



Connecting two networks to save lives.



# Final Report

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**Client:** Matthew Wolf  
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SI 487

# Index

2	Executive Summary
3	Background
3	Project Goals
4	Research Findings
11	Requirements
14	Design Process
24	Final Design
30	Validation
32	Recommendations
34	Appendix

# Executive Summary

CPR Save LLC is a startup that will crowdsource CPR trained individuals and utilize them to become first responder for victims of cardiac arrest. They will notify the community when someone nearby is in need of CPR, to help save lives. In preliminary research about cardiac arrest, we found that victims have a window of **2-10 minutes of receiving CPR before they start to become brain dead**. How can we design for distressed users so they can respond or request help with limited time in emergencies?

To address this, our team did user research where we found that teaching CPR and communicating notifications concisely were key to responding effectively. In our design phase, we implemented different methods of displaying information and navigating through the app. We concluded with validation testing of our previous design with our final design; differing in navigation and feature set.

**How can we design for distressed users so they can respond or request help with limited time in emergencies?**



# Background

“Only about 46% of people who experience an OHCA<sup>1</sup> get the immediate help that they need before professional help arrives.” CPR Saves hopes to improve response times for victims of cardiac arrest by crowdsourcing CPR trained individuals that may be closer to the person in need of help in order to save more lives.

Since CPR Save is in the research and development phase, there is yet to be a functioning prototype at this time. Thus, our role involves creating research-based prototypes. Our research is going to be focused on discovering the most effective, functional and usable approaches to using emergency response applications. We will be designing for a bystander and responder, who are essentially the same user who switches roles based on their willingness to respond.

# Project Goals

The primary goal of this application is to improve the response time it takes to help so cardiac arrest. To achieve this we've identified goals, such as:

1. Understand CPR and the emergency medical field/healthcare
2. Develop and leverage data from research efforts and turn into design decisions.
3. Collaborate with our client on changing requirements.
4. Facilitate intuitive experience: Ensuring efficient use in an emergency situation.
5. Develop a prototype for the emergency request and respond process.

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<sup>1</sup> OHCA: Out of hospital cardiac arrest

<sup>2</sup> CPR trained is anyone who has some exposure to CPR and knows how to perform it.

# Research Approach

- 1. Understand the complexity of CPR related emergencies and how this application can aid with these emergencies.**
  - Cardiac arrest victims have < 2 minutes to be saved in order to have the least amount of brain damage. < 10 minutes to survive. How can we design for such a time frame?
  - Victims can't call for help, so how do we inform and motivate bystanders to use this application to crowdsource other individuals who may help?
  - Bystanders need to be able to find help quickly in order to help save someone's life. ([Derived from POV matrix](#))
    - i. How might we notify people around the area for help?
    - ii. How might we keep the bystander calm?
    - iii. How might we limit the amount of phone interaction to maximize the focus on the victim?
  - Bystanders need to be able to identify cardiac arrest and perform CPR in order to help save someone's life and not hurt the person further. ([Derived from POV matrix](#))
    - i. How might we teach the bystander how to do CPR?
    - ii. How might we show the bystander that this person is in cardiac arrest?
- 2. Evaluate why competitors used their methods and compile a list of features we believe align with our personas needs.**

# Research Findings

## Competitive Analysis

### Purpose

We conducted a competitive analysis to understand how other companies are dealing with emergency response systems. By looking at the onboarding, notification, and communication components of our competitors we found what was effective and not.

### Methodology

We identified our competitors based on the target users and purpose of the application. Then we downloaded the accessible applications and reviewed each for possible strengths, weaknesses, features and differences.

	Direct Pulsepoint	Innovative Apple Watch	Niche Be My Eyes	Niche Uber		
Target User	Victims and Responder	Customer	Blind Person And Helper	Driver and Customer		
<strong>Notifications</strong>					Unsure	-
Sound	●	∅	-	●	Non-existent	∅
Vibration	∅	∅	-	●	Poor	∅
Lock Screen	●	●	●	●	Acceptable	●
Calls 911	-	●	∅	∅	Good	●
<strong>Map</strong>						
Route	●	∅	-	●		
Distance	-	∅	-	●		
AED Locator	●	∅	∅	∅		
<strong>Directions</strong>						
CPR How to	●	∅	∅	∅		
AED How to	●	∅	∅	∅		
Status Report	●	●	-	●		
Onboarding	∅	∅	●	∅		
Number of apps	2	0	1	1		

## **Result/Key Findings**

The main competitor is PulsePoint, as it does almost the exact same thing as CPR Save. PulsePoint uses Google Maps API to determine the location of who can perform CPR. It projects those people as icons on the user's map to showcase how close they are to the victim. The application is able to bypass the "do not disturb" function on the user's phone so that they can alert them. PulsePoint also shows the user where the closest AED is to the victim.

Along with this, the Apple Watch is the most accurate wearable technology that performs as an EKG. It can tell the user whether or not their heart is irregular and if they are having a heart attack. Pairing this application with an Apple Watch could give the user more medical attention. By calling 911 and community sourced first responders, the victim would have the closest person willing to perform CPR.

Overall, we found that the most valuable features was the lock screen notification. We also noticed that teaching wasn't as important to our competitors as we hypothesized it would be.

# Research Findings

## Interviews

### Purpose

In initial interviews we developed a mental model on how users respond to emergency situations. We needed to understand our users wants, needs and motivations.

### Methodology

For recruitment, we looked for anyone who would be willing to receive or perform CPR. Responders with different CPR skill levels and certifications. Within our social network we interviewed doctors, EMT responders and everyday individuals that don't know anything about CPR.

No Experience



CPR Trained



CPR Certified



### Result/Key Findings

During this process, we interviewed ten people of all different training to see what their reaction was to an app like this. We interviewed three medical professionals, two people that were CPR trained at one point but no longer know if they would feel comfortable utilizing it, and five people that would be considered "bystanders" and do not know CPR. These people were not interested in trying CPR but would utilize the app to call for help. One of the major takeaways was that most people who we interviewed that are **not CPR trained would not be willing to perform CPR on strangers** as they would be too afraid of hurting them. People did, although, say that they would do it if they were the only ones around and it was a family member or friend who was going through cardiac arrest. One person we interviewed was CPR certified years ago to be a lifeguard and said, "I mean, I've been taught how to do it but I don't know... if someone needed me I would try". Some of the more trained people that were interviewed said they would be willing to perform CPR but would be nervous

because they had not done it in a long time and would prefer someone that was more trained. Another point people made, both trained and untrained, was that **awareness was the best way to mitigate this problem**. One person interviewed said, “Everyone should know how to perform CPR. They should teach it in school or at work.”

A common theme among interviewing medical professionals was that they stressed the importance on time. From research and speaking with people, about 90% of non-deadly heart attacks do not need emergency medical attention and have no idea they are going through cardiac arrest. If this was the case for a victim, time is not an issue. If this was not the case, and the victim needed emergency medical attention, they are going to need someone that is CPR trained to be as close as they could see them having the attack. This application would need to be used for the victims who have at least five to six minutes. Most medical responders would be willing to help someone if they could, but another concern was how they would not be able to help if they were dealing with another medical situation that their job permits. Something said by a medical professional was, **“If you are not looking at them going through cardiac arrest, you are too far away”**.

