Designing and Evaluating User-Centric Mobile Application:

A Comprehensive Approach from Personas to Prototypes

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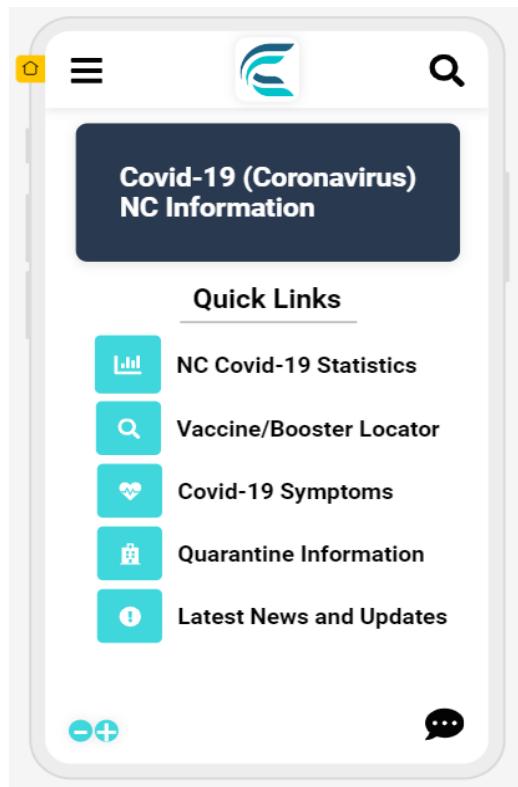ITIS 3130-051 Human-Centered Design

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Table of Contents

Introduction

The main purpose of our Covid-19 application is to inform North Carolina residents about Covid-19 through implementing various usability design principles we have learned about in human-computer interaction. In the beginning stages of design, our team examined different apps that focus on supporting people in tasks through interaction between humans, dashboards, and artificial intelligence. We made a plan to implement an interactive dashboard feature that organizes and displays the most crucial Covid-19 information.

We took inspiration from two existing websites, https://www.joinviolet.com/ and https://www.makeuseof.com/tag/apps-help-someone-do-good/. First, we drew inspiration from the Violet app because it has few colors, a sophisticated layout, and has a chat box feature for users. The UI can be seen in Figure 1 below. Second, we liked the Golden Volunteer Opportunities (Figure 2) app layout. Our team agreed that it has a simple, straightforward design that we will try to achieve when creating our application.
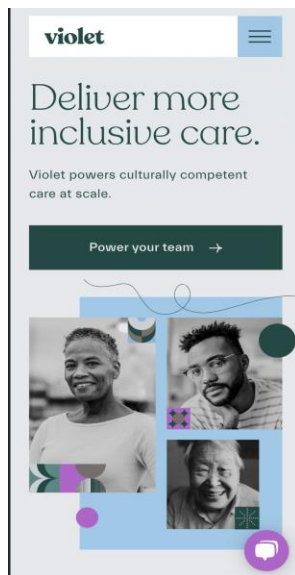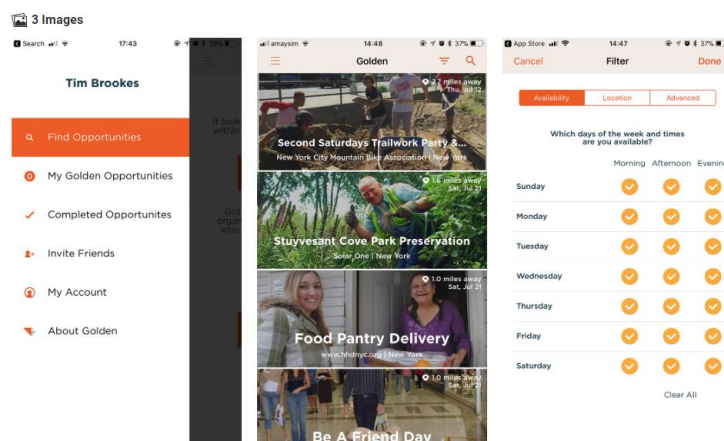

Figure 1   Figure 2

Needfinding

Focus Groups

Logistics

Each team member organized a focus group session with their five respondents. In total, four focus group sessions were facilitated. Below are more details for each of the focus group sessions.

For focus group session one, Edwin led the discussion. Below are the people in his focus group, from various locations in NC.

- Respondent 1 (55 years old, resident of Lexington, NC, entrepreneur, female)
- Respondent 2 (23 years, old resident of Charlotte, NC, history teacher, female)
- Respondent 3 (33 years old resident of Thomasville, NC, manufacturer worker, male)
- Respondent 4 (27 years old, resident of Lexington, NC, waitress, female)
- Respondent 5 (58 years old, resident of Winston-Salem, NC, salesman, male)

For focus group session two, Dasha led the discussion. Below is the list describing the people in the focus group:

- Respondent 1 (55 years old, resident of Charlotte, NC, QA Software tester, female)
- Respondent 2 (63 years old, resident of Charlotte, NC, handyman, male)
- Respondent 3 (23 years old, resident of Charlotte, NC, product manager, female)
- Respondent 4 (29 years old, resident of Charlotte, NC, car salesman, male)
- Respondent 5 (22 years old, resident of Charlotte, NC, a pharmacy worker, female)

For focus group session three, Jai led the discussion. The following list is a description of the people in the focus group:

- Respondent 1 (35 years old, resident of Asheville, NC, Buyer, male)
- Respondent 2 (32 years old, resident of Asheville, NC, Educational Diagnostician, female)
- Respondent 3 (32 years old, resident of Asheville, NC, Receptionist, female)

- Respondent 4 (33 years old, resident of Conover, NC, Supervisor, female)
- Respondent 5 (32 years old, resident of Conover, NC, Supply-Chain Manager, male)

For focus group session four, Maya led the discussion. The five group participants included three females and two males. The following describes the five respondents:

- Respondent 1 (76 years old, resident of Raleigh, NC, Retired nurse, Female)
- Respondent 2 (22 years old, resident of Raleigh, NC, Public Health Graduate Student at Chapel Hill, Female)
- Respondent 3 (21 years old, resident of Lincolnton, NC, Nursing student, Female)
- Respondent 4 (25 years old, resident of Raleigh, NC, Chemist, Male), and
- Respondent 5 (23 years old, resident of Charlotte, NC, HR - Talent Acquisition, Male)

Focus Group Introductions and Questions

All group members (Edwin, Dasha, Jai, and Maya) followed group rules and asked the following set of questions to their focus group participants:

1. What apps do you currently use (or have used) to get information and updates on Covid-19?
2. What issues do you currently experience with the apps that you use (or have used); if none, can you explain why your experience has been good?
3. What kinds of features or information would you like to see implemented in our app? What is the most important?
4. Do you think our app has the potential to positively benefit all North Carolina residents? Who do you think will benefit the most?
5. Do you find a chatbot/virtual assistant helpful when browsing an app?
6. Are there any features that you dislike?
7. How often would you use the app?

Each group member created their own introductory sentence to ask.

- **Edwin** introduced the app with the introductory sentence:
  - My team has developed an amazing app that contains all your informational needs about Covid-19 for all the great people of North Carolina. I would like to truthfully answer a few questions.
- **Dasha** introduced her focus group to the app by using the following sentences:

- ○ We are creating an app that will contain all the useful information about Covid-19 for North Carolina residents. I would like to ask you all a few questions to help us improve our app
- **Jai** introduced his focus group to the the app the team designed with the following introductory sentence:
  - ○ In a design class from school, my team and I created an app containing important information relating to Covid-19 for the residents of North Carolina and would love for you to be part of the group that provides feedback for us.
- **Maya** introduced her focus group to the app we are designing by using the following introductory sentences:
  - ○ My team and I are creating an application which contains Covid-19 information and resources. This application will focus on providing this information to North Carolina residents so I would love to hear your input and feedback.

Summary

During our focus group planning session, our team established a set of questions that each team member would ask their 5 respondents throughout the week. In the following bullet points, the views of all 20 respondents are summarized for each question. The set of questions is as follows:

Question 1. What apps do you currently use (or have used) to get information and updates on Covid-19?

All respondents across the four focus groups recorded using various social media platforms as their source of Covid-19 information, especially during the midst of the pandemic. Specifically, respondents recorded using Twitter to get updates. Other respondents used apps such as CNN or other news outlets to get Covid-19 related information, statistics, and updates. The remaining respondents recorded using the CDC's official website.

Question 2. What issues do you currently experience with the apps that you use (or have used); if none, can you explain why your experience has been without issues?

Many of the respondents in Edwin's and some from Jai's group said that they were not entirely confident that the information they were getting from social media apps was accurate.

Some of Maya's respondents could not recall any significant issues they had experienced with the apps they have used. Some respondents did acknowledge that a lot of the apps only contained updates rather than general information. In many cases, they would end up having to search for specific information on Google if it was not on the app they were using. Majority of older

respondents said that a lot of the apps they have used lack an easy-to-navigate structure which affected their ability to find information.

Some of Dasha's respondents also mentioned that they had stopped using a few apps due to poor performance; for instance, the app speed was prolonged.

Question 3. What kinds of features or information would you like to see implemented in our app?

The recommended features of Maya and Jai's respondents varied. Some respondents said it is important for them to have an application/website with an organizational structure that would make it easy for them to access the most important or relevant information. Some respondents acknowledged that a search bar or chat box would benefit them. Other respondents expressed that they would like interactive features such as data charts to see changing Covid-19 statistics. Accurate and updated information were important to some participants.

Question 4. Do you think our app has the potential to positively benefit all North Carolina residents?

All respondents across all four focus groups said that this app will be a benefit to the residents of North Carolina. Many respondents said that elderly folks would benefit the most because of our app's simple navigation. Adding on to this notion, Respondent 1, a woman in her 70s, from Maya's focus group, reported that an app like this would make it easier for her to find Covid-19 information, especially with the use of a chatbox feature. Additionally, she said that many individuals with low technical expertise could also benefit from the feature. Respondent 1 from Jai's Focus Group believes it will help those immuno-compromised and companies and agencies who need to keep track of this kind of information. Overall, respondents from all focus groups supported creating a North Carolina Covid-19 informational app.

Question 5. Do you find a chatbot/virtual assistant helpful when browsing an app?

All respondents across all four focus groups were positively receptive to the idea of integrating a chatbox/virtual assistant into the application design.

Some respondents recorded that while they do not use chat boxes often, these features make it easier to find help or specific information at certain times. Other respondents expressed that they find it easier to find information by using a chat box rather than clicking through the navigation bar. They said a chat box allows them to find a specific topic without the extra hassles. Examples of focus group responses include "I will be able to get the information that I'm only looking for" and "Good, I'm too lazy to type sometimes."

Question 7. Are there any features that you dislike?

No respondents in Maya, Dasha, Jai, or Edwin's focus group expressed any dislike towards the features we have planned for our application thus far. Instead, respondents reacted positively towards our design ideas of using a chatbot/AI feature, integrating the flu/vaccine locator form, and including interactive data charts. Some mentioned that it seems to be very user-friendly and inviting.

<u>Question 8.</u> How often would you use the app?

Maya and Jai's respondents said they would occasionally use the application. Many said they used Covid-19 information apps more frequently at the beginning of the pandemic, and since then, their app usage for these kinds of applications has slowed down. While this is the case, respondents still acknowledged that our application could be critical and informative to individuals who consistently want to stay updated or knowledgeable on everything about Covid-19.

Edwin's Respondents said they would use the app as often as needed; whenever a new variant emerged, they would check the app to learn more about it.

Older respondents from Dasha's group mentioned using this app frequently, about 2-3 times a week. However, younger respondents said that while they appreciate the app, they would not use it until needed. Some examples of occasions when they would use it would be vacation planning, a new Covid strain outbreak, and any updates regarding vaccinations.

Personas

The purpose and tasks that can be performed with your app.

The main purpose of our app is to organize and provide information on Covid-19 to our intended users. Following the answers from our focus group sessions, we defined the most important tasks to implement. These tasks are defined and described below:

1. Chatbot, voice assistant (This feature will allow users to find information, ask questions, and navigate the website)
2. Covid-19 Vaccine Locator (This interactive form will allow users to input unique information to find a vaccine near their location)
3. Sends notifications (This function notifies users when there is new information)
4. Graph analytics (We plan to implement various graph analytics to show changing Covid-19 data over time. This could be across various counties)
5. Zoom feature (This feature will allow users to zoom in to view content closer. It is a handy feature for people with low vision)

The target population of your app

The target population of our app includes North Carolina residents of all ages. After our focus group sessions, the team agreed that our target population should stay consistent with our original plans.

Personas

"As a nurse, it is important that I stay educated on Covid-19 updates"

Goals
- "I would like to keep up to date with Covid-19 vaccines because it is important for me to know where I can get them and what is available."
- "I would like to have trust in where I am getting my information."

Frustrations
- "Sometimes, I cannot find the information I need without having to search Google for additional information."
- "Sometimes, I can't trust information that is spread on social media or news articles."

Diana is a nurse who lives in Raleigh, North Carolina. She spends the majority of her time working but in her free time, she likes to keep up with health news. After the pandemic, Diana knows how impactful and unexpected the course of Covid-19 was. Because of this, she keeps up with the latest information; however she gets frustrated by untrustworthy sites and desires an app that would organize and contain all of the information she needs.

