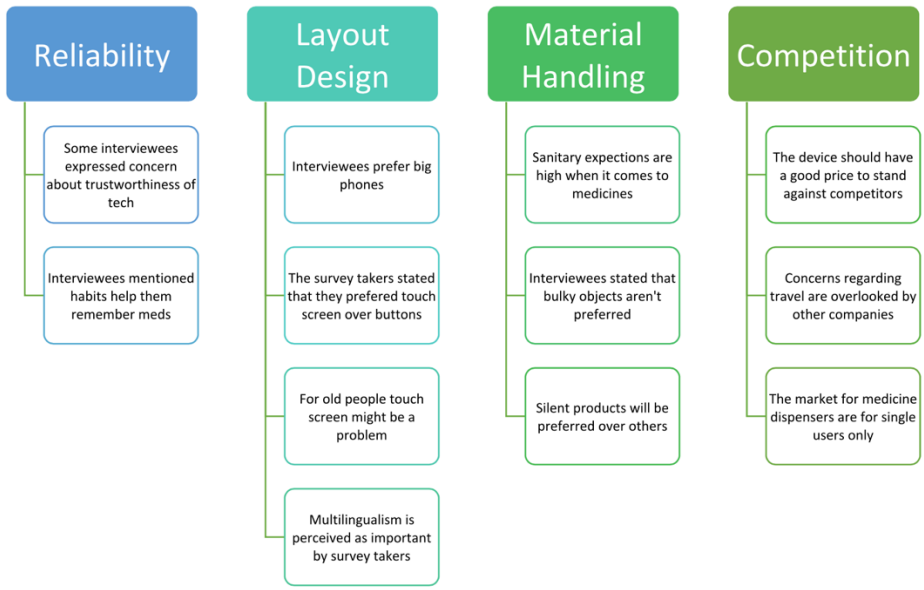


Fig 2:



With this information we were able to create an affinity diagram to help layout design issues as shown below in figure 3.

Fig 3:



Upon our research on competitive companies, we identified two products, Hero Health and MedaCube. Hero Health is a subscription-based medicine dispenser, whereas MedaCube comes with a single payment and is very expensive. This showed us that a

design that doesn't cost too much would be ideal for the competition. The competitive products were also bulky, didn't give the user the ability to use the device for multiple people, and didn't offer any solutions regarding portability. These features that the products lack gave us the framework of what can be improved to stand out in the market.

Personas

Our personas we created were solely based on the three roles we created that would come out of our product. With each persona we wanted to clearly note the direct design issues that came out of our interviews and additional research.

#1

46-year old Jane Solomon makes sure her 14-year old daughter Alana gets to school on time while also managing her business firm. Work gets busy fast at Jane's firm, so Alana usually has to stay at school in their after-school program until she's picked up just before dinner. Alana has a chronic renal disease from birth that requires her to take medicine three times a day with meals, but from the morning hustle and being at school it is easy to forget to take her daily dosages.

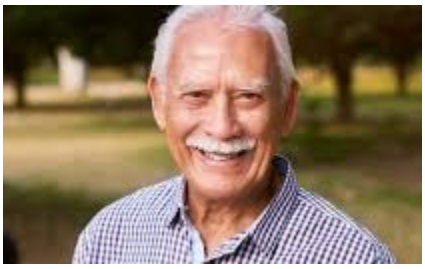
Jane really tries to make sure her daughter takes her medicine, but sometimes Jane isn't even there to remind Alana. Jane must leave early on some days, leaving Alana to prepare herself in the morning and leave on the school bus. While Alana is at school, the nurse makes sure that she takes her medicine, but sometimes she feels embarrassed to visit the nurse everyday as her friends go to lunch, so she takes an extra pill to bring to school to swallow during lunch. The nurse is aware of this and Alana makes sure that the nurse knows she is taking her extra pill through emails and texting, so there is no problem with Alana taking her own medicine during lunch.

While she runs her business, Jane is always worried if Alana is taking her pills or not. Jane stores the pills in a prescription bottle next to the toaster, and the nurse has a legal prescription bottle herself. When Alana takes the medicine to school, she has them safely contained in a little box in the front pocket of her backpack. Alana is confident in her memory to take the pills, but the school nurse and Jane are worried, as missing a pill could really set her back in her health. Being a teenage girl in her 14, Alana clearly has more to concern than just taking medicine, although it has become a part of her life.

Jane's Goals

- Have a way to make sure Alana can take her medicine by herself in the morning
- Can ensure if she is taking medicine to school or not
- To make sure that the nurse knows when to give Alana her medicine

#2



71-year old Pablo Martinez lives happily by himself in his apartment. He has been retired for a few years now, allowing him the wanted time to visit his children and grandchildren. He also tries to be active by doing some light exercise with groups each or every other day.