Another main concern of the application are the negative effects of someone who is untrained performing CPR on someone. From research, we have figured out that the victim could break ribs or rupture a lung if someone incorrectly performs CPR. Also, it is important to note, that a panic attack looks very similar to a heart attack, but if someone performs CPR on someone having a panic attack they could possibly injure them.

Our research led us to understand that cardiac arrest victims aren't able to call out for help. These victims only have < 2 minutes to receive CPR or else they'll start to develop brain damage. If they don't receive CPR within 10 minutes, the likelihood of surviving is slim. Thus, time is of the essence and bystanders are the actual target users along with responders.

From our interviews, users thought the best solution to this problem is to **train everyone in CPR**. Along with this, our competitive analysis showed that almost all of our competitors are educating users on CPR in some form. This brought us to the conclusion that a major use case of this app should be to educate users.

# Research Findings

## Persona and User Journey

### Purpose

Coupled with interviews, we organized the target users into personas and user scenarios to solidify user mental models. These are important because they will help us gain user empathy faster and allow us to design with any accessibility issues in mind. They should cover the overall range of the users, on both sides, of the app.

### Methodology

We can assume that many of our users will be elderly patients, and many of them are not proficient with technology. Therefore, we need to keep that in mind and design for simplicity and efficiency. As designers, we need to transport ourselves into the shoes of the user and imagine how they would use the app under sensitive situations. For example, how would a responder act when they are asked to respond to a CPR request? On the other hand, what would a victim need the most to receive the CPR they need in a critical amount of time?

### Result

#### Bystander Persona

2 Months Since Husband's Heart Attack | 45 Years Old | Lives with Husband



**Natalia Barrow**

Spouse of first-time Victim,  
Unfamiliar with cardiac health

I'm unfamiliar with the world  
of cardiac health... we don't  
have a family history of this  
and I want to do everything I  
can to ensure that, should this  
happen again, we're as  
prepared as possible.

#### About Natalia:

Natalia is a wedding planner located in Seattle, WA. She's an active woman, always on the go, and goes out of her way to live a healthy lifestyle with her husband. Recently, while touring a new venue with her husband, he collapsed and was hospitalized. He had an underlying heart condition that he wasn't aware of, and this was his first medical scare. As someone who's always been on top of her family's health, she's determined to make sure that, should he ever experience cardiac trouble again, she's best equipped to provide the care he needs. Her insurer advised that she download the CPR Save App, which she does, and becomes a member of the app ecosystem.

#### Motivations:

- Better understanding of how to prepare for another cardiac emergency

#### Goals:

- Being fully-prepared for her husband's next cardiac event.
- Getting assistance as quickly as possible, no matter where they are.

#### Pain Points:

- Generally unfamiliar with the world of cardiac health, and needs to learn more in order to be fully informed.
- Sometimes struggles with technology, isn't incredibly savvy and needs simplicity.

Never Had Heart Attack (Family History) | 39 Years Old | Lives with Wife and Son



**Jack Nguyen**

Has family history,  
Familiar with cardiac health

I'm quite familiar with the world of cardiac health. My father is 76 and has needed CPR twice in the past 10 years, and my brother (aged 48) just recently had his first cardiac scare. I need to stay on top of my family's heart health and be prepared should anyone need help.

#### About Jack:

Jack is a hardworking family man located in San Jose, CA. Jack has a family history of heart problems, and he's realizing that he needs to start preparing for what happens if his brother were to fall into cardiac arrest. His father has gone into cardiac arrest twice in the past ten years, and his older brother has just recently gone through a similar cardiac event. Given his family history and his brother's recent incident, he approaches his physician. His physician and insurer both suggest that he download the CPR Save App, which he does. While Jack doesn't know when he'll need to use the app (of course, hopefully he never does), he feels better knowing that, should a loved one experience cardiac arrest, he's as equipped as he can be to provide assistance.

#### Motivations:

- Being prepared to call assistance should anyone he knows experience cardiac arrest.

#### Pain Points:

- Doesn't know when next family cardiac event will occur - could be six months, could be ten years.

#### Goals:

- Being fully-prepared to call assistance.
- Getting assistance as quickly as possible, no matter where he is.

## Responder Persona

Experienced in Performing CPR | 58 Years Old | Cardiologist



**Roger Durant**

Has done CPR many times,  
Well-versed in Cardiac Health

I'm a cardiologist. I have an intrinsic desire to save lives. Even when I'm off-duty, I still want to be available to anyone who may need my help. There's nothing more important than saving a life.

#### About Roger:

Roger is a full-time cardiologist at the UPMC in Pittsburgh, PA. While he works long hours, and has an exhausting job, his intrinsic desire to heal never fades away. He is willing to go out of his way, by any means necessary, if it means he can make a difference between life and death. Roger remains up-to-date on the newest trends in cardiology. Some of his patients start to tell him about this new app, the CPR Save App, which allows for responders to assist victims before emergency personnel arrive. Roger, seeing this as yet another opportunity for him to potentially save lives, downloads the app for responders. He knows that, should anyone need assistance, having a cardiologist arrive on the scene would help direct people and calm down the victim.

#### Motivations:

- Has taken an oath to heal.
- Knows that, in many situations, he is the most qualified person to help.

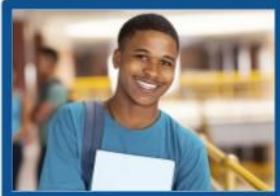
#### Pain Points:

- Sometimes struggles with new technologies.

#### Goals:

- Providing his help and expertise whenever it is needed.

Has Never Performed CPR | 21 Years Old | College Student



### Christian Allen

Has never done CPR,  
Unfamiliar with cardiac health

I'm mostly unfamiliar with the world of cardiac health... I don't know much about CPR administration either, but would be happy to help should anyone ever need me to.

#### About Christian:

Christian is a student at Columbia University in New York City. At Columbia, he studies Biomedical Engineering, and is a member of the Columbia Men's Soccer team. He's driven to make the world a better place - which is why he studies Biomedical Engineering. He also understands that some people aren't in his type of excellent physical condition. He hears about the CPR Save App during a discussion with some fellow BME students, and realizes that, with this App, he may be able to save someone's life. Inspired by the possibility, he downloads the CPR Save App as a responder. Christian isn't CPR trained, but despite this, indicates that he would be willing to perform compressions if it meant he could help save a life.

#### Motivations:

- Being a good samaritan, making a difference, potentially save a life.

#### Goals:

- Providing help if someone ever desperately needs it.

#### Pain Points:

- Generally unfamiliar with the world of cardiac health, and needs to learn more in order to be fully informed.
- Has never performed CPR, admits that he isn't trained but would still be willing to try in a dire situation.