Diana

Age: 32
Education: College degree
Hometown: North Carolina
Occupation: Nurse

"I want to stay informed on Covid-19 in my city but I am not tech-savvy"

Goals
- "As a senior citizen, I appreciate an accessible app with a bigger font and good color schemes as I have a low vision."
- "I would love to use an easy-to-navigate app on my phone."

Frustrations
- "Sometimes I delete overly complicated apps, i.e., when I cannot find necessary information quickly."
- "Some apps have text that is too small for me too read/ some apps are hard to look at due to the poor color choices."

Sam is a retired accountant. He stated that he would like an easy-to-navigate application on his phone with a chatbot or a voice assistant feature that would deliver news about Covid-19 daily. Sam experiences vision issues due to the nature of his life career, so he would love to have an application accessible for low-vision folks.

Sam

Age: 67
Education: College Degree
Hometown: Charlotte, NC
Occupation: retired

"A safe school environment plays a major role in my academic success"

Goals
- "I want to be able to reference the latest guidelines quickly"
- "As a student, it is important to know the current status of Covid-19 because this may impact my academic plans"

Frustrations
- "I cannot seem to find accurate information regarding Covid-19"
- "A lot of information regarding Covid-19 is not relevant or out-of-date"

Levi

Age: 19
Education: University Student
Hometown: Hickory, NC
Occupation: Teacher Assistant

Levi is a college student from the University of North Carolina Greensboro. He wants to know the most updated information about Covid-19 but finds himself reading outdated reports. This has caused fear and worry about his own health and the well-being of his loved ones. It has been difficult for him to concentrate on his schoolwork. His sleep patterns have been disrupted because he does not know what harm Covid-19 will do next. The outdated information has decreased his social interactions with other students.

"Sometimes im busy and dont have time to dig for information."

Goals
- "To get accurate information about Covid-19. "
- "To be able to navigate smoothly."
- "To able to use a chatbox to imput information verbally."

Frustrations
- "Sometimes, I have trouble finding an adequate information about Covid-19."
- "Sometimes, I have to spend a lot of time shifting through apps to find information about Covid-19 in NC."
- "i sometimes dont know how spell medical terminology!"

Will

Age: 58
Education: High School Diploma
Hometown: Winston-Salem NC
Family: Lives with his wife
Occupation: Salesman

Will is salesman from Winston-Salem NC, in his line of work Will comes into contact with many clients and sometimes he worries that Covid-19 still lingers around. Will wants to practice safety measures for the protection of his clients and himself.

How these Personas are related to the information you learned in your focus group sessions.

Persona 1: This persona relates to what we discovered in our focus group discussions. We discovered that many participants don't have a lot of trust in the apps they currently use or have used to collect information about COVID-19.Mainly, many users use news or social networking apps. Our focus group session revealed that many people do not currently have an app with all the information they desire. Many stated that they have to visit multiple websites or use Google to search for what they need. This persona illustrates our objectives to develop a reliable and accessible site where North Carolina residents can easily find Covid-19 information and updates.

Persona 2: We have found that older respondents tend to stick with apps that have a straightforward structure and are easy to navigate. People do not like to spend more time figuring out the correct link to click on to get the information. That is why we created Sam, that would like an idea of chatbot and voice assistant features on an app as they would help one to navigate the app. It would also help those who are not tech-savvy, just like Sam. We also decided to make our website as accessible as possible, including good color schema and accessible, sizable font size, as it would help older people or users with low vision.

Persona 3: In the third persona, we created Levi who represented young adults. In our focus group, we came across the effect Covid-19 had on younger people, particularly students. Planning for the future is so important and not an easy task for college students. However, this may be hindered by the outdated information on many applications regarding Covid-19. Referencing the latest guidelines and knowing the current status of Covid-19 is an important part of academic planning. If accurate information is unavailable, it may be difficult for some students to concentrate on their schoolwork, and others may decrease their social interaction with other students. It is important to have trustworthy and relevant information, which is what our new app will consist of.

Persona 4: This persona is a perfect example of why an app that gives you accurate information about Covid-19 will be beneficial to the residents of NC. Will is a Salesman from Winston-Salem; in his line of work, he meets with a few clients in person, so he has concerns with Covid-19 that he might expose himself. He would like a mobile app that would be quick and easy to navigate. Will also wants the information to be accurate, and most importantly, he wants information related to North Carolina.

Design Goals

Usability Design Principles

- Increase flexibility and efficiency of use by implementing the chatbot and other shortcut features.
- Have an aesthetic and minimalist design user interface by prioritizing the most important content/features in order to reach our design goals.
- Provide help and documentation through the chatbot feature.
- Create predictable interactions to create trust in our product.

Major Purposes and Tasks

- Implement an interactive dashboard feature that displays the most crucial information.
- Have a Covid-19 vaccine/booster locator so users can easily see the availability and location of vaccines and boosters. This form will prompt the user to fill in the following information: zip code, age, preference options, etc.
- Include a web-based AI chatbot feature across all web pages so users can easily find information and ask questions. This feature will give users the option to find information with their voice rather than typing.
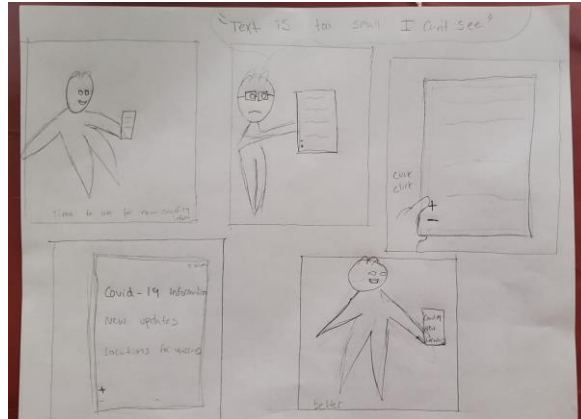
Storyboards and User Journeys

1. Zoom Feature

Persona 1	
User's goals: Get new and acute information about covid-19. **Their motivations:** Will is a salesman and he deals with various people in his line of work, so because of that, he worries about Covid-19. **Their current pain points:** Not being able to read the small writing in most apps. **Their overall character:** Will, a salesman in his late 50s, likes to meet with clients and make deals in person. **The main tasks they want to achieve:** To find new and written accurate information about Covid-19.	"Sometimes im busy and dont have time to dig for information." **Goals** • "To get accurate information about Covid-19. " • "To be able to navigate smoothly." • "To able to use a chatbox to imput information verbally." **Frustrations** • "Sometimes, I have trouble finding an adequate information about Covid-19." • "Sometimes, I have to spend a lot of time shifting through apps to find information about Covid-19 in NC." • "i sometimes dont know how spell medical terminology!" **Will** Age: 58 Education: High School Diploma Hometown: Winston-Salem NC Family: Lives with his wife Occupation: Salesman Will is salesman from Winston-Salem NC, in his line of work Will comes into contact with many clients and sometimes he worries that Covid-19 still lingers around. Will wants to practice safety measures for the protection of his clients and himself.

Storyboard 1	
"Using the zoom feature"	

User Journey 1	
	"He who could not see" Context– Will is at his home, curious about any new updates on covid-19 opens our new app. **Progression**– After opening the app, he realized he could see the app's text very well, so he found a feature that lets the user Zoom in on the reader. **Functionality**– A zoom in/out feature lets will be able to read the text **Emotion**– At first, Will is annoyed that he cannot see the information he desires. He later feels sad and blames his low vision. After discovering the zoom-in/out feature on the new app, he was so happy to be able to read further covid-19 information.

2. Covid-19 Vaccine/Booster Locator

Persona 2	
User's goals: to find a Covid-19 booster near him. **Their motivations:** Sam wants to find an available booster near him as quickly and as easy as possible. **Their current pain points:** Sam dislikes overly complicated apps that take him too long to figure out. He likes simple apps with easy-to-navigate structure. **Their overall character:** Sam is a retired senior citizen, he does not like to play with technology too much; however, find it a necessary aspect of his life. The main tasks they want to achieve: to find an available Covid-19 booster	

Storyboard 2 "Using the Covid-19 Vaccine/Booster Locator"	
User Journey 2	**"Using the covid app to quickly and easily find a booster"** **Context–** After a long day of staying home and watching the news about Covid-19, Sam gets a bit worried. He is in good health but does not want a chance of getting Covid. Sam already got a previous booster when his friend suggested he could get one. Unfortunately, that friend moved away from NC, so now Sam needs to find a Covid-19 booster location himself. **Progression**– Sam remembers that his granddaughter downloaded an app on his phone that gives him various updates about Covid-19 in North Carolina. He explores the app once again; Sam notices that the app has a "find a vaccine" option. Sam types in all his personal information, such as age, gender, and location. Shortly after, Sam sees several places where he can get his shot nearby. **Functionality**– Sam expects to find information regarding boosters in his app. Sam can achieve his goal thanks to easy navigation and the Covid-19 Vaccine locator. **Emotion**– Sam is a bit anxious about using an app as he had many negative experiences before where he could not figure out how to use an application. However, Sam sees that an app uses a straightforward layout with accessible colors and fonts. He is happy about how easy it is to navigate through the app. Sam is excited when he sees a Covid-19 Vaccine Locator page and is extremely satisfied with the final results when he sees multiple locations that offer Covid-19 boosters nearby.
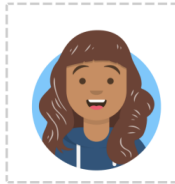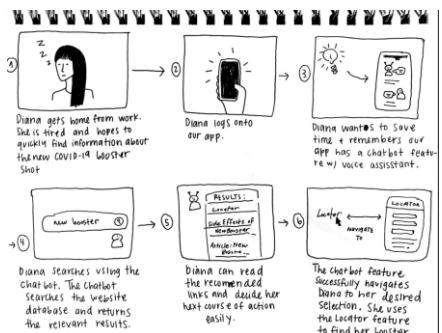
3. Updates Section

Persona 3	
User's goals: to receive relevant information regarding Covid-19 **Their motivations**: Levi needs to plan for the upcoming semester and needs to know the status of the pandemic. **Their current pain points**: Levi does not like how guidelines and information are not up-to-date. **Their overall character**: Levi is a young student. He is a people-person and dislikes social-distance. **The main tasks they want to achieve**: He wants to receive updated information regarding Covid-19 guidelines and status.	"A safe school environment plays a major role in my academic success" **Goals** • "I want to be able to reference the latest guidelines quickly" • "As a student, it is important to know the current status of Covid-19 because this may impact my academic plans" **Frustrations** • "I cannot seem to find accurate information regarding Covid-19" • "A lot of information regarding Covid-19 is not relevant or out-of-date" **Levi** Age: 19 Education: University Student Hometown: Hickory, NC Occupation: Teacher Assistant Levi is a college student from the University of North Carolina Greensboro. He wants to know the most updated information about Covid-19 but finds himself reading outdated reports. This has caused fear and worry about his own health and the well-being of his loved ones. It has been difficult for him to concentrate on his schoolwork. His sleep patterns have been disrupted because he does not know what harm Covid-19 will do next. The outdated information has decreased his social interactions with other students.
Storyboard 3 Receiving news updates related to Covid-19 via the app's notifications feature	
User Journey 3	**"Using our application's notification feature to receive relevant information on Covid-19 "** **Context**: Levi had been taking online classes since the outbreak of Covid-19. Being a people-person, this affected him greatly. For the upcoming semester, the university is allowing students to take in-person classes, but at their own risk. Levi does not know what to do. Should he attend in person-class and take the risk? Or should he play it safe and continue with the remote learning? All he needs is the latest guidelines of Covid-

	19 to make the decision. He is sitting in his bedroom with his Iphone in hand and with only five minutes left before class registration begins.
	Progression: Levi had seen on youtube that there was an app that sent out accurate guidelines and information regarding Covid-19. With only a few minutes left, he quickly downloaded the app in the hope that he would receive the information he needed.
	Functionality: Levi is expecting to receive relevant information before his class registration begins. To his surprise, he received a notification that the pandemic is at a safe level and the social-distancing has been lifted. He quickly signs up for classes.
	Emotion: Levi was extremely anxious as each second passed by. He is a senior and does not want to lose his classes. His eyes were locked on his Iphone throughout the entire process, waiting anxiously for the good news. His emotional state goes from being anxious to surprised and to joyful. He does a split in mid-air after hearing the good news and celebrates.

4. Chatbot Feature

Persona 4	
User's goals: to find information about the new booster shot.	"As a nurse, it is important that I stay educated on Covid-19 updates"
Their motivations: needs to get the new booster shot.	**Goals** • "I would like to keep up to date with Covid-19 vaccines because it is important for me to know where I can get them and what is available." • "I would like to have trust in where I am getting my information."
Their current pain points: finding an efficient and trustworthy way to find information.	**Frustrations** • "Sometimes, I cannot find the information I need without having to search Google for additional information." • "Sometimes, I can't trust information that is spread on social media or news articles."
Their overall character: always wants to find the most efficient way to complete tasks.	**Diana** Age: 32 Education: College degree Hometown: North Carolina Occupation: Nurse
The main tasks they want to achieve: learn more about the booster and find out where she can get a booster shot in her area.	Diana is a nurse who lives in Raleigh, North Carolina. She spends the majority of her time working but in her free time, she likes to keep up with health news. After the pandemic, Diana knows how impactful and unexpected the course of Covid-19 was. Because of this, she keeps up with the latest information; however she gets frustrated by untrustworthy sites and desires an app that would organize and contain all of the information she needs.