His past job of a mechanic though has been catching up with him, giving him some back pain and arthritis. His doctor has prescribed him two pain medications for these issues along with two other daily medications for his blood pressure and cholesterol. When his doctor explained to Pablo in the room of when and how much to take of each medication, Pablo understood and took notes on a piece of paper. This paper however is the main way Pablo keeps track of his medication and through travel and constant handling, the paper is now messy and hard to read, which frustrates Pablo.

Pablo doesn't want to call the doctor each time to be reminded because the doctor is sometimes hard to understand over the phone and speaks very fast. This is another frustrating thing to Pablo, as he is aging he speaks and understands more of his first language, Spanish, then his second language English. This language difference also gets in the way of when Pablo tries to read the medication labels, as they are only in English and written in very small print, making it harder.

Pablo enjoys being by himself and does not want an at home caretaker, but recognizes he needs help organizing and keeping track of his medication. Pablo is not too concerned about expenses as he has a saved retirement fund along with his pension. Since Pablo never travels much besides visiting family during the day, he is not concerned about traveling with medication as he can just keep it at home on his bedside table where he usually keeps his medication.

Pablo's Goals:

- Have a new method of keeping track of his medication that will keep him organized and make sure he takes the correct dosage.
- Have a more effective way to communicate with his doctor.
- Be able to read the labels clearer on medication boxes and in both Spanish and English.
- Have something compact enough to fit on his bedside table to host his medications so he can keep them all together.

#3

Lauren Green is 31-years old and has been working as an at-home caretaker for three years now. When she first started she had an easy time keeping track of her patient's medication since she only worked for one person. Now that she is working for three different patients, she struggles in keeping the medications separate as well as carrying all of them on a daily basis.

On top of her patients' medications, Lauren also has two medications of her own that she takes. She even sometimes forgets to bring them with her because of how many other boxes of medications she has on her. This is extremely frustrating to Lauren and she is worried that if she can't keep organized for everyone she will have to stop working for so many patients.

Lauren's main method of keeping track for each patient are three different colored weekly pill boxes that she has to refill every week. The tricky part is when she is in a hurry she doesn't double check whose box she is refilling and she puts in the wrong medication. This scares her because she could give the wrong medication to her patient so then she has to empty every box and restart just in case. This is very time consuming and after long working hours she just wants to rest. Additionally, there are so many bulky containers and boxes that it gets heavy and hard to rummage through her bag without emptying out the whole bag.

While Lauren loves her job, she only makes an average income and doesn't have much extra to expend on extra items. However, if there is something that is related to her work she would do heavy research to make sure it was essential and beneficial to her having it. She is also very smart and a fast learner when it comes to technology so she is always looking for the next new thing in the tech world.

Lauren's Goals:

- Have an easier time refilling each of her patients' medications and being positive she is refilling the correct medication for the correct patient.
- Have something convenient to transport around instead of many bulky boxes.
- Be able to access the pills faster including her own

Context Scenarios and Requirements

Context Scenarios	Requirements
Although Alana is 14, Jane always worries that her daughter may be overdosed. One time she caught Alana taking her morning AND afternoon dosages at the same time because she had an activity to do after lunch that day, which would leave her no time to eat lunch and take her afternoon dosage. That's not how medicine works, especially Alana's. Taking them excessively or inappropriately may lead to unfathomable consequences. Since she bought the Auto-Medicine Dispensary (AMD), Jane has been setting a child lock that only lets Alana take the right amount of medicine needed for the dose. The lock also disables some functions like time setting or amount setting, which are only accessible after entering a password that only Jane knows.	-The ability to lock certains function -The ability to protect the lock by a password
Because of the child lock, Alana cannot bring her own medicine to school anymore. Fortunately, the school's clinic has purchased some AMDs and locates them in the cafeteria for the students in need. Jane only has to provide the school nurse with monthly medicine and the nurse will supply Alana's medicine, along with others', into the AMDs. When it's time for Alana to take her medicine after lunch, she only has to enter her own customized password and her pills will be dispensed. The AMDs will send both Jane and the nurse a notification that Alana has taken her pills.	-The ability to store multiple people's medicine -The ability to recognize each users through a set of passwords -The ability to notify caretakers -The ability to connect with a phone app
At the end of the day, Jane will receive an automatic email from the app that reports Alana's medicine taking activities during the day, both at home and at school. She will know exactly what time Alana took her pills, as well as how many doses left in both AMDs. If there is something unusual, she will leave the nurse a notice through the app or email.	-The ability to connect to other AMDs -The ability to log the activities of the users -The ability to keep track of the amount of medicine -The ability to create a communicative environment between caretakers/users.
Pablo wakes up at 6 AM. He fixes himself some breakfast and a cup of tea. He finishes his breakfast around 6:30, right when he hears an alarm from his AMD. He has it customized to his favorite classic	-The ability to dispense medicine at the scheduled times