### The Field House Scenario

Christian is at the Men's Soccer field house preparing for a practice. He's in the locker room chatting with some friends, when suddenly an alarm goes off on his phone. It's distinct - he's never heard it before. He realizes that it's the CPR Save App, informing him that someone in his immediate vicinity needs CPR. He opens the app, and sees that the call has been made from the Athletic Center, which is on the other side of the field. The app also informs him that the ambulance has already been called. Realizing that he's in a position to provide assistance, he runs across the field to find the Women's Field Hockey coach on the ground, surrounded by two trainers. The trainers have begun CPR, which is quite exhausting, so Christian assists them by cycling into the rotation. As they're performing CPR, the App is playing a beat to keep the responders on a rhythm. The App also reminds the responders to send a person outside to flag down the ambulance. One of the trainers goes and flags down the ambulance, and they turn the situation over to the EMTs. The victim survives the cardiac event, and strongly credits Christian and the trainers for performing CPR for the 8 minutes before the ambulance arrived.

# Design Requirements

From our synthesized user interview data and conversations we have had with our client about the specific needs and functionalities of our product, we have planned out a comprehensive list of requirements for the CPR Save app and they are as follows:

## [Responder/Bystander]

### Must Haves

**Requirement: Short onboarding process** to understand who the users are

- Responders must choose the level of CPR training/certification they have through radio button selection (No experience, trained, certified).
- Other information (age, location, etc)
- CPR Refresher video to remind them how to do CPR

**Requirement: Current location of victim/bystanders** in need of CPR when notified

- This information will allow responders to quickly gauge whether or not they will be able to reach the victim in time.

**Requirement: Customizable notifications system**

- Change the type of notification that responders would receive
  - Different types of alert sounds
  - Vibrations, push notifications and/or texts
- Turn off certain types of notifications during:
  - Certain times of day and week (ex; off Mon.-Thurs)

**Requirement:** A very prominent **call for help button**.

### Should Haves

**Requirement: Engaging CPR learning tab**

- Can be opened and viewed both during and outside of crisis
- Video, animation/gif, and verbal instructions
- Beat that helps responder/bystander complete compressions easier

### **Responder Nice to have**

- **Preferences for CPR requests**
  - Responders should be able to set a certain radius indicating the distance they are able to reach and are willing to reach to help a victim in need.
    - Without this feature, people who don't have access to a car would receive notifications for someone 20 miles away that they are unable to reach.

## **Nice to Haves**

**Requirement: Incentives** to increase the responder/bystander retention, engagement, and interest in CPR Save

- Anonymized community stories and CPR/cardiac arrest facts of the day.
- (Gamification) Business partnerships with organizations to offer rewards.
  - Red Cross, clinics, and other related orgs (CPR certification discounts, other medical discounts and rewards under legal limits)
  - Local community centers and government-affiliated orgs (community discounts and government benefits under legal limits)

# Design Requirements

## [Business/Client]

### Must Haves

**Requirement:** Interactive low-fidelity prototype along with detailed annotations.

**Requirement:** Cannot promise user a responder will come. All information about responder should be hidden.

### Should Haves

**Requirement:** Hi-fi mockups with some colors included in the designs.

**Requirement:** Design for iOS: use Apple iOS Human Interface Guidelines

### To Nice to Haves

**Requirement:** Two prototypes: For insurance companies/victim and responder

**Requirement:** Style guide (typography, primary/secondary colors, etc.)

### Other Design Requirements

***Shift in scope and added constraint:*** We will focus our design on office buildings and other similar high-density areas. In office buildings, more bystanders would already have the app and help would more readily arrive.

# Design Process

## Brainstorming

Based on our user research and requirements, we followed a cohesive design process as a team to create the current high fidelity designs we have.

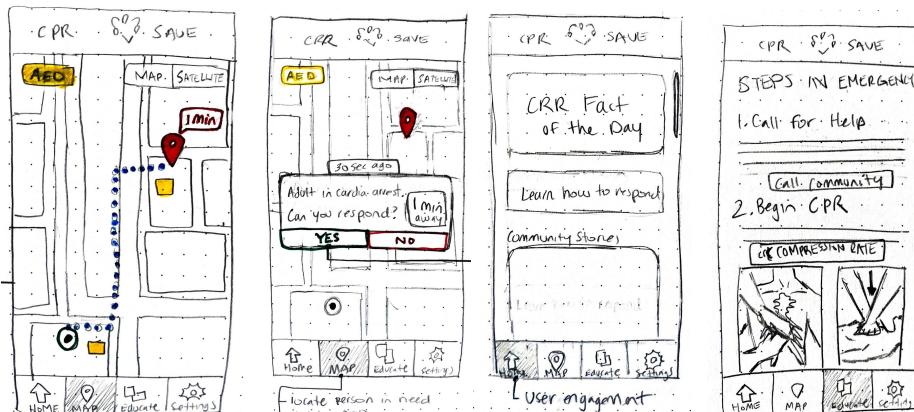
### Journey Map | Initial Designs | Design iterations | Feedback

We knew, for the witness/first responder side, this app needed an easily identifiable button that users could press in an emergency. Along with this, our app needed to give directions on how a user would get to the victim, perform CPR and learn how to respond in emergencies. Knowing we had this criteria, we decided to divide and distribute designs tasks into different quadrants.

- **Onboarding** - To request user information and location/notification permissions
- **Map View** (out of crisis and in crisis) - To allow users to see other responders in the area and follow directions to the scene
- **Community** - To inform users of what is going on in the community and the impact that CPR Save has on CPR victims
- **Educate** (out of crisis and in crisis) - Users can learn how to perform CPR here

The primary goal is to save cardiac arrest victims, but the other important supplementary goals are to encourage the user to stay active in the CPR Save community and become more knowledgeable in CPR.

Our initial ideas came from these sketches.



**Figure 2.** Sketches of map, respond popup, community and learn screens (left to right).

# Design Process

## Journey Map

For the bystander side:

Learn: 1 min	Perform: 2 min	Takeover: 3 min	Notice: 0 sec	React: 15 sec	Respond: 30 sec
<b>Action</b>  Notices CPR instructions in picture format and audio button for CPR beat	<b>Action</b>  Begins performing CPR with audio beat playing in background	<b>Action</b>  CPR Save responder arrives at scene with defibrillator and revives victim	<b>Action</b>  Bystander notices someone collapsed	<b>Action</b>  Calls 911 CPR Save app pop up asks user if they'd like to crowdsource CPR capable people	<b>Action</b>  Responder is on their way 911 instructs bystander to perform CPR
<b>Emotion</b> Unsure and afraid of hurting the person	<b>Emotion</b> Afraid that they are not performing CPR correctly	<b>Emotion</b> Relieved that someone who knows how to handle the situation intervened	<b>Emotion</b> Panicking because they don't know what's wrong	<b>Emotion</b> Relieved that there are more people invested in saving this person's life	<b>Emotion</b> Calm because someone who knows CPR is coming within minutes. Scared to do CPR
<b>Pain Points</b> Becoming confident in doing CPR and relying on technology to teach it	<b>Pain Points</b> Knowing how far responder is and whether or not they can replace them	<b>Pain Points</b> Understanding how to do CPR in the future	<b>Pain Points</b> Doesn't know how to identify cardiac arrest	<b>Pain Points</b> Talking to 911 and using app would be difficult for someone who isn't tech savvy.	<b>Pain Points</b> Doesn't know how to do CPR and 911 is confusing them