Storyboard 4 Using the chatbot feature to search and find information or resources	

User Journey 4	**"Using our application's chatbot feature to quickly find information on the new Covid-19 booster."**
	Context: The user just got off a long day of work and is back at home. She needs to get multiple things done in her free time and knows that she wants to quickly find her booster shot location so she won't need to worry about it for the rest of the night
	Progression: Diana heard about our app and recently downloaded it. She opens our app and knows what information she wants to find. She considers using the search bar but sees the chatbot and decides to use that instead. Since she doesn't know what exactly is on our application that relates to the booster, she thinks the chatbot would be able to help her find what she's looking for. She searches for "New booster shot." The chatbot gives her a list of recommended options. She did not know prior to searching that our website has a booster locator. She navigates to the Vaccine/Booster locator to find where she can get a booster in her area.
	Functionality: Diana is expecting to find out more information from the chatbot. Through searching the chatbot, the task was achievable.
	Emotion: Diana's emotional states throughout each step of using the chatbot and finding her intended information included: curiosity, surprise, and satisfaction.

Design Prototype

We want to satisfy our North Carolina customer's needs based on the user journeys and personas we have created. Customer needs define the most important elements of our website design. With that, we created a Low Fidelity Prototype and High Fidelity Prototype. These prototypes are crucial in the process of designing a website. Through these prototypes, we will express our design ideas. Moreover, the prototypes will simulate the interaction between the user and the user interface.

Low Fidelity Designs

In the early stage of developing this prototype, we implemented a prototyping technique called wireframe. Also known as a page schematic or screen blueprint, it is a visual guide that represents the skeletal framework of a website. There are three goals of the wireframes, which are: to present the information to be displayed on the app screen, outline the structure and layout of the app, and include and describe the basic interactive element of the user interface. We have created four wireframes based on the user journeys and personas we created in a previous assignment and four low-fidelity prototypes. Their aim is to provide a basic visual representation of the elements we plan to incorporate into our Covid-19 information application. Included in the prototypes is an easy-to-navigate design with a top navigation bar, quick links, and a chatbot. We focus on establishing a simple hierarchical model and interface. Our design includes interactive forms and features to increase user engagement, control, and easy access to Covid-19 information.

Wireframe 1:

User Journey: Using our application's zoom feature, users will be able to enlarge the image to make it easier to view.

Main Tasks to Achieve: To find new, accurate, and easy-to-read information about Covid-19.

Persona:
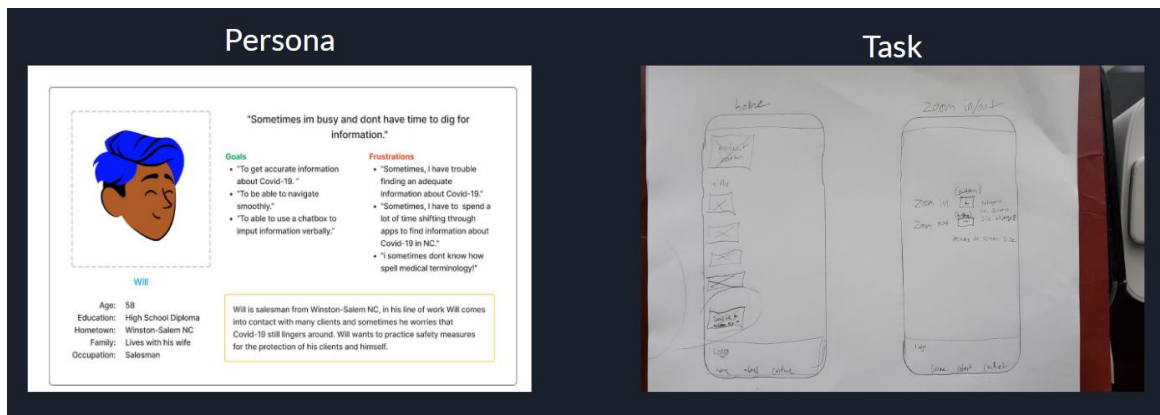
Wireframe 2:

<u>User Journey:</u> Using our application's Covid 19 Vaccine locator to quickly and easily find an available Covid-19 booster.

<u>Main Tasks to Achieve:</u> To find an available Covid-19 booster near his area by using the Covid-19 Locator feature

<u>Persona:</u>
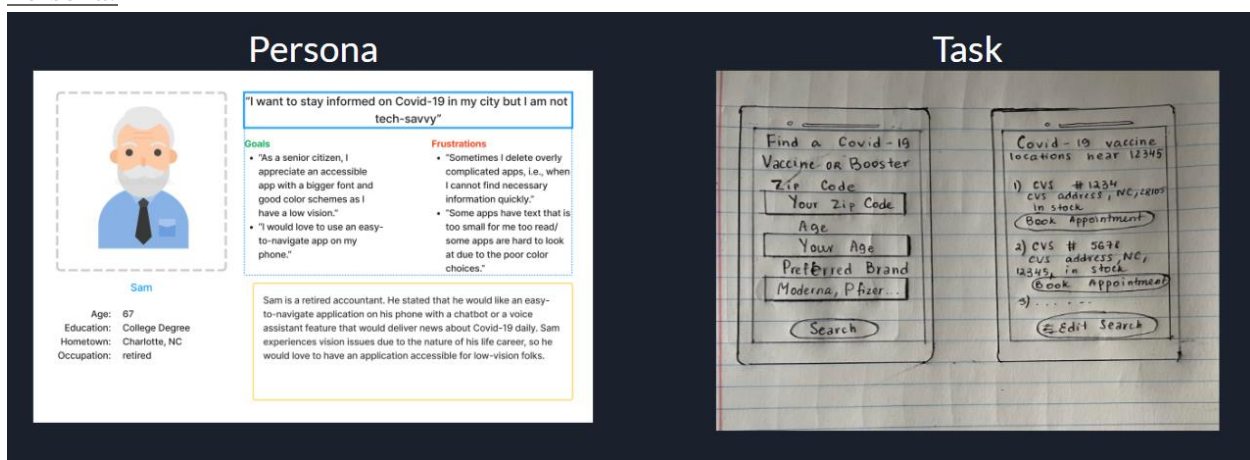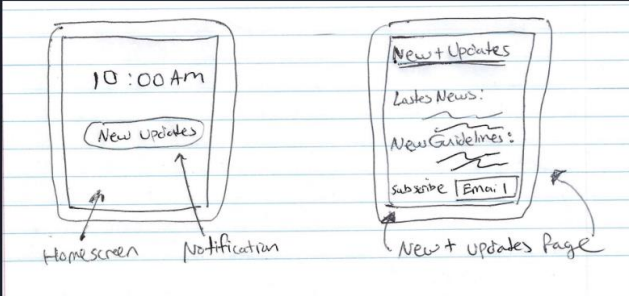
Wireframe 3:

User Journey: Using our application's notification feature to receive relevant information on Covid-19

Main Tasks to Achieve: He wants to receive updated information regarding Covid-19 guidelines and status.

Persona:

Wireframe 4:

User Journey: Using our application's chatbot feature to quickly find information on the new Covid-19 booster.

Main Tasks to Achieve: To learn more about the booster and to find out where she can get a booster shot in her area.
Persona:
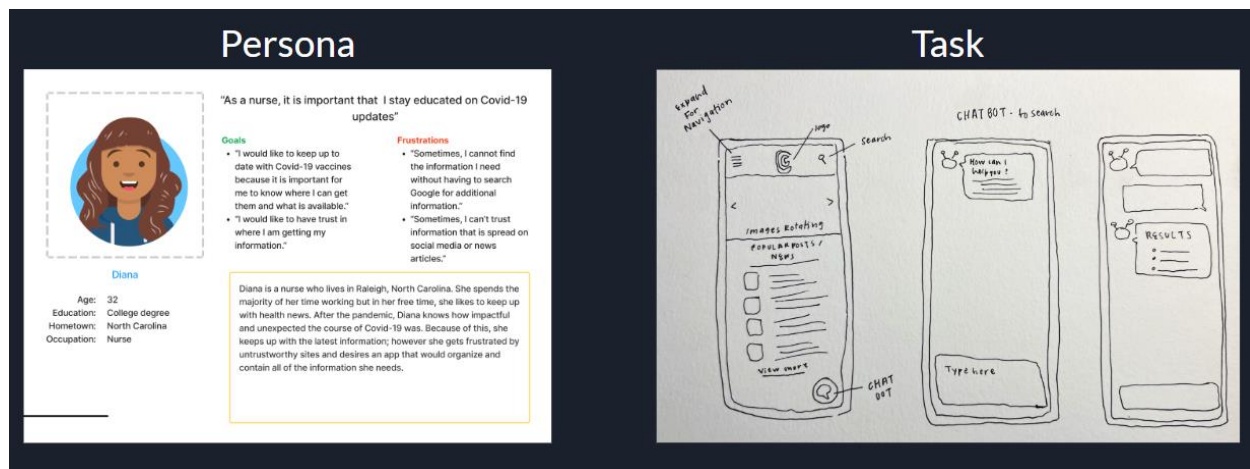
High Fidelity Prototype (Prototype Design):

The final prototype includes a high level of detail in terms of information, visual design and functionality. It is a digital interactive representation of the product with close resemblance to the final product in terms of the details and functionality. The prototyping tool used to create the prototype design was called wizard. Multiple features are associated with the prototype design.

Open App

The design includes a simple logo alongside a detailed logo at the opening of the app.
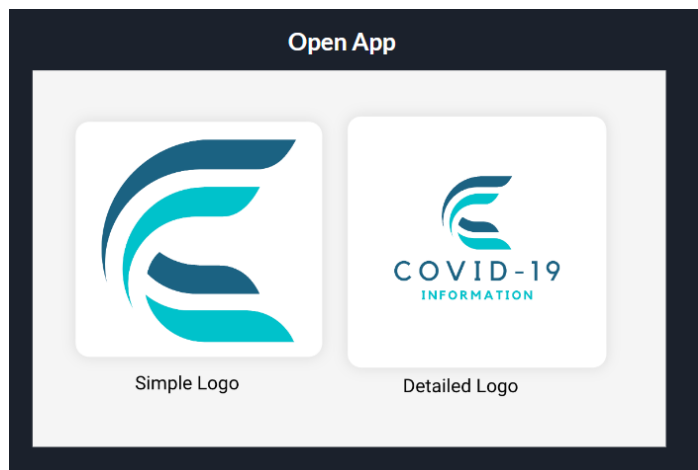
Homepage (with Icons, Typography, Interaction), Navigation Drop-List, and Zoom Feature

On the homepage, quick links are provided for users to navigate to relevant information. On the top left of the homepage, a Navigation Bar can be found. A drop-down list will appear when

Navigation is selected. To the bottom left of the homepage, users can zoom-in and out as they please. The icons to the left of each quick link has its resemblance to the link. The front and style of text used throughout the app was Roboto with the styles alternating from bold to regular to medium and size fluctuating from 12 to 20. The titles of sections and any important information that needs to catch users attention are bolded. Our application's zoom feature allows users the ability to enlarge the image and to make it easier to view. The zoom feature is another interaction type implemented into the app.
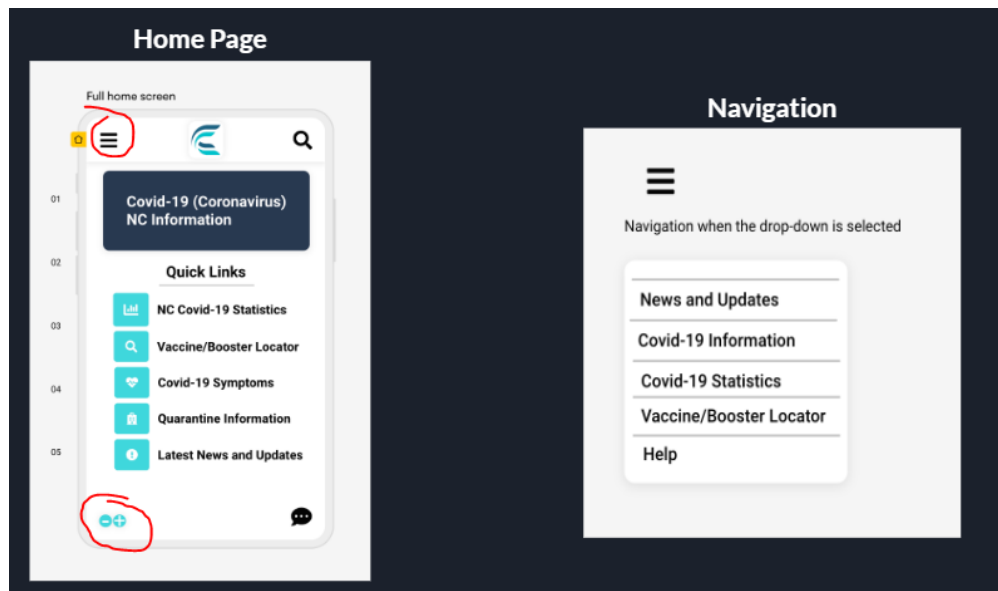
Chatbot Feature, Home Icon, Left Arrow:

To the bottom right of the homepage, a chat-box feature is available for users. Clicking the rectangle white box at the bottom of the page, one can either speak to the chat-box and it will auto-fill the box with what the users said or one can type into the chat-box. Clicking the search arrow afterward will display the information the user is searching for. This is one of the interaction features we implemented into our app to make it user-friendly. The Home icon on the top left corner of the app will allow users to automatically navigate back to the homepage.
Users can also click on the left arrow on the top left of the app to view the previous page if they desire to do so.
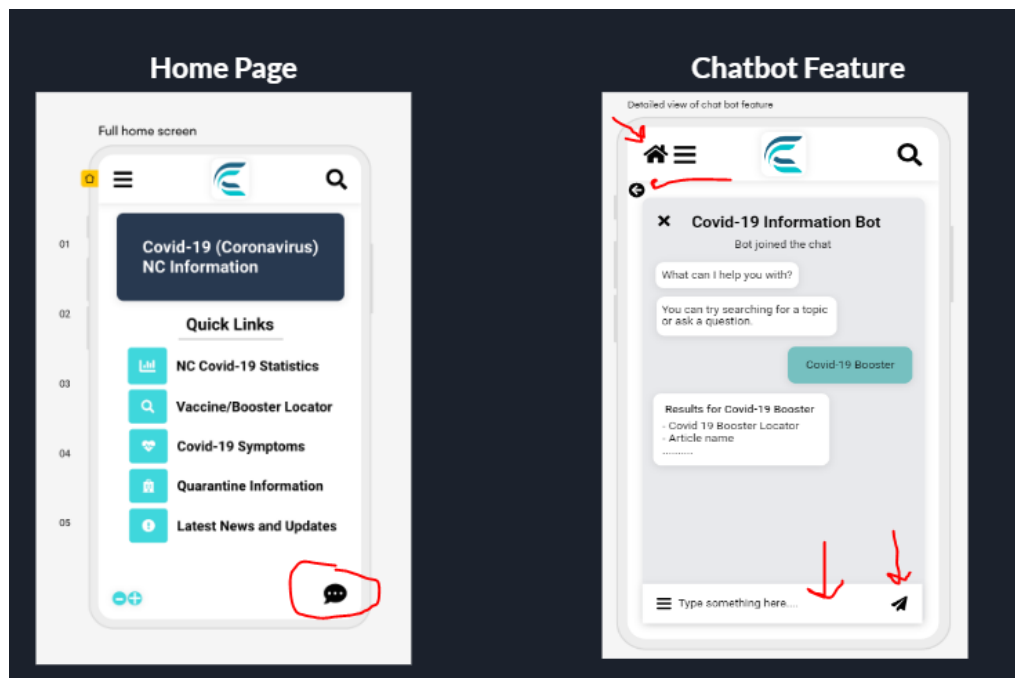
Covid-19 NC Statistics:

In the quick links, users can view the latest statistics regarding new cases and deaths in North Carolina by selecting NC Covid-19 Statistics. This is an example of a visual aid we provided for the user.
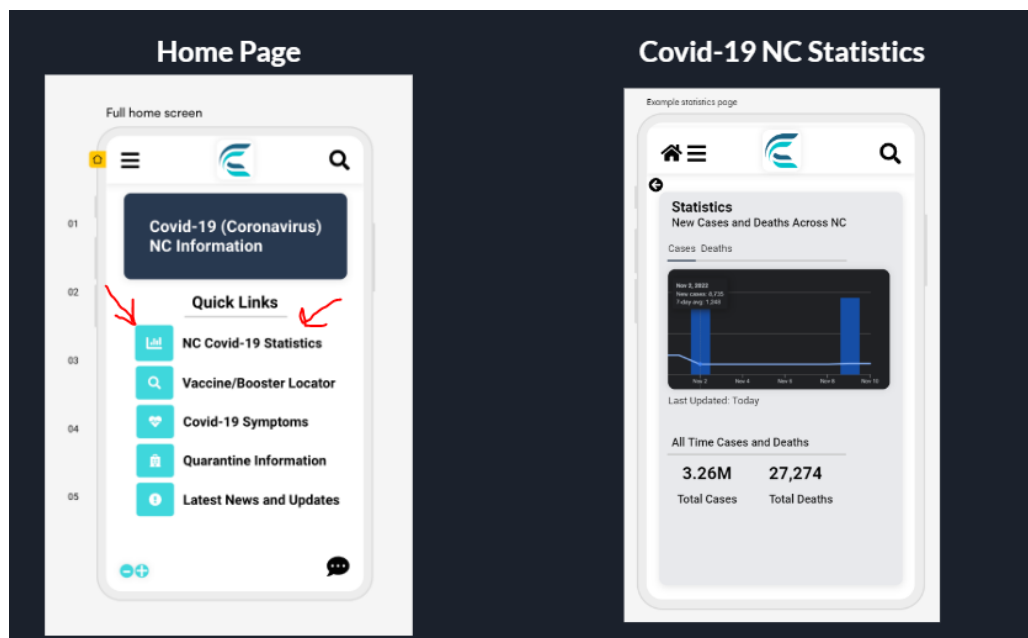
Vaccine/Booster Locator:

A link to Vaccine/Booster Locator is available on the homepage. Clicking on the Vaccine/Booster Locator will bring users to a section in the app where users will be prompted to enter their zip

code, age, and choice of vaccine/booster. After entering the information and clicking the search button, the app will display the nearest Covid-19 Vaccine Location.
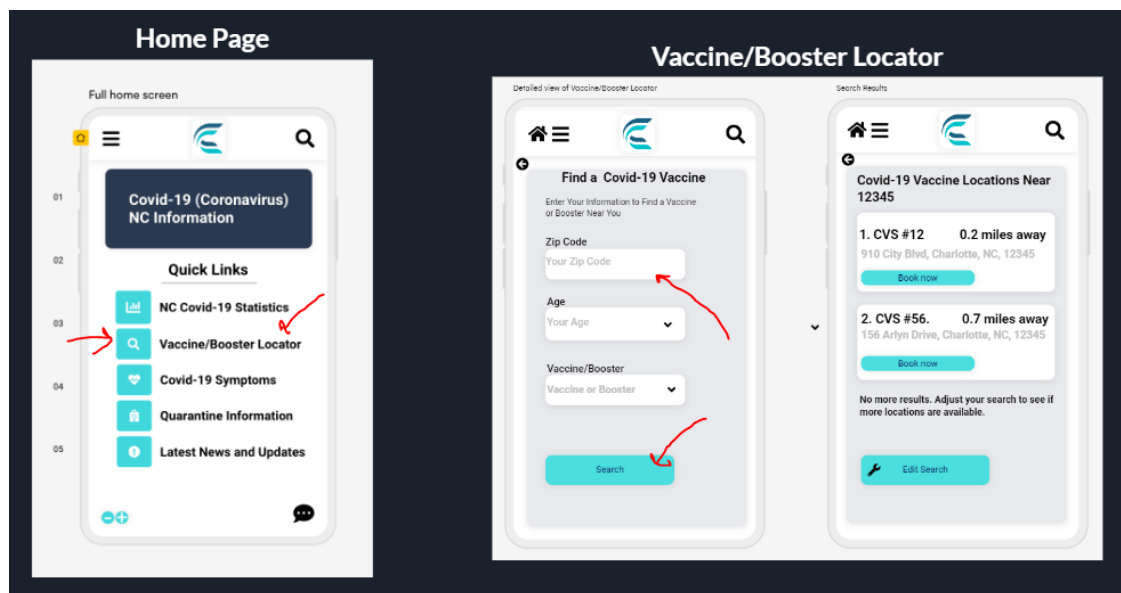
News and Updates Section, Affordance and Signifier:

A link to the latest news and updates will also be available on the homepage. Clicking this link will bring users to a section displaying the latest news and new guidelines for Covid-19. Users can read more about certain topics by clicking the plus signs to the right of article titles. To subscribe to the app in order to receive email updates about Covid-19, users can enter their email address in the white box at the bottom of the page and click submit. Moreover, the affordance and signifier can be seen in the news and updates section. In the below screen, circled in green are the items that represent the Affordances on the Homepage. The user perceives the icons and quick links as opportunities to perform actions or navigate the app. Circled in red is an example of the corresponding Signifier. Users can hover over objects such as the "Pfizer Covid-19 Oral Treatment" link to see a description of what that object can do.
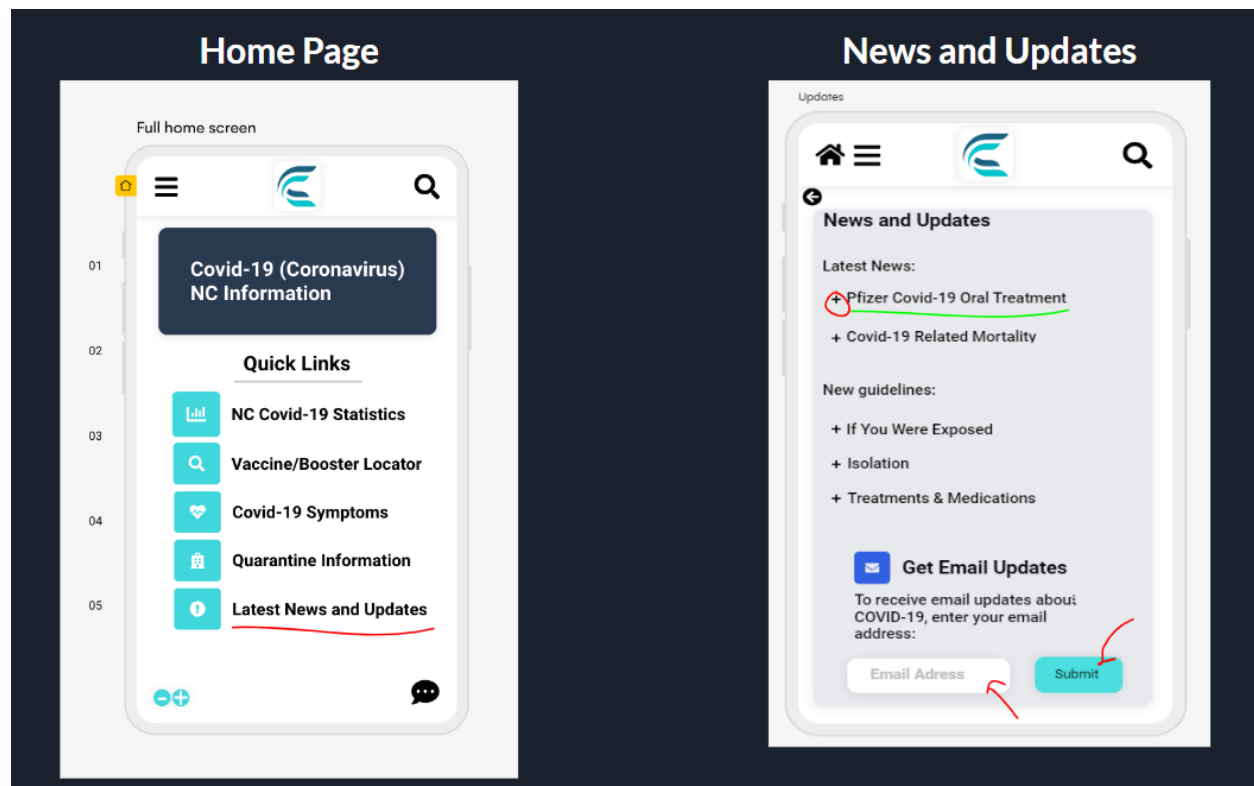
Evaluation

Design Goals:

We have identified several design goals for our application. First of all, we want to increase the flexibility and efficiency of our app by implementing features, such as shortcuts and a voice assistant chatbot. Moreover, the chatbot will guide our app users; hence, easing the app navigation. We would also like to have a minimalist and aesthetically pleasing user interface and implement predictable interactions to gain users' trust in our product. One of our goals is also to implement an interactive dashboard that displays the most important information. Finally, we also want to have a Covid-19 vaccine/booster locator on our app, so users can easily find vaccines/boosters near them.

User Study Evaluation Goals:

Moreover, we've identified several goals for the user study evaluation. Firstly, we want to understand who our users are and what are some of their likes and dislikes. We want to know what they particularly like about our app's features and whether they find them helpful. For instance, we need to get feedback about our chatbot, zoom-in/out, and Covid-19 vaccine/booster locator feature. We would like to get some criticism regarding how easy it is to use these features and how effective the user design is. It is also important for us to know whether our users can easily navigate through our app using the navigation bar on each page. We also want to know whether the user experiences any issues while using our app. We strive to get the users' evaluation because it will help us to identify our app's strengths and pain points we should address.

Wizard Of Oz Interview:

User journeys

      Edwin:

"Sometimes im busy and dont have time to dig for information."

Goals
- "To get accurate information about Covid-19. "
- "To be able to navigate smoothly."
- "To able to use a chatbox to imput information verbally."