Spanish song, so he really enjoys it and it makes him feel that this pills taking thing is not a big deal at all . The AMD gives him the pills for his back pain and arthritis conditions, and also notices him that his afternoon dose will contain the back pain and arthritis pills PLUS his blood pressure and cholesterol pills.	-The ability to let users know when it's time to take the medicine -The ability to dispense the right types of medicine -The ability to memorize users' medicine taking schedule
Right around 12:30 PM, Pablo hears his favorite song again, after finishing his lunch, together with an automated Spanish female voice that lets him know it's time for his afternoon dose. Since he is aging and his eyesight gets worse over time, he has switched to a voice-guiding option so that he doesn't have to read anything. He intents to change the alarm song as it gets boring after a month listening to the same song all over again.	-The ability to have a multilingual setting -The ability to have a voice-guiding function -The ability to customize the alarm function
However, there are things that the AMD isn't programmed to pronounce, like medicine names. In that case, Pablo is very pleased to read the names of the medicine contained in his doses in large-size sans-serif-font letters, which are displayed on a brightness-adjustable LED screen. Now everything Pablo needs to know is provided by the AMD, which saves him the time when he has to contact his doctor and has some difficulty understanding him.	-The ability to adjust fonts and sizes of the letters -The ability to adjust the brightness of the screen -The ability to display medicine information
In the past Pablo had to scrabble around his multiple pill boxes and pill containers to find the right medicine, now they are all contained within an equipment the size of a coffee maker. He can bring it along if he has to travel out for a few days, or bring it to his son's for refilling when his caretaker can't make it. His son is very pleased to help with refilling and sorting because everything is programmed in steps and he doesn't feel the task is a hassle anymore.	-Compactness -Friendliness to users
Lauren finishes her breakfast and is setting out to work. With the AMD it takes her less time to prepare before work, which gives her more time for herself in the morning. The only thing she has to do before going out for work is unplugging the AMD, putting it in its case and grabbing some pre-charged batteries in case she doesn't have access to a power socket.	-The mobility -The ability to operate in both direct electric power or through batteries

At the beginning of each month Lauren would refill the medicine inside her AMD, including hers. First she chooses the name of the patient, then a list of medicine that that patient is taking appears, together with the remaining amount (usually 0 at the beginning of each month). Then Lauren will choose the medicine name and load the pills in. Everything is laid out in very detailed steps, so there's no room for mistakes.	-The ability to hold a large amount of medicine (that needed to be refilled on a monthly basis) -The ability to be easily refilled steps by steps
Lauren arrives at the house of her first patient of the day. She sets the AMD in a safe place and chooses the respective name of the patient, then proceeds to taking care of her patient. When it's time for the patient to take the medicine the AMD will dispense the pills and alarms to let Lauren know. She will retrieve it and give it to her patient. The process repeats with each of Lauren's patients so she has more time to take care of her patients, rather than spending more than 15 minutes to find the right medicine in the past.	-The ability to manage multiple settings of different users

Experience Attributes

The following attributes are visually oriented adjectives that describe the messages or personality that our product conveys. These qualities were chosen based on the persona's goals, stakeholder interviewers, and our other methods of research, as well as what we as a company thinks is a good representative of our product.

- **Navigable:** Not only do we want our product to be navigable, organized, and easy to use for patients, but we also want it to be this way for healthcare providers and caretakers. There are multiple layers to the success of our product, and having it easy to navigate is crucial. It needs to be quick to access both on the app and the physical product.
- **Advanced:** Although there are other companies in this market, we want users to see our product as "advanced". Because of our market research, we feel our product compiles a variety of design work that makes our product the most advanced automated medical dispensary out in the market.
- **Reliable:** Medicine is important to the health of many. Since our device deals with medicine, we need it to be reliable. It needs to be a device that our users feel they can trust. By granting people of this security product users are able to trust the dispenser to perform as needed.
- **Accessible:** Access to the product is key to our user base. This product must be usable by many age groups of different capabilities, and accessible to different people using the same system. By having this accessible by many, people are able to get the full usage out of the product.

Colophon

The design team roles and their contributions to the User and Domain Analysis are as follows:

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Introduction section write-up
Two personas
Executive Summary section write-up
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Summary of Research Findings- Affinity diagram, survey results, focus group results

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Context Scenarios and Requirements section write-up

Nefle Nesli Oruc
Interaction Design Synthesizer
Research Methods and Rationale section write-up
Summary of Research Findings- Interview results, competitive market

Faraz Ghorbanpour
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Experience Attributes- Accessible write-up
One persona