For the responder side:

Notice: 0 sec	React: 15 sec	Respond: 1 min	Arrive: 2 min	Takeover: 2.5 min	Reflect: 5 min
<b>Action</b>  Bystander receives vibrating pop up notification	<b>Action</b>  CPR Save app opens after user clicks yes User clicks defibrillator toggle to locate nearest AED	<b>Action</b>  Located an AED and is going to the scene	<b>Action</b>  Bystander lets person into building	<b>Action</b>  Notices someone doing CPR and steps in to shock victim to consciousness	<b>Action</b>  Mark this emergency as done on app
<b>Emotion</b> Adrenaline rush to save someone	<b>Emotion</b> Calm and analytical towards finding AED and getting to victim	<b>Emotion</b> Worried they won't get there on time	<b>Emotion</b> Worried they won't get there on time	<b>Emotion</b> Confident in their ability to do CPR and handle AED	<b>Emotion</b> Self satisfaction for saving someone's life
<b>Pain Points</b> Needs to find a defibrillator that is near the victim	<b>Pain Points</b> Getting to destination on time with map could delay arrival	<b>Pain Points</b> Entering the building or location where victim is Communicating with bystander who called in	<b>Pain Points</b> Locating victim once inside building	<b>Pain Points</b> Keeping everyone calm and communicating with bystanders/911 responder about the situation	<b>Pain Points</b> Doesn't care to use app after the crucial parts of saving a life is over

## Design Rationale

From an inconsistent understanding of the users journey- that was discovered by creating these maps- we realized locating AEDs was a feature our client did not want to implement.

# Design Process

## Onboarding | Initial Designs

The image displays four screenshots of the CPR Save app's initial onboarding process, showing the progression from sign-in to permission requests.

**Screenshot 1:** Shows the sign-in screen with options to "Join Using Facebook" or "Join Our Community". It includes a "Sign In" button and three navigation dots at the bottom.

**Screenshot 2:** Shows the first step of the onboarding process, asking "How much CPR training do you have?". It lists five options: Untrained, Trained (Not Certified), CPR-A\*, CPR-B or CPR-C\*, and CPR-HCP\*. The user has chosen "Trained". A note states: "All CPR certifications last two years and should be valid at the date of your CPR Save account registration." It also mentions: "We are asking you some basic information so you can become a valuable member of our community." and "We will also ask permission for yo push notifications and your location so you can promptly give help to victims in need." It includes fields for First Name, Last Name, Email, Password, Confirm Password, and Birth Date (mm/dd/yyyy).

**Screenshot 3:** Shows the second step of the onboarding process, with a "Next" button and three navigation dots.

**Screenshot 4:** Shows the third step of the onboarding process, with a "Next" button and three navigation dots.

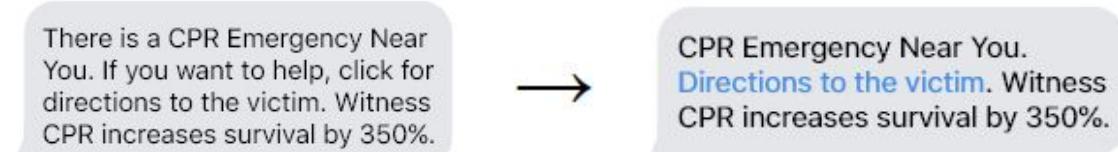
**Iteration 1. Sign In, choose CPR knowledge, get response from previous choice, permissions. (left to right)**

**Design Rationale**

Offering recommendations based on the level of CPR training/certification can customize the experience for the user and offer data on the type of users using CPR Save. Along with this, notifications are a key component of this app so we provided popup permissions. We also modified the verbage and made it more concise, because users thought the screens were text heavy.

# Design Process

## Notification



*Emergency Text Alert: Iteration 1 to final design (left to right)*



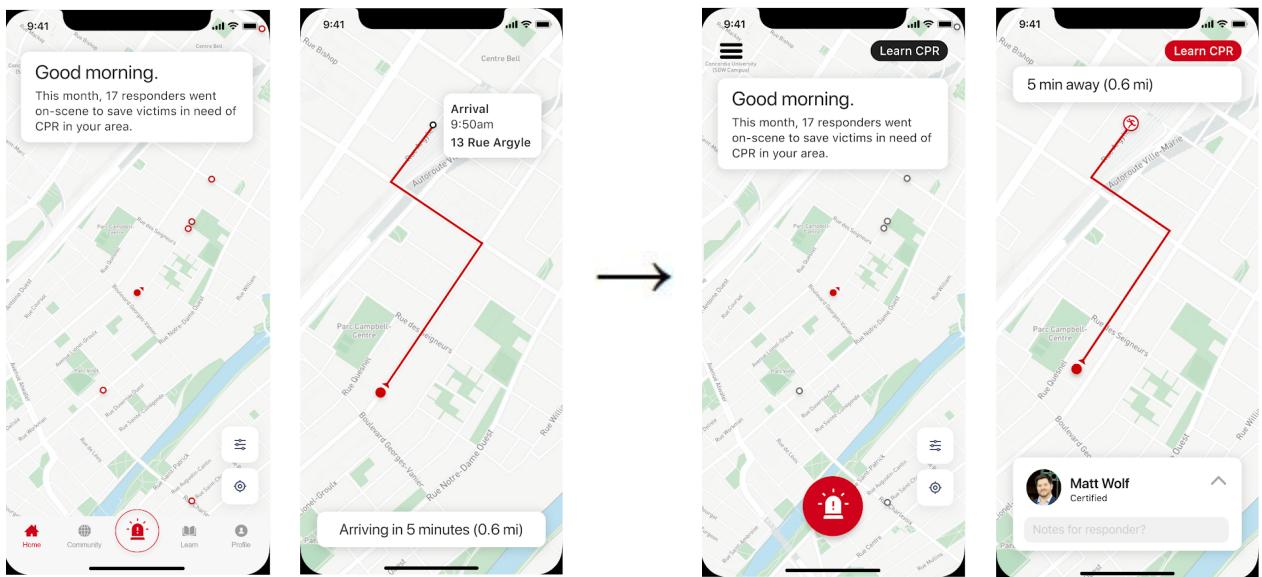
*Emergency Push Notification: Iteration 1 to final design (left to right)*

### Design Rationale

In our usability test we created tasks revolving around the users goal of *understanding the notifications and responding to them*. Most people knew what the text was for, but took longer to get context on the emergency and if they could respond. The users also mentioned that it took them longer to read the message and they weren't sure how to respond-- so we made the message more concise and added actionable links (yes, no, directions).