Frustrations
- "Sometimes, I have trouble finding an adequate information about Covid-19."
- "Sometimes, I have to spend a lot of time shifting through apps to find information about Covid-19 in NC."
- "i sometimes dont know how spell medical terminology!"

Will

Age: 58
Education: High School Diploma
Hometown: Winston-Salem NC
Family: Lives with his wife
Occupation: Salesman

Will is salesman from Winston-Salem NC, in his line of work Will comes into contact with many clients and sometimes he worries that Covid-19 still lingers around. Will wants to practice safety measures for the protection of his clients and himself.

Dasha:

"I want to stay informed on Covid-19 in my city but I am not tech-savvy"

Goals
- "As a senior citizen, I appreciate an accessible app with a bigger font and good color schemes as I have a low vision."
- "I would love to use an easy-to-navigate app on my phone."

Frustrations
- "Sometimes I delete overly complicated apps, i.e., when I cannot find necessary information quickly."
- "Some apps have text that is too small for me too read/ some apps are hard to look at due to the poor color choices."

Sam

Age: 67
Education: College Degree
Hometown: Charlotte, NC
Occupation: retired

Sam is a retired accountant. He stated that he would like an easy-to-navigate application on his phone with a chatbot or a voice assistant feature that would deliver news about Covid-19 daily. Sam experiences vision issues due to the nature of his life career, so he would love to have an application accessible for low-vision folks.

Jai:

"A safe school environment plays a major role in my academic success"

Goals
- "I want to be able to reference the latest guidelines quickly"
- "As a student, it is important to know the current status of Covid-19 because this may impact my academic plans"

Frustrations
- "I cannot seem to find accurate information regarding Covid-19"
- "A lot of information regarding Covid-19 is not relevant or out-of-date"

Levi

Age: 19
Education: University Student
Hometown: Hickory, NC
Occupation: Teacher Assistant

Levi is a college student from the University of North Carolina Greensboro. He wants to know the most updated information about Covid-19 but finds himself reading outdated reports. This has caused fear and worry about his own health and the well-being of his loved ones. It has been difficult for him to concentrate on his schoolwork. His sleep patterns have been disrupted because he does not know what harm Covid-19 will do next. The outdated information has decreased his social interactions with other students.

Maya:

"As a nurse, it is important that I stay educated on Covid-19 updates"

Goals
- "I would like to keep up to date with Covid-19 vaccines because it is important for me to know where I can get them and what is available."
- "I would like to have trust in where I am getting my information."

Frustrations
- "Sometimes, I cannot find the information I need without having to search Google for additional information."
- "Sometimes, I can't trust information that is spread on social media or news articles."

Diana

Age:	32
Education:	College degree
Hometown:	North Carolina
Occupation:	Nurse

Diana is a nurse who lives in Raleigh, North Carolina. She spends the majority of her time working but in her free time, she likes to keep up with health news. After the pandemic, Diana knows how impactful and unexpected the course of Covid-19 was. Because of this, she keeps up with the latest information; however she gets frustrated by untrustworthy sites and desires an app that would organize and contain all of the information she needs.

Task description:

Edwin: "Good day my friends! My team and I have developed a useful app that will display accurate information about Covid-19 in the beautiful state of North Carolina. The app contains many useful functionalities which would make the user interaction a pleasant one. One such function is the availability to make the window display larger with the zoom in/out feature, we felt this is an important feature because it would make it easier for all to see small fonts. Please feel free to test all the 3 levels of the function and tell me how it can be improved."

Dasha: "Hi all. My team is working on an app that contains all the necessary information about Covid-19 in North Carolina. This app not only updates users about Covid-19 statistics in our state but also has many great features. One of the functionalities I would like to test you out today is Covid-19 Vaccine Locator. This function shows locations near you where you can get the Covid-19 vaccine or a booster. Feel free to navigate to the Vaccine/Booster locator and think out loud. That means you can perform tasks and give me any feedback as you test this feature out. "

Jai: "Hello there! My team and I created an app containing important information relating to Covid-19 for the residents of North Carolina. It displays the latest guidelines and allows users to subscribe to the app with their email. I would like you to find those functionalities while using the app, and afterward, let me know what you are thinking while you are using the app. Speak out loud and tell me your thought process. Please provide feedback for us. Thank you!"

Maya: "Hello! For class, my team and I have created an application to provide important Covid-19 information for all North Carolina residents. There are features such as our virtual chatbot, interactive data and analytic charts, and Covid-19 vaccine/booster locator that have been integrated into the application design to provide a usable experience for all individuals. I would like you to open the Covid-19 Information application and begin using the chatbot feature. While you use the

chatbot please speak aloud any thoughts, questions, or concerns you experience. Thank you so much for your participation!"

Think aloud summary

Edwin's participant:

The participant displayed enthusiasm while testing the zoom in/out function, a joy point is that the participant knew what the "+" and "-" symbols were for "I know what this does". One pain point was that the participant tried to zoom in/out using his thumb and index finger on the window display, he said "I thought all apps could do that".

Dasha's participant:

My participant enjoyed the Covid-19 Vaccine Locator feature, and mentioned that it was really helpful. They said that they appreciated that they did not need to go to a third party website to look for an available vaccine/booster.

Pain point: "It is important for users to see what kind of vaccine they are getting before proceeding to a book now page."

Joy point: "It was very easy to navigate to the right page and enter the information. Simple and user-friendly design."

Jai's participant:

While my participant was using the app, she mentioned that there were too many words on the new/update sections. She also remarked that the plus signs after each link are confusing since there is no direction on what to do on the page. On the other hand, she really likes the icons on our homepage and said that they are relevant to the information she wants to search for. Lastly, she indicated that the colors used in the app are simple and great selections.

Pain point: "Too much wording in the update section. The plus signs are confusing; they look like hospital signs"

Joy point: "The icons are relevant to the information and it also separates the tabs. The blue color is good. It's simple"

Maya's participant:

My participant expressed her appreciation for us incorporating a chatbot feature into our application. This was not her first time using a chatbot feature. She mentioned that the reason she likes this feature is because it makes navigation easier.

Finding the chatbot was a simple process. She was able to easily find the feature because there was a chat symbol located at the bottom right corner of the home screen. I gave my participant the following prompt - "For this experience, let's say you want to find information on the new Covid-19 booster, can you walk me through how you would use the chatbot feature to search?" She walked me through her process of how she would use the chatbot to find Booster information. She recorded that she would like the chatbot to generate more results regarding Booster information.

Pain point: "It is important that the chatbot generates multiple results. It can be confusing for some if the only results that generate are the Booster locator when instead they wanted to find an article on the new Booster."

Joy point: "The chat icon made it easy to find the feature. The simple design made the process very user friendly. I think this feature would help me navigate better through an application like this."

Interview results:

Transcriptions of participants:

Edwin's Participant:
- As the participant performed the set of tasks on the design, this is the recorded data from our conversation:
  - "I like the home page"
  - "So what do you want me to try out?"
  - "How many times do I press the +?"
  - " so to minimize you press -"

Dasha's Participant:
- As the participant performed the set of tasks on the design, this is the recorded data from our conversation:
  - "You have a pleasant color scheme, I really like it."
  - "Navigation drop-down menu seems easy to use."
  - "I like that you can navigate to the home page and see the nav bar at any page."
  - "The 'edit search' button is a nice touch."

Jai's Participant:
- As the participant performed the set of tasks on the design, this is the recorded data from our conversation:
  - "The color is very simple."
  - "White, light and dark blue go well together."
  - "The icons are relevant to the app."
  - "I feel that there are too many words in the update section."
  - "The plus signs are confusing. What are they for?"
  - "I feel that a back button would be nice."
  - "What do you think about having a translation button for your app?"
  - "Subscribing to the app was easy."

Maya's Participant:
- As the participant performed the set of tasks on the design, this is the recorded data from our conversation:
  - "The home screen is nice. I really like the use of the icons, and also the color scheme. I think these colors are used well since this is a health information app"
  - "I would assume this is the chat bot, since the icon is a message symbol"
  - "It looks like any other chat bot I have used before."
  - "Simple design and it looks pretty easy to search any topic"
  - "So when I search for the Covid-19 Booster, I like that the chatbot generates multiple results. This is helpful especially if I just want to browse and I am not looking for anything specific."
  - "I am not sure, but I am assuming in the working model, a user would be able to click on these suggested results? It would be nice if these links were underlined or a different color so users can know that they are links."
  - "There should maybe be a follow up chatbot message that asks if this was the information they were looking for. Or like extra search recommendations"
  - "Would there be a voice option on this search bar? Or can you only type. I think a voice option would be nice."
  - "Okay so to go back to home I think I would assume that I would press the home icon. Or I guess the "X" symbol would also exit out of the chatbot."
  - "Can you only access the chatbot when you are on the home page? Or is this symbol consistent across all screens?"

Questions We Asked The Participants:

Question 1: How is the navigation of the mobile application?

Edwin's participant: "Even lacking technical skills I know what I am doing, so I like that the navigation is user friendly".

Dasha's participant: "The navigation is straightforward, and a home link on every page also helps a lot. I like the simple nav bar on every page."

Jai's participant: "A little confusing because when you click on "Latest News and Updates" it takes you to a page that only displays updates and not news. Also, there are a lot of plus signs. A back button would be nice."

Maya's participant "Using the chatbot feature, I think navigation became more user friendly."

Summary From Question 1:

One of the participants said that the navigation was a little confusing from the start. On the homepage, it displays "Latest News and Updates" but after clicking the link, the page that appears only has the title "Updates". This participant further went on to say that the plus signs are distracting and too bold on the News/Update page. A second participant liked the drop down navigation tab because of user friendliness. A third participant, who tested the chatbot, expressed that navigation became more user friendly by using this feature. A fourth participant, who tested the Covid-19 Vaccine Locator, mentioned that the app navigation was simple enough for them.

Question 2: What were some issues you experienced while using the app?

Edwin's participant: "Navigation speed was a little slow."

Dasha's participant: "I wish Covid-19 Vaccine page would also ask me what kind of a vaccine/booster I want before proceeding with a search."

Jai's participant: "Too much wording and plus signs are confusing. No back button."

Maya's participant: "The chatbot did not generate many results - I wish it recommended more links or articles. Maybe even related topics would have been nice."

Summary From Question 2:

A participant pointed out that one issue was the large amount of wording in the new/update section. This participant further went on to say that the plus signs did not have a clear direction on what the user should do with them and viewing the previous page was difficult because there was no back arrow button. Another participant felt that although navigation was easy, the speed from one page to another was slow. The participant who tested the chatbot feature, explained that it would have been nice to have more generated results or additional recommended navigational

opportunities. The participant who tested the vaccine locator feature said that we need to implement a prompt that asks the user what brand of a vaccine/booster they want to get.

Question 3: What kinds of features or information would you like to see implemented in our app?

Edwin's participant: "A pinch-zoom feature must be added, controls +/- is the old way of zooming."

Dasha's participant: "Beside adding another prompt for a vaccine locator, it would be nice to have a feedback page, so you can constantly improve your web app based on users' recommendations."

Jai's participant: "Back button or arrow would be nice. Instead of the plus sign, maybe have something like, 'Click here for more information'. Also, a translation button would be nice as well, since many users read and speak in different languages."

Maya's participant: "The chatbot feature was great, but I think there should be a related topics section so users can continue navigating through the app. Some may simply want to read up on information without having something specific they want to search for."

Summary From Question 3:

A participant suggested that implementing a back arrow button would be better than having them click on the navigation drop-down list. This will allow users to view the previous page quicker. Another suggestion was to add something to inform users to click on the links instead of plus signs on the news/update page. A translation button for users who read in a different language would be a great implementation according to another participant. A participant wanted a pinch zoom feature because he felt it is the norm to have now. Another participant suggested that while the chatbot feature was great for finding information, there may be people who don't know what they want to search for. Rather, they may want to browse simply to educate themselves on the newest topics. This participant suggested a related topics feature. Another suggestion was to implement a feedback page where users can submit their feedback/suggestions/comments.

Experiment Study Report:

Goal(s) of the experiment:

The goal of our experiment was to acquire feedback from participants in order to improve the design of our Covid-19 Information App. By comparing design A and design B of our application, we were able to choose the design that was perceived as more effective, efficient, and engaging.

While comparing the two designs, participants provided valuable feedback which helped us locate various usability issues that we did not recognize prior to the experiment. The satisfaction of our participants was important to our team from beginning to end of this experiment. By the end of the experiment, we feel that we have found the best way to deliver the most user-friendly design.

Methodology:

The team decided to use a within subject method. Each participant tested all interfaces and afterward provided their feedback. Since there were eight participants in total, and each team member had two participants, each of us let the two participants test one interface first. Afterward, we had the participants try the other interface. Each participant had the opportunity to test out both interfaces. Using the within-subjects study design gave us a better picture of the two designs. It does not require a large pool of participants, which was the case for our team. Our study had an insignificant room for error since all individuals participated in both conditions; hence, there was no variation in individual differences. Everything was counterbalanced.

Participants:

Our group decided to recruit participants through word of mouth and email invitations. We interviewed eight participants in total (4 men and 4 women). Each team member acquired feedback from two participants. The ages ranged from 18 to 55.