# Design Process

## Responder Map | Initial Designs



**Iteration 1.** Map mode: Non-emergency and Emergency (left to right) **Iteration 2.** Map mode: Non-emergency and Emergency (left to right)

### Navigation Bar.

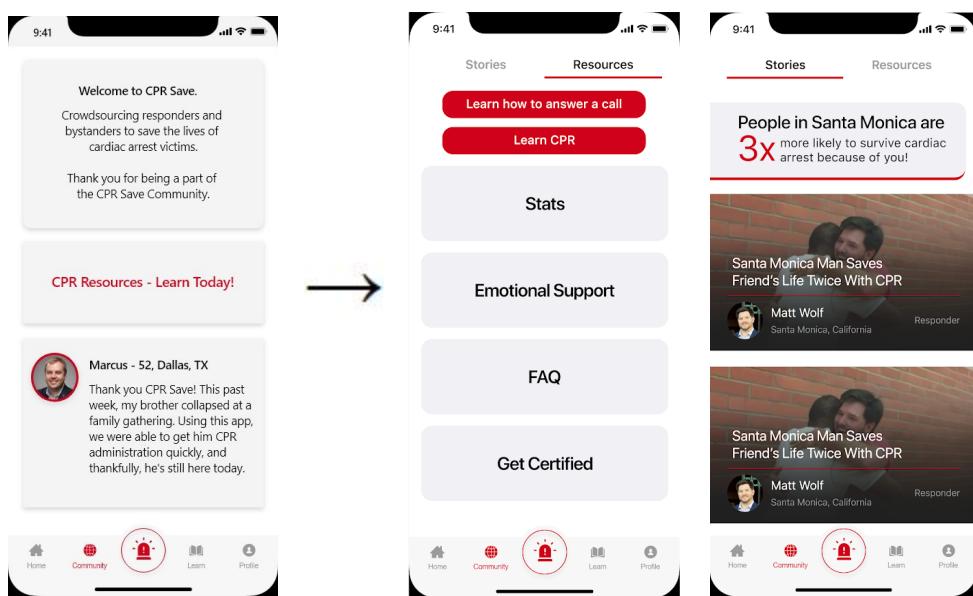
The initial design divided the users attention by five due to the tab bars. Users weren't confident in how to call for help and the main feature of the app wasn't prominent. In the second iteration, we fixed this by moving secondary component of the app into a hamburger menu and leaving the "call for help" button in an accessible thumb zone region. We also made the button a vibrant red to indicate it's importance and make it more salient.

### Directions.

Users wanted to know more details about responding, such as, receiving directions, knowing which dot they were on the map and receiving CPR instructions as they are coming to the scene. In the second iteration we attempted to make those aspects more clear.

# Design Process

## Community | Initial Designs



*Iteration 1. Community screen*

*Iteration 2. Community screen and resources page (left to right)*

### Stories.

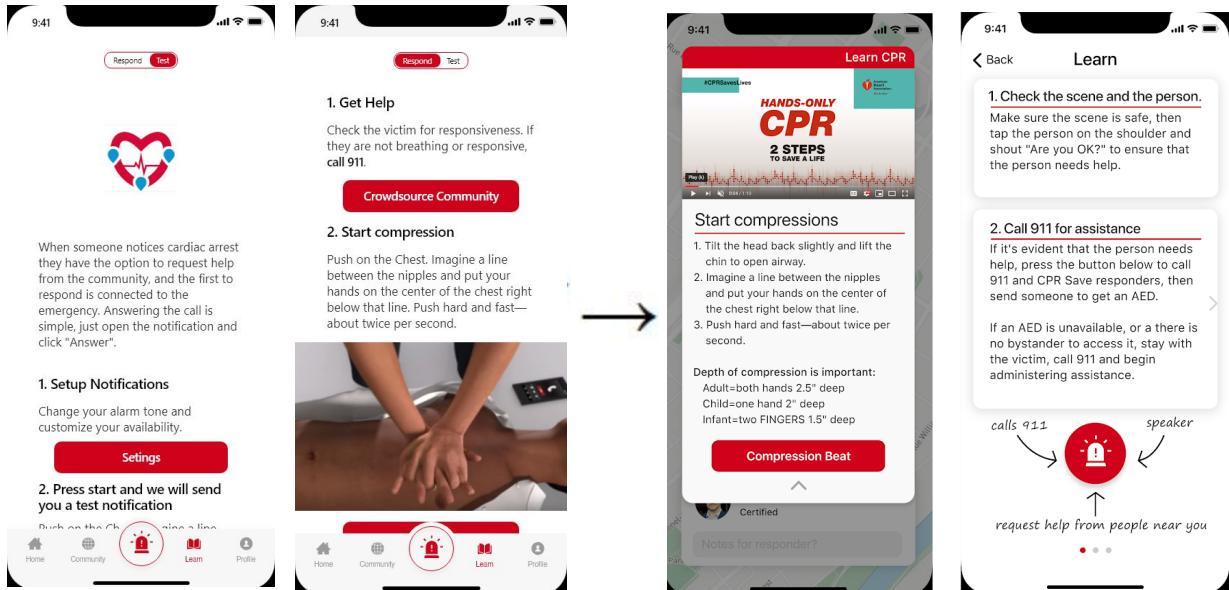
Users thought the stories aspect was motivating, but the initial design looked dull.

### Resources.

Client feedback included introducing resources such as CPR Save stats, emotional support, FAQ and certification information. Users weren't sure what kind of stats were going to be displayed and didn't understand why "Learn how to cancel a call" and "Learn CPR" were in the community tab.

# Design Process

## Educate | Initial Designs



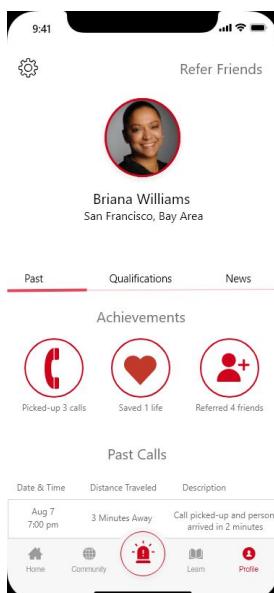
**Iteration 1.** Learn: Practice responding and emergency CPR **Iteration 2.** Learn: Emergency CPR and out of emergency (left to right)

### CPR Instructions.

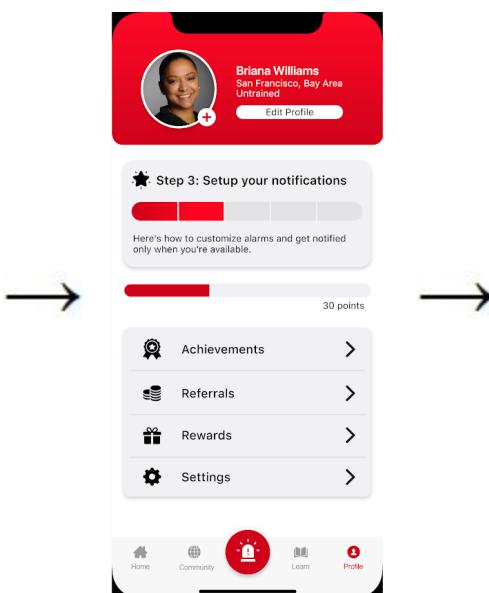
From the usability test our users goal was to *know how to do CPR from the instructions*. Users thought that the wording was too robust and that a video would be better for an actual emergency. We split the functionality of an in emergency CPR and out of emergency CPR, so we could provide fast instruction while also providing thorough instruction somewhere else in the app.

# Design Process

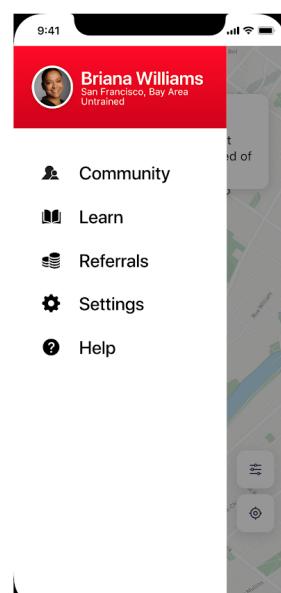
## Educate | Initial Designs



Iteration 1. Profile slightly gamified



Iteration 2. Profile gamified



Iteration 3. Profile stripping gamification

### Gamification.

For the usability test our users goal was to go to their profile and customize the app to fit their availability. Due to our clients changing requirements we went from a gamified design to a minimal profile. Some users thought the act of receiving rewards for helping save lives was in a way immoral. In contrast some thought it was great to receive recognition for their good deed.

# Design Process

## Usability Testing

Our team was not able to user test until we had a good first prototype. This proved difficult for us as we started testing later in this process. Our user testing was based more on wording and comprehension. We wanted to get a feel for what users thought the main use of the application was and how it worked. We wanted to ensure they were easily able to call for help, could navigate the learn page to be able to learn CPR, utilize the community aspect and refer their friends. We also wanted to ensure people understood the purpose of the app from the onboarding phase.

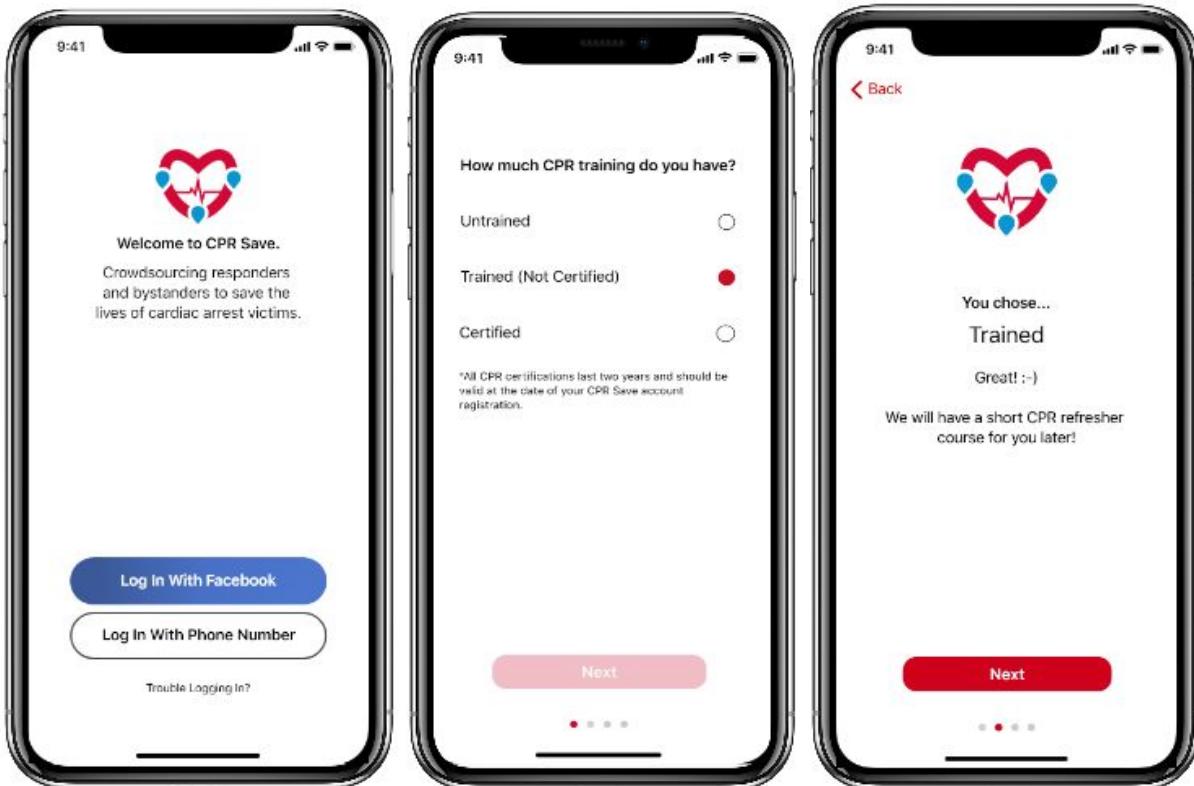
We gave user tests to some potential users and asked them their thoughts on the purpose of the application as a whole and if they understood what the app was trying to accomplish. We asked comprehensive questions about the onboarding process. We then found out that users were interested in ensuring that the app knows their phone so when the first responder arrived they would be able to contact the bystander or user. Users were able to tell us that they thought the the learn page was confusing and that they felt that the emergency response system should be more prevalent on the main page. We utilized all of this information to create our next versions of our prototype and validate it.

This application is not finished and user testing will have to continue past the end of this project in order to continue fixing and iterating on the current designs.

As we continue to test, we have realized that we can mostly reach individuals in the college age range (18-22) as our primary testing audience. However, we recommend visiting hospitals, clinics, and the local Red Cross organization to test our potential users there for feedback.

# Final Design

## Onboarding

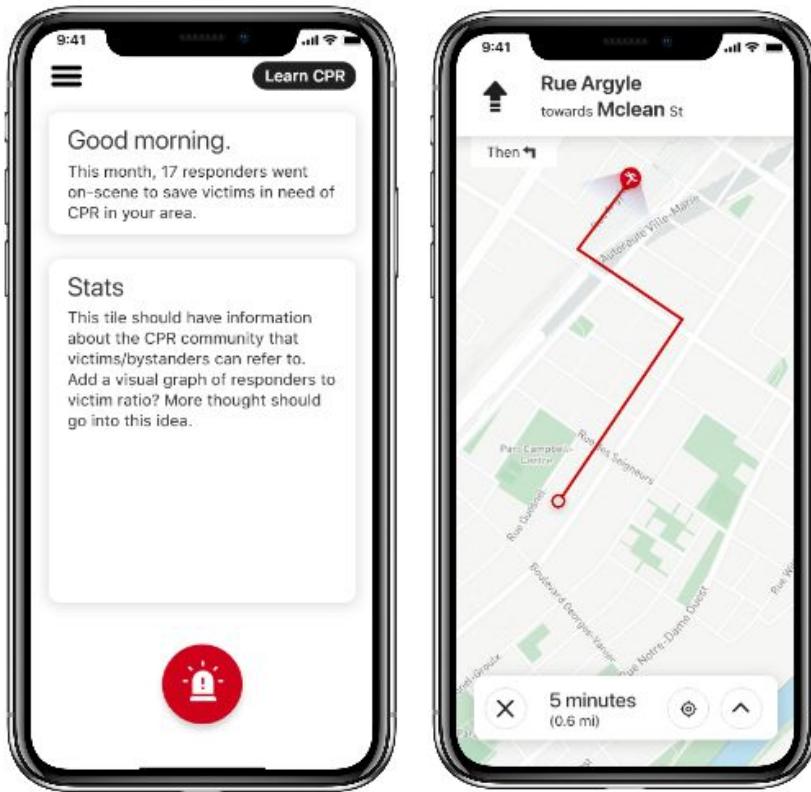


## Design Rationale

We eliminated the excessive CPR options due to client and user feedback of the cluttered, text heavy screen.