Protocol:

Each session started with a team member letting the participant know the goal of our project and the purpose of our Covid-19 Information application. Participants gave verbal consent for us to record the meeting for data collection purposes. We then presented each participant with design A (the original design) and design B (the alternative design) of our application. Each team member curated a unique design, set to represent their specific user journey. These detailed tasks can be seen here:

- **Edwin (Zoom Feature)**
  As the session began, one thing I told my participant was that I wanted to write down all his suggestions that he came up with. I asked him to not be afraid to think aloud. The one feature I wanted my participant to try out is the zoom feature. I told the participant to try to zoom in and out with the pinch-zoom feature.

  Set of tasks for the Zoom Feature
    - Go to the homepage
    - Locate the drop menu

- At the bottom you will find "+" "-" buttons
- Tap the "+""-"

- **Dasha (Covid-19 Vaccine/Booster Locator)**
  At the beginning of the session, I told the participants about our app and its significance. Later, I let them know that I am testing two designs (A and B) for a Covid-19 Vaccine Locator page. I told them to navigate to the right page, and share their thought process as they complete the tasks and test the features. I let them know that any feedback is appreciated.

  Set of tasks for the Covid-19 Vaccine/Booster Locator
  - Navigate to the Covid-19 Vaccine Locator page
  - Input your personal information, including your zip code, vaccine/booster brand and your age
  - View the results
  - Go back to the previous page and adjust the settings if needed (optional)
  - View the updated results(optional)
  - Book the vaccination/booster

- **Jai (Receiving Updates and Notifications)**
  At the start of the session, I told my participants what they would be locating in the Covid-19 Information application. I informed the participants that I would not be helping them locate the information but would observe them instead. I had them speak aloud their thought-processes, ask questions, and provide feedback as they tested out the designs. Their speaking aloud provided the necessary information needed to improve the receiving updates and notifications feature on the application.

  Set of tasks for the receiving updates and notifications feature:
  - Locate the latest news and updates from the application's home page
  - View new guidelines for COVID-19
  - View latest news
  - Subscribe to receive email on latest news and updates about COVID-19
  - Navigate back to home page

- **Maya (Chatbot Feature)**
  Prior to beginning the tasks, I told participants how important it was that they speak aloud their thought-processes, questions, and comments. Through speaking aloud,

I was able to identify what parts of the chatbot were usable. I told my participants that they would be using the Chatbot feature and comparing the UI of two interfaces in order to provide valuable feedback on the usability of the feature.

Set of tasks for the chatbot feature:
- ■ On the home page, locate the chatbot icon and open the dialog
- ■ Search anything Covid-19 related
- ■ View the Covid-19 results
- ■ Navigate to a recommended result
- ■ Navigate back to home page

Each team member then followed the set of tasks with the following questions:
1. How usable did you find the application? Can you explain what specifically you liked or disliked?
2. Do you have any suggestions on how we could improve <feature name>?
3. From your experience, how effective did you find our application at providing Covid-19 information? Are there any features you think we should edit, add, or delete?

Data Collection:

Our group collected verbal data during our participant sessions. We obtained verbal data by letting participants know that we would like them to "think aloud" during all tasks. The verbal data included any comments, questions, suggestions, or concerns that a participant made during their session. We also used follow-up questions at the end of our sessions to receive answers. The verbal data and answers to questions were collected and compared in order for us to evaluate which interface (design A or design B) was more usable for a specific feature. Detailed data can be found in the following sections below.

Summarized data charts can be found in the following spreadsheet: Module 2.7 Experiment Data.

Data Analysis:

Summary: "Think Aloud" data
- ● Edwin
  Participant A: Male, 53
    - ○ As participant A performed the set of tasks on design A, this is the recorded data from our conversation:

- ■ "I like the home page"
        - ■ "So what do you want me to try out?"
        - ■ "How many times do I press the +?"
        - ■ " so to minimize you press -"
    - ○ As participant A performed the set of tasks on design B, this is the recorded data from our conversation:
        - ■ "I like the home page"
        - ■ "So how do I zoom in on this one?"
        - ■ "I like how easy it is"
        - ■ "Nice and modern"
    - ○ Based on the speak-aloud data from my participant A while looking at both design A and design B, I observed the following points
        - ■ The homepage is well liked
        - ■ My participant liked the pinch-zoom feature more than the "+" and "-" button.

Participant B: Female, 33
    - ○ As participant B performed the set of tasks on design A, this is the recorded data from our conversation:
        - ■ "Looks neat"
        - ■ "I like the colors"
        - ■ "It's simple to use"
    - ○ As participant B performed the set of tasks on design B, this is the recorded data from our conversation:
        - ■ "The zoom in feature is much smoother"
        - ■ "I like the flexibility"
        - ■ "It's just like the other apps"
    - ○ Based on the speak-aloud data from participant B while looking at both design A and design B, I observed the following points
        - ■ I observed that Participant B also enjoyed designed A
        - ■ Also Participant B like the pinch-zoom feature"
- ● Dasha

Participant C: Male, Age 29
    - ○ As participant C performed the set of tasks on design A, this is the recorded data from our conversation:
        - ■ "You have a pleasant color scheme, I really like it."
        - ■ "Navigation drop-down menu seems easy to use."
        - ■ "I like that you can navigate to the home page and see the nav bar at any page."
        - ■ "The 'edit search' button is a nice touch."

- ○ As participant C performed the set of tasks on design B, this is the recorded data from our conversation:
    - ■ "I like this design too; however, I prefer the colors from the design A."
    - ■ "Okay, once again the same navigation menu, I like that you did not change that."
- ○ Based on the speak-aloud data from my participant C while looking at both design A and design B, I observed the following points
    - ■ My participant preferred the design A color scheme
    - ■ My participant liked the nav bar due to its simplicity

Participant D: Female, Age 24
- ○ As participant D performed the set of tasks on design A, this is the recorded data from our conversation:
    - ■ "I like the fact that I do not need to input too much personal information to see the vaccine/booster. Do I have to input all the information to see the results? Can I just input my zip code and see the results?"
    - ■ "Very convenient that I also see how far every pharmacy is from me."
- ○ As participant D performed the set of tasks on design B, this is the recorded data from our conversation:
    - ■ "Seems that I once again have to input my personal information; however, now I see that I can also choose the brand of a vaccine I want to get! I liked that new addition."
    - ■ "I don't see anything different on the results page. Well, except that the colors are different. I think you guys really need to add whether all fields are required or not."
- ○ Based on the speak-aloud data from participant D while looking at both design A and design B, I observed the following points
    - ■ My participants liked that they could choose the brand of a vaccine/booster in design B
    - ■ My participants suggested to specify whether all fields are required

- ● Jai

    Participant E: Male, 28
    - ○ As participant E performed the set of tasks on design A, this is the recorded data from our conversation:
        - ■ "The color is very simple."

- ■ "White, light and dark blue go well together."
- ■ "The icons are relevant to the app."
- ■ "I feel that there are too many words in the update section."
- ■ "The plus signs are confusing. What are they for?"
- ■ "I feel that a back button would be nice."
- ■ "What do you think about having a translation button for your app?"
- ■ "Subscribing to the app was easy."
- ○ As the participant E performed the set of tasks on design B, this is the recorded data from our conversation:
  - ■ "The color is very good. Great selection."
  - ■ "Again, the icons are relevant to the app,"
  - ■ "There's not much wording in the second design."
  - ■ "I like how the plus signs are before the link. This will slow the user to know what it's doing."
  - ■ "The addition of the back button feature is very good."
  - ■ "I like the second design better than the first."
- ○ Based on the speak-aloud data from participant E while looking at both design A and design B, I observed the following points
  - ■ My participant liked the second design more than the first.
  - ■ The second design had less wording and made it easier to understand.
  - ■ The second design was more effective than the first.

Participant F: Female, 35
- ○ As participant F performed the set of tasks on design A, this is the recorded data from our conversation:
  - ■ "I feel like the color selections are great. They match well."
  - ■ "The quick links on the homepage are very helpful as it helps me locate the information I want to look at."
  - ■ "The plus signs in the update section are a little confusing. Most apps will have their plus signs in front of the link."
  - ■ "The subscribing direction to receive email updates is self-explanatory."
  - ■ "I think there should be a back button or arrow that lets the user navigate back."
  - ■ "Now when I think about it, the link that directs me to the update section doesn't really match well. On the homepage, the link refers to both the latest news and updates, but on the update section, it only displays guidelines for Covid-19."
  - ■ "The update page should include both guidelines and news.

- ○ As participant F performed the set of tasks on design B, this is the recorded data from our conversation:
  - ■ "The second design looks great!"
  - ■ "I feel like the second design is even simpler than the first design."
  - ■ "The News and Updates section is just as the name of the link in the homepage has suggested."
  - ■ "The color is the same as the first design."
  - ■ "I have nothing to complain about the second design"
  - ■ "Even a back button was added. Nice."
- ○ Based on the speak-aloud data from participant F while looking at both design A and design B, I observed the following points
  - ■ My participant liked the second design more than the first.
  - ■ The improvement made to the second design made navigation easier for the user.
  - ■ The second design was more effective than the first.

- ● Maya:

Participant G: Male, 28
- ○ As participant G performed the set of tasks on design A, this is the recorded data from our conversation:
  - ■ "The home screen is nice. I really like the use of the icons, and also the color scheme. I think these colors are used well since this is a health information app"
  - ■ "I would assume this is the chat bot, since the icon is a message symbol"
  - ■ "It looks like any other chat bot I have used before."
  - ■ "Simple design and it looks pretty easy to search any topic"
  - ■ "So when I search for the Covid-19 Booster, I like that the chatbot generates multiple results. This is helpful especially if I just want to browse and I am not looking for anything specific."
  - ■ "I am not sure, but I am assuming in the working model, a user would be able to click on these suggested results? It would be nice if these links were underlined or a different color so users can know that they are links."
  - ■ "There should maybe be a follow up chatbot message that asks if this was the information they were looking for. Or like extra search recommendations"
  - ■ "Would there be a voice option on this search bar? Or can you only type. I think a voice option would be nice."

- - "Okay so to go back to home I think I would assume that I would press the home icon. Or I guess the "X" symbol would also exit out of the chatbot."
  - "Can you only access the chatbot when you are on the home page? Or is this symbol consistent across all screens?"
- As participant G performed the set of tasks on design B, this is the recorded data from our conversation:
  - "So I definitely liked the colors of the first design better. I think the use of blues in the first design suited the application purpose.
  - "Okay so to access the chatbot, this design has the same message icon which I think suits the feature well. So I will click on that again."
  - "Again, I think I liked the color scheme of the previous design better. It looks here that if I search for a topic, the time stamps are recorded. I think that is nice. It feels more interactive."
  - "Okay, nice. I see that the generated results are more detailed with the underline. I think this makes it easier for me to understand that I could navigate to these pages."
  - "I like how this chatbot includes the follow-up message too to engage users and make sure that they found what they wanted."
  - "Overall, functionality wise I like the additional design elements in this design compared to the first. But I like the colors of the first design better."
  - "And navigating back to home, it seems like the "X" and Home icons are the same in this design so I will use those to get back."
- Based on the speak-aloud data from my participant G while looking at both design A and design B, I observed the following points
  - The color choice from design A is effective and should stay consistent in our final design
  - The chatbot could add more prompted messages for a better flow
  - The chatbot could add timestamps for messages
  - The chatbot could add a speech option.

Participant H: Female, 54
- As participant H performed the set of tasks on design A, this is the recorded data from our conversation:
  - "So is the chatbot one of these icons?"

- - "Hm.. I am not sure where it would be. Oh maybe the chat icon at the bottom"
    - "It would be nice if the chatbot had a little pop-up like "Try me!" so I would've known this icon was the chatbot."
    - "Alright so if I search here. It is nice that it generates many results for me."
    - "Wow. This is great because it feels like I am talking to someone."
    - "This is much easier than looking through the whole app for something specific."
    - "I do wish I could voice search"
    - "Okay, so to navigate back to home, is there a back button?"
    - "Oh I guess I have to use the home icon here. What if I didn't want to go back to the home page?"
  - As the participant H performed the set of tasks on design B, this is the recorded data from our conversation:
    - "Okay, so I see this design has different colors. That's nice. I may like this better than the first design."
    - "So I remember this chat icon was the chatbot."
    - "Seems like this is pretty similar to the first one but I do notice this feels more like a messaging app because of the timestamps. Yeah, I like that."
    - "Oh so this one actually has a back button which is nice. That is something I wish the first design had."
  - Based on the speak-aloud data from participant H while looking at both design A and design B, I observed the following points
    - Speech-to-text (Voice option) would be preferable
    - The participant thought the chatbot feature was very useful in searching and navigating
    - The participant wants a back arrow
    - Participant H preferred the color scheme of the second design

Summary: Follow-up questions

How usable did you find the application? Can you explain what specifically you liked or disliked?

Edwin's participants A and B thought the zoom-in feature was great and thought it was a useful feature that will help many users. The participants suggested adding a pinch-zoom feature where the user uses their thumb and index finger to zoom in/out.

Dasha's participants C and D expressed that the app navigation is straightforward and; hence, easy to use even if you are not tech-savvy. Participant C expressed their love for the color scheme, they mentioned that gray and a variety of blue colors match well together. Participant D also noted that the Covid-19 Vaccine locator is a nice touch for our application as they do not have to look at the 3rd party website to find a vaccine available.

Jai's participants E and F found the first design kind of difficult to use. There was too much wording on the update section and the plus signs were confusing. However, the participant did like the color of choice and said that the icons in the home page were relevant to the application. The participant mentioned scribing to the application to receive the latest news and new guidelines for COVID-19 was easy. In the second design, the participant did not see any issue with it. The application was designed well and made it easier for the participant to use.

Maya's participants G and H found the application and chatbot feature to be very usable. In particular, they noted that the design and aesthetics of the application suited the purpose well. Maya's participants liked the color schemes, simplicity of navigation, and the use of icons. Specifically, participant G preferred design A's color scheme while participant H preferred design B. These design choices made the application more usable. Additionally, they said the chatbot feature had a simple interface structure that was easy to follow and understand.

Do you have any suggestions on how we could improve <feature name>?

Zoom feature: Edwin's participants A and B suggested that we should add a pinch-zoom feature to our design in order to modernize it. Our team agrees with the participants since most of the apps that are out today usually have a pinch-zoom feature.

Covid-19 Vaccine/Booster Locator: Dasha's participants C and D mentioned that it would be helpful to note whether fields are required/optional on a Covid-19 Vaccine Locator page. Participant D also expressed that it would be best if we implement a design that has a field asking a user their desired vaccine/booster brand.

Updates and Notifications: Jai's participants E and F mentioned we should implement a back button to the application so that it will make it easier for users to navigate back to the previous page. Furthermore, the participant suggested a translation feature would be nice since there are many users who speak and read in different languages. We should accommodate their needs and make the application user-friendly for them.

Chatbot Feature: Maya's participants G and H recommended that the chatbot feature could integrate a voice feature. This way, users can search topics by speaking aloud rather than typing. It was also suggested that the chatbot should have more follow-up messages such as "Did you find what you were looking for? Try searching for…." They said that these kinds of messages could create a better flow with the user. It would be nice to include timestamps in the chatbot

conversation so it feels more personable. Lastly, it would be wise to have the chatbot available on all screens, not just the home screen.

From your experience, how effective did you find our application at providing Covid-19 information? Are there any features you think we should edit, add, or delete?

Edwin's participants A and B showed enthusiasm on how easy it was to find accurate Covid-19 information on the app. The participant found that he was able to navigate from one page to another by tapping the drop down menu. The participant was also pleased to be able to zoom-in the texts to see better, the participant suggested adding a pinch-in feature.

While Dasha's participants C and D liked something from both designs A and B, they liked the original design better. They expressed that the color scheme of the original design is more pleasant. Participant C also liked the features that our app provided, especially the chatbot, and statistics, while participant D enjoyed the Covid-19 Vaccine locator. Participant D noted that it would be useful to add a testing/treatment page.

Jai's participants E and F found the application to be very useful. It was very user-friendly. The design was simple and the colors of choice were excellent. There were a few aspects of the application that needed to be improved such as the wordings and plus signs. Overall, the application provided accurate information regarding Covid-19.

Maya's participants G and H tested the home page and chatbot feature on both design A and design B. The participant noted a few ways the design could be improved, specifically through adding additional prompted messages and timestamps in the chatbot feature. Maya's participant thought the user interface was designed well and suited the application's purpose. The design elements effectively provided Covid-19 Information in their opinion.

Data Analysis Visualizations

The summary of questions and results can be seen in the following google sheets: Module 2.7 Experiment Data. *This includes data on participant demographics, their design preferences, answers to questions, and more.*

Module 2.7 Experiment Data:

Participant Info: A (Edwin's participant), B (Edwin's participant), C (Dasha's participant), D (Dasha's participant), E (Jai's participant), F (Jai's participant), G (Maya's participant), H (Maya's participant)

Summary: Participants

Team Member	Participant ID	Gender	Age
Edwin	A	Male	53
Edwin	B	Female	33
Dasha	C	Male	29
Dasha	D	Female	24
Jai	E	Male	28
Jai	F	Female	35
Maya	G	Male	28
Maya	H	Female	54

Summary: Questions

Question 1: How usable did you find the application? What speicfically did you like or dislike?

Participants	Responses
A	Participant A suggested adding a pinch-zoom feature (use thumb/index finger to zoom)
B	Participant B liked the the app design and the drop down menu for navigating
C	Participant C expressed their love for the color scheme, they mentioned that gray and a variety of blue colors match well together.
D	Participant D also noted that the Covid-19 Vaccine locator is a nice touch for our application as they do not have to look at the 3rd party website to find a vaccine available.
E	The updates section had too much wording, the plus signs were confusing. The participant liked the color choice. The icons in the home page were relevant. The participant suggested that users should be able to subscribe to updates to recieve latest news/guidelines easier.
F	The plus signs were a little confusing. The color matched well. The quick links on the homepage were helpful. The direction for subscribing was simple. There should be a back button.
G	The chatbot feature was usable. Notably, the design and aesthetics suited the application well. The simple interface was easy to follow and understand
H	Design B was percieved as more usable. The design and additional icons (back button) helped functionality wise.

Question 2: Do you have any suggestion on how we can improve <feature name>?

Participants	Responses
A	The zoom feature could have a pinch-zoom feature in order to modernize it.
B	Participant B also suggested to add a pinc-zoom function.
C	It would be helpful to note whether fields are required/optional on a Covid-19 Vaccine Locator page.
D	Participant D also expressed that it would be best if we implement a design that has a field asking a user their desired vaccine/booster brand.
E	A back button to the application would make it easier to navigate to a previous page. A translation feature would be nice for individuals who speak another language. This would accomodate their needs and make the application more user-friendly.
F	Add a back button to news and update page. The update page should include both guildelines and latest news.
G	The chatbot feature could integrate a voice feature. The chatbot should have more follow-up messages to carry the conversation. Timestamps should be added to the chatbot messages
H	A voice feature would make the chatbot more usable. The chatbot should be consistent across all pages.

Question 3: From your experience, how effective did you find our application at providing Covid-19 information? Are there any features you think we should edit, add, or delete?

Participants	Responses
A	The application was effective at finding accurate information. A pinch-in feature should be added to make the zoom feature more usable.
B	The drop down menu made it easy to navigate across the application
C	liked something from both designs A and B, they liked the original design better.

Question 3: From your experience, how effective did you find our application at providing Covid-19 information? Are there any features you think we should edit, add, or delete?

Participants	Responses
A	The application was effective at finding accurate information. A pinch-in feature should be added to make the zoom feature more usable.
B	The drop down menu made it easy to navigate across the application
C	liked something from both designs A and B, they liked the original design better.
D	liked something from both designs A and B, they liked the original design better. Noted that it would be helpful to add a testing/treatment page.
E	The application was very user friendly. The design was simple.
F	Accurate information was present in the app. The app was easy to use and to navigate.
G	The chatbot feature could integrate a voice feature. The chatbot should have more follow-up messages to carry the conversation. Timestamps should be added to the chatbot messages
H	The user thought the chatbot feature and overall application was very usable however they had a few suggestions for improvements (voice feature, back button, prompt-messages on the message icon)

Summary: Overall Preferences (Design A vs. Design B)

	Edwin	Edwin	Dasha	Dasha	Jai	Jai	Maya	Maya
	Participant A	Participant B	Participant C	Participant D	Participant E	Participant F	Participant G	Participant H
Color-Scheme	A	A	A	A	A	A	A	B
Home Screen	A	A	A	A	A	A	B	B
Chatbot Feature	x	x	x	x	x	x	B	B
Covid-19 Locator	A	A	B	B	x	x	x	x
Zoom Feature	A	A	x	x	x	x	x	x
Updates Section	x	x	x	x	B	B	x	x
Overall Usability	A	A	A	A	B	B	B	B

Summary: How we can achieve the most usable design based on participant results

Color-Scheme	Use design A's color scheme
Home Screen	Keep home-screen icons and navigation drop-down menu. Add in a back button that allows users to go to a previous page.
Chatbot Feature	Voice feature icon, Timestamps, Additional chatbot prompts, More generated recommendation and results, Add chatbot icon across all pages
Covid-19 Locator	Allow users to choose their preferred vaccine (More user options) Let users know whether a input field is required or not
Zoom Feature	Allow users to zoom using pinch rather than buttons
Updates Section	Adding in a subscription option to recieve news and updates would be great.
Overall Usability	Options for translations/multiple languages

Observations: What worked well in the experiment, what worked well in your high fidelity prototype?

Edwin: What worked well in my experiment was leaving the design style the same, but I added a pinch-zoom feature to the second design because I was interested mainly in the participant's reaction to the difference of zoom-in.

Dasha: What worked well in my experiment was to provide two different designs that differ in color scheme. While our team liked the original design(design A), we wanted to make sure that users also agreed with us. It gave us more confidence to stick with our design A as participants also liked the gray/blue colors. As for the Covid-19 Locator function, I wanted to make it

informative yet concise, I did not want too many prompts for a user to fill out before they can see their results. I am glad that I tested two designs, one with 3 prompts and another with 4 prompts to see which user likes it more. To my surprise, users did not mind filling out an additional prompt.

Jai: Allowing the participants to test out two different designs was very effective. I was able to see which designs better suit the users. The high-fidelity prototypes were a lot easier to make and required less time instead of creating the actual real application, which would have used more time.

Maya: My participant noted various aspects of our high fidelity prototype that worked well such as the color scheme, minimalistic/hierarchical design, and effective icons. Specifically, the chatbot feature worked well in terms of usability and effectiveness; however, by allowing the participant to compare design A (our original design) with design B (an alternative design), we gained valuable insights into what features should be kept and how we can improve the original design to make features more user friendly.

Data Analysis:

Raw Data

Participant Data

Team Member	Participant ID	Gender	Age
Edwin	A	Male	53
Edwin	B	Female	33
Dasha	C	Male	29
Dasha	D	Female	24
Jai	E	Male	28
Jai	F	Female	35
Maya	G	Male	28
Maya	H	Female	54

Think Aloud Data

ID	Design A - Think Aloud	Design B - Think Aloud	Final Observations
A	"I like the home page" "So what do you want me to try out?" "How many times do I press the +?" " so to minimize you press -"	"I like the home page" "So how do I zoom in on this one?" "I like how easy it is" "Nice and modern"	The homepage is well liked. My participant liked the pinch-zoom feature more than the "+" and "-" button.
B	"Looks neat" "I like the colors" "It's simple to use"	"The zoom in feature is much smoother" "I like the flexibility" "It's just like the other apps"	I observed that Participant B also enjoyed designed A. Also Participant B like the pinch-zoom feature
C	"You have a pleasant color scheme, I really like it." "Navigation drop-down menu seems easy to use." "I like that you can navigate to the home page and see the nav bar at any page." "The 'edit search' button is a nice touch."	"I like this design too; however, I prefer the colors from the design A." "Okay, once again the same navigation menu, I like that you did not change that."	My participant preferred the design A color scheme and liked the nav bar due to its simplicity
D	"I like the fact that I do not need to input too much personal information to see the vaccine/booster. - Do I have to input all the information to see the results? - Can I just input my zip code and see the results?" "Very convenient that I	"Seems that I once again have to input my personal information; however, now I see that I can also choose the brand of a vaccine I want to get! - I liked that new addition." "I don't see anything different on the results page. Well, except that	My participants liked that they could choose the brand of a vaccine/booster in design B. My participants suggested to specify whether all fields are required

	also see how far every pharmacy is from me.”	the colors are different. ● I think you guys really need to add whether all fields are required or not.”	
E	● “The color is very simple.” ● “White, light and dark blue go well together.” ● “The icons are relevant to the app.” ● “I feel that there are too many words in the update section.” ● “The plus signs are confusing. What are they for?” ● “I feel that a back button would be nice.” ● “What do you think about having a translation button for your app?” ● “Subscribing to the app was easy.”	● “The color is very good. Great selection.” ● “Again, the icons are relevant to the app,” ● “There’s not much wording in the second design.” ● “I like how the plus signs are before the link. This will slow the user to know what it’s doing.” ● “The addition of the back button feature is very good.” ● “I like the second design better than the first.”	My participant liked the second design more than the first. The second design had less wording and made it easier to understand. The second design was more effective than the first.
F	● “I feel like the color selections are great. They match well.” ● “The quick links on the homepage are very helpful as it helps me locate the information I want to look at.” ● “The plus signs in the update section are a little confusing. Most apps will have their plus signs in front of the link.” ● “The subscribing direction to receive email updates is self-explanatory.” ● “I think there should be a back button or arrow that lets the user navigate back.” ● “Now when I think about it, the link that directs me to the update section doesn’t really match well. On the	● “The second design looks great!” ● “I feel like the second design is even simpler than the first design.” ● “The News and Updates section is just as the name of the link in the homepage has suggested.” ● “The color is the same as the first design.” ● “I have nothing to complain about the second design” ● “Even a back button was added. Nice.”	My participant liked the second design more than the first. The improvement made to the second design made navigation easier for the user. The second design was more effective than the first.