# Final Design

## Responder Map

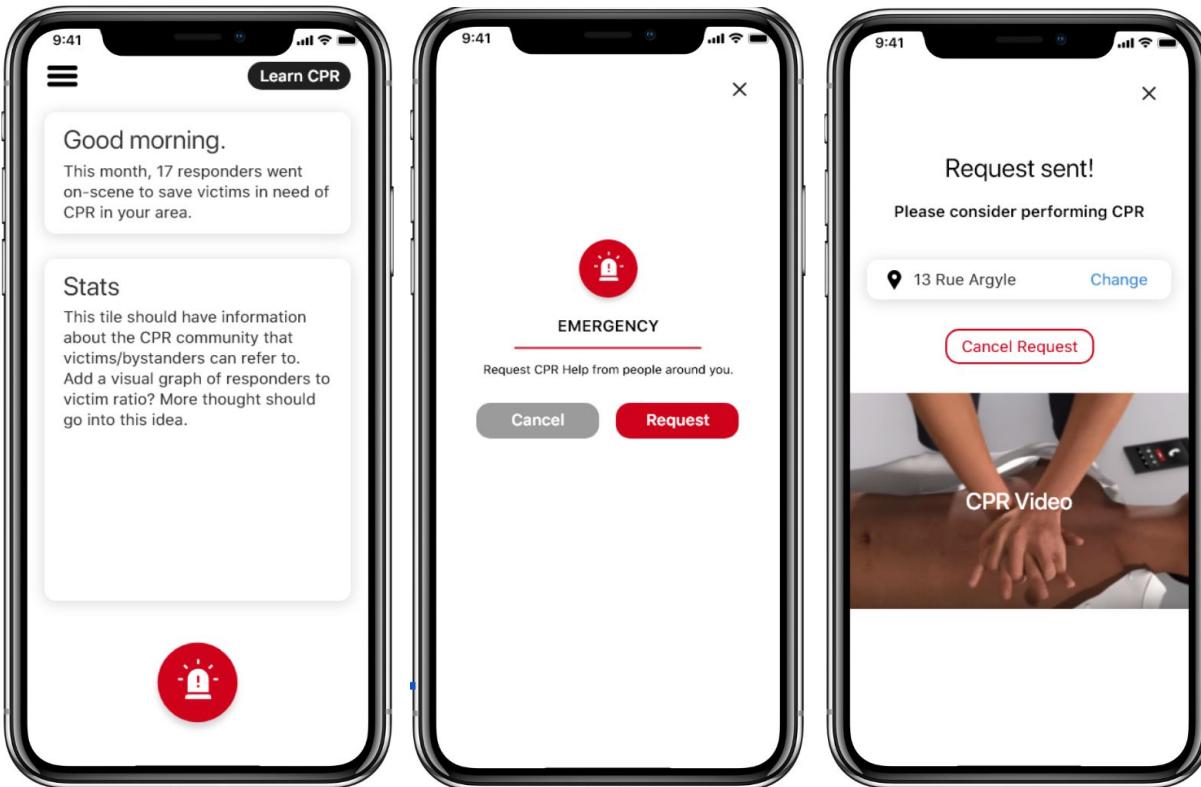


### Design Rationale

Legal requirements led us to eliminate the map screen from the home screen background. Since we are unable to promise a victim/witness that a responder will come, we cannot show them any aspect of the responder network.

# Final Design

## Request Help

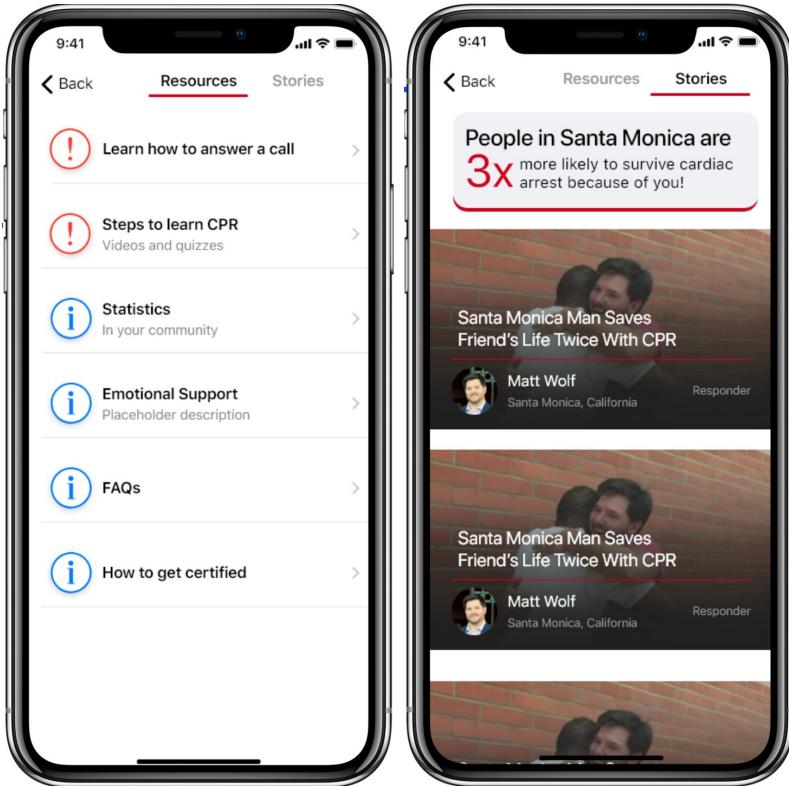


### Design Rationale

Users may accidentally hit the “emergency button”, so we included a popup to make sure they are sure they want to request help. Once the request is made they get a confirmation and are asked to consider doing CPR. In past iterations the language was said to be too harsh, so we made sure to make it sound more assuring this time around. A CPR video was added because users preferred this method of learning CPR, compared to the written text. We recommend including a message telling users to call 911 while in the popup and/or on the confirmation page.