	homepage, the link refers to both the latest news and updates, but on the update section, it only displays guidelines for Covid-19."		
G	● "The home screen is nice. I really like the use of the icons, and also the color scheme. I think these colors are used well since this is a health information app" ● "I would assume this is the chat bot, since the icon is a message symbol" ● "It looks like any other chat bot I have used before." ● "Simple design and it looks pretty easy to search any topic" ● "So when I search for the Covid-19 Booster, I like that the chatbot generates multiple results. This is helpful especially if I just want to browse and I am not looking for anything specific." ● "I am not sure, but I am assuming in the working model, a user would be able to click on these suggested results? It would be nice if these links were underlined or a different color so users can know that they are links." ● "There should maybe be a follow up chatbot message that asks if this was the information they were looking for. Or like extra search recommendations" ● "Would there be a	● "So I definitely liked the colors of the first design better. I think the use of blues in the first design suited the application purpose. ● "Okay so to access the chatbot, this design has the same message icon which I think suits the feature well. So I will click on that again." ● "Again, I think I liked the color scheme of the previous design better. It looks here that if I search for a topic, the time stamps are recorded. I think that is nice. It feels more interactive." ● "Okay, nice. I see that the generated results are more detailed with the underline. I think this makes it easier for me to understand that I could navigate to these pages." ● "I like how this chatbot includes the follow-up message too to engage users and make sure that they found what they wanted." ● "Overall, functionality wise I like the additional design elements in this design compared to the first. But I like the colors of the first design better." ● "And navigating back to home, it seems like the "X" and Home icons are the same in this design so I will use	The color choice from design A is effective and should stay consistent in our final design. The chatbot could add more prompted messages for a better flow. The chatbot could add timestamps for messages The chatbot could add a speech option.

	voice option on this search bar? Or can you only type. I think a voice option would be nice." ● "Okay so to go back to home I think I would assume that I would press the home icon. Or I guess the "X" symbol would also exit out of the chatbot." ● "Can you only access the chatbot when you are on the home page? Or is this symbol consistent across all screens?"	those to get back."	
H	● "So is the chatbot one of these icons?" ● "Hm.. I am not sure where it would be. Oh maybe the chat icon at the bottom" ● "It would be nice if the chatbot had a little pop-up like "Try me!" so I would've known this icon was the chatbot." ● "Alright so if I search here. It is nice that it generates many results for me." ● "Wow. This is great because it feels like I am talking to someone." ● "This is much easier than looking through the whole app for something specific." ● "I do wish I could voice search" ● "Okay, so to navigate back to home, is there a back button?" ● "Oh I guess I have to use the home icon here. What if I didn't want to go back to the home page?"	● "Okay, so I see this design has different colors. That's nice. I may like this better than the first design." ● "So I remember this chat icon was the chatbot." ● "Seems like this is pretty similar to the first one but I do notice this feels more like a messaging app because of the timestamps. Yeah, I like that." ● "Oh so this one actually has a back button which is nice. That is something I wish the first design had."	Speech-to-text (Voice option) would be preferable. The participant thought the chatbot feature was very useful in searching and navigating. The participant wants a back arrow. Participant H preferred the color scheme of the second design

Question 1: How usable did you find the application? Can you explain what specifically you liked or disliked?

- **Participant A:** Very usable. The zoom-in feature was great and a very useful feature that can help many users.
- **Participant B:** The application was usable. I liked the zoom-feature but it would be nice if the application allowed for pinch-zoom. Where I could use my thumb and index finger to zoom in and out. I am not a fan of having to use the zoom buttons.
- **Participant C:** The app navigation made it more usable. I think this application would be easy to use even for individuals who aren't tech savvy. I loved the color scheme with the gray and blues.
- **Participant D:** I thought the application was usable. I think the Covid-19 Vaccine locator was a nice touch for the app. It makes it easier so I don't have to look at 3rd party websites to find an available vaccine
- **Participant E:** There were some areas that made the application usable but design A of the application was kind of difficult to use. Like in the update section there was a lot of wording and the plus signs were confusing. I did like the color scheme of design A though.
- **Participant F:** The application was usable but more so in design B. I think it would be nice if a user could subscribe to the news and updates in that section. It would make the application more interactive and user friendly. Overall, design B was designed better and easier to use.
- **Participant G:** The application was usable, I think the design and aesthetics of the application layout and colors suited the purpose. I liked the color scheme of design A as well as the use of icons and simplicity of navigation.
- **Participant H:** I thought the application was very usable. I personally liked design B better both the color scheme, layout, and chatbot feature.

Question 2: Do you have any suggestions on how we could improve <feature name>?

Zoom feature:

- **Participant A:** I think a pinch-zoom feature would be nice
- **Participant B:** Like I said, I don't really like having to use the zoom buttons so being able to use touch gestures or my fingers to zoom would be more accurate and easier.

Covid-19 Vaccine/Booster Locator:

- **Participant C:** It would be nice to see whether an input field is required or not

- **Participant D:** I think there should be a field to ask a user what their designed vaccine or booster brand is.

Updates and Notifications:

- **Participant E:** There should be a back button on the application to make navigation easier for users.
- **Participant F:** A translation feature would be nice. There are many users who may need information in a different language. This would make it more usable by accommodating the needs of everyone.

Chatbot Feature:

- **Participant G:** The chatbot could integrate a voice feature so users don't have to type everything. This way I could search by just speaking aloud. The chatbot feature should also be available on all pages, not just the home button.
- **Participant H:** Timestamps and follow-up messages in the chatbot would make the conversation more personable. I think it would be nice for more recommendations

Question 3: From your experience, how effective did you find our application at providing Covid-19 information? Are there any features you think we should edit, add, or delete?

- **Participant A:** I love how easy it is to find accurate information on Covid-19 on this application. I loved the drop down menu for navigation. I just wish the zoom feature wasn't buttons.
- **Participant B:** The application did a great job at providing Covid-19 information, there just needs to be a way for a user to zoom using their fingers.
- **Participant C:** I think the original design (design A) did a better job at providing the Covid-19 Information. The color scheme was better and I really liked the features the app provided - especially the chatbot and statistic charts.
- **Participant D:** I really loved the Covid-19 vaccine locator - this is a very great feature. I think it would be useful to add a testing or treatment page. But overall, the application did a great job at providing information.
- **Participant E:** I think there were a few areas of the application that could be improved such as the wording and plus signs on the Updates section. Other than that, I think the application did a great job at presenting the information.
- **Participant F:** The application was very useful and it did a great job at presenting Covid-19 information. The design was simple and the colors of choice were excellent.

- **Participant G:** I think the color scheme of design A was nice and suited the purpose of an information application. I do think the design could be improved in a few ways similar to the design B. The UI was better designed in the alternative design created. I think the chatbot did a great job at providing information to users.
- **Participant H:** I think the design elements provided Covid-19 information very well. I think the chatbot is a super useful feature that anyone could use to navigate across the application.
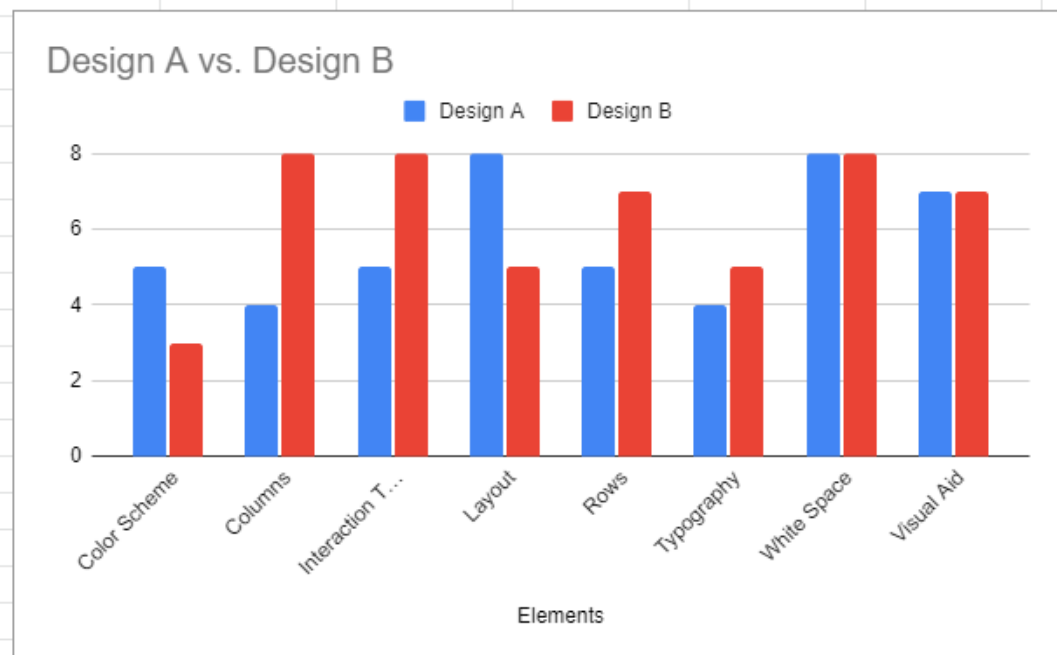

Data Analysis

Numerical Comparisons

One main goal of our study was to show our participants design A (original design) alongside design B (alternative design). Through our studies, we wanted to analyze how users perceived the usability of these two designs. In the chart below, we have documented the preferences of our eight participants across various elements of the two designs. Below the Design A and B columns, are the number of participants who like that particular element. Under the Elements column are the different types of elements associated with the designs.

Elements	Design A	Design B
Color Scheme	5	3
Columns	4	8
Interaction Types	5	8
Layout	8	5
Rows	5	7
Typography	4	5
White Space	8	8
Visual Aid	7	7

Aggregate data

- Google Sheet (Bar Chart)
  https://docs.google.com/spreadsheets/d/1qrytR9rc6lld9J9Ms_EvdCfUAnOzxcsIhYOchAChqhs/edit?usp=sharing

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Thematic Analysis

Theme	Quotes/Excerpts	# of participants	What this means for the design
Accurate Information	"I love how easy it is to find accurate information on Covid-19 on this application." "The application did a great job at providing Covid-19 information." "I think the application did a great job at presenting the information." "I think the design elements provided Covid-19 information very well."	6	The application provided relevant information regarding Covid-19. Users are able to use the app knowing that the information is up-to-date.
Ease of use	"I like how easy it is." "Navigation menu seems	5	One of our main goals was to create an easy-to-use application by

	easy to use." "Subscribing to the app was very easy." "This is much easier than looking through the whole app for something specific." "I like that you can navigate to the home page and see the nav bar at any time."		implementing a simple nav bar, and creating features, such as chatbot that can help users with navigation. 5 out 8 participants noted the ease of use of our application. Hence, we did a good job with that.
Aesthetic, Minimalistic Design	"You have a pleasant color scheme, I really like it." "The color is very simple." "White, light and dark blue go well together." "The color is very good. Great selection." "I feel like the color selections are great. They match well." "The home screen is nice. I really like the use of the icons, and also the color scheme. I think these colors are used well since this is a health information app"	8	All participants made observations on our application's color scheme and layout positively. The majority of participants favored design A over design B. Using this information, we know how we can create the most aesthetic and minimalistic design for our Covid-19 application.
Back button (back navigation)	"I feel that a back button would be nice." "The addition of the back button feature is very good." "I think there should be a back button or an arrow that lets the user navigate back." "Even a back button was	4	Our participants expressed that they wanted us to implement a back button for navigation, so they liked a design B that had that feature. So we will utilize a back button that will help users with navigating back to the

	added. Nice."		previous page.
	"Oh so this one actually has a back button which is nice. That is something I wish the first design had."		
	"Okay, so to navigate back to home, is there a back button?"		

How we would modify the design based on the results of the evaluation:

For the news/update section, we will be adding the word 'news' in the title section of the page. This will allow users to know the latest news and updates that can be found in this section. The plus signs will be moved to the front of each link. There will be a section called "Latest New" that will be added to the page, displaying relevant news. We will also enhance our Covid-19 Vaccine Locator page by adding a prompt that asks what brand of vaccine/booster the user wants to choose. Moreover, we are going to specify whether all fields are option/required on a Covid-19 vaccine/booster locator page. We will also add a pinch-zoom feature to modernize the app more. We will be adding a back button to the app so the user can get back to the previous page quickly. Also, we want our app to be as accommodating as possible so we are going to implement translation features for people speaking other than English. As for our chatbot, we would like it to ask more follow-up questions to be thorough. We would also like to have a chatbot on every page and have timestamps in conversations for the user's convenience.

Summary

We want to satisfy our North Carolina customer's needs based on the user journeys and personas we have created. Customer needs define the most important elements of our website design.We created a Low Fidelity Prototype and High Fidelity Prototype.We expressed our design ideas through the prototypes. These prototypes simulated the interaction between the user and the user interface. In the early stage of developing this prototype, we implemented a prototyping technique

called wireframe. We created four wireframes based on user journeys and personas. Their aim was to provide a basic visual representation of the elements we plan to incorporate into our Covid-19 information application. Included in the prototypes is an easy-to-navigate design with a top navigation bar, quick links, and a chatbot. Our design includes interactive forms and features to increase user engagement, control, and easy access to Covid-19 information. The final prototype included a high level of detail in terms of information, visual design and functionality. It was a digital interactive representation of the product with close resemblance to the final product in terms of the details and functionality.