# Final Design

## Community

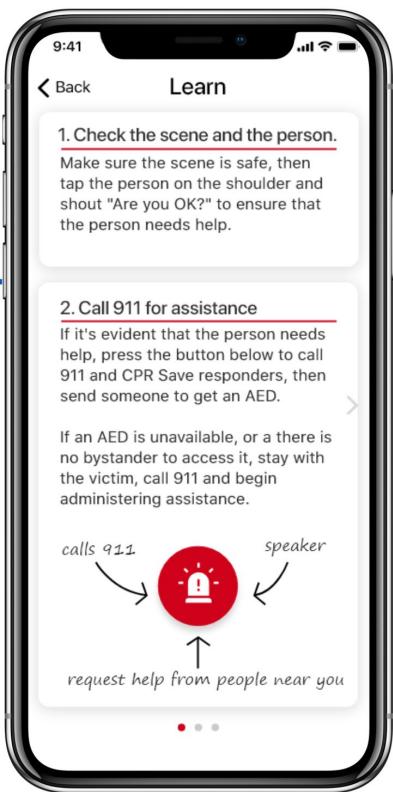


## Design Rationale

The community feature is aimed at telling users what is going on in their community as it relates to CPR Save. There are going to be success stories for those that have helped people. This will help maintain and grow the responder network and showcase, to those with the app, what this app aims to do. The resources portion of the community page will help users learn how to use some of the main features of the app, while also giving them stats, a support page, an FAQs page and a page for certification. This will help answer any questions the user might have.

# Final Design

## Educate

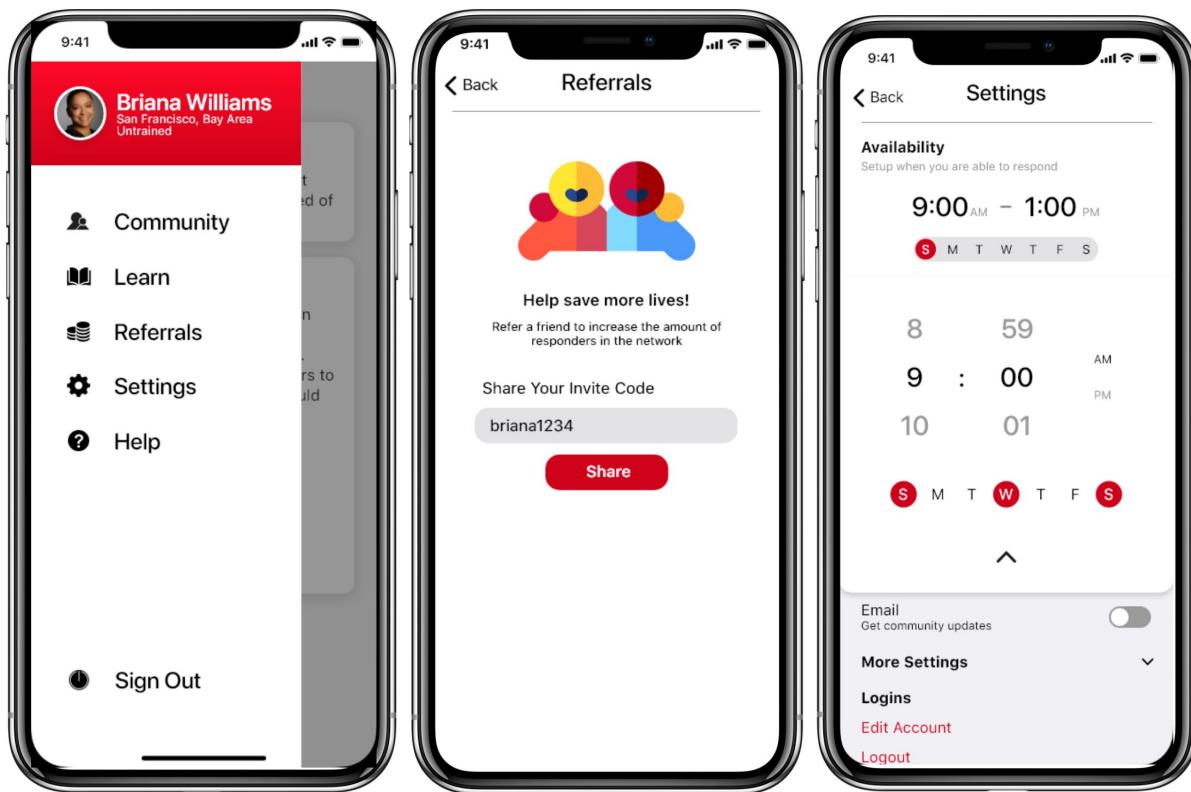


## Design Rationale

The educate/learn feature has had a lot of work done to do it as one could argue it is the second most important feature of the entire app after the emergency request process. This page is aimed to help anyone on the app know what to do when they are in an emergency situation. Because this app is for both bystanders and first responders and those people could be interchangeable at times, it is important for people to know the protocol. A lot of user research went into what was the best way to display this information. With input from both our client and users, we found it most useful to do a combination of words and videos to help people learn the best. We also found that a step-by-step process was the best way to get through to people what exactly they have to do and at what times.

# Final Design

## Profile



## Design Rationale

There are two main goals here are to increase the network effect of the product and give flexibility to the users. Offering referrals encourages our existing users to bring more responders to the network. More responders means cardiac arrest victims have a higher chance of survival. The settings feature allows responders to set the times that they are available so they would not receive requests to help when they are busy.

Link: [Interactive Xd Prototype](#)

# Validation

## Study Design

The purpose of this validation study is mainly to understand which of our designs best serve the needs of our potential users. They have two primary needs. First, they need to become informed of an emergency situations and have the incentive to act on it in the fastest way possible. The other need involves incentivizing users to stay active in the app and the CPR Save community through our feature set.

Here are our main research questions:

1. What is the most effective navigation and is the primary goal of the app represented by this navigation?
2. Which design is most effective in teaching CPR in an emergency and non-emergency case?
3. Which design is most effective given our legal and technical constraints?

## Study Approach

To approach our research subjects, we chose comparative quantitative testing so we can pinpoint the most optimal set of designs for potential responders in the CPR Save community. CPR training and emergency situations are sensitive topics that need to handled in the best way possible. So understanding the most efficient user experience is key.

More specifically, we chose a within-subjects design. We chose this option because our designs are not very different in terms of content, but only in layout and content organization. We also want to test as many users as possible with our time constraints.

We do not have a control group of designs because we do not have an original or existing design to use. Instead, we have two experimental groups with two different design variations

## Recruitment

For our application, anyone is a potential user. We ended up recruiting our peers to test both sides of the app. We wanted people who were passionate about the project and could potentially relate to the issue at hand. We considered the fact that some people would not

understand the emergency situation since many people we know have not witnessed it. We will account for the fact that the people we are testing our more tech savvy and younger by not taking all of their suggestions into account in our final and continuing to explain in more depth. We tested a total of five (5) unique subjects.

## Insights

The overarching theme throughout the validation studies is that people preferred design B, which is the newer version. Design B got an overall score of 7.8, while Design A got an overall score of 5.2 out of 10. Starting with the onboarding process, Design B had an overall mean score of 8.5 verse Design A that had a score of 5.6. Users generally thought Design B's onboarding process was a lot more seamless. They liked the addition of the verification code to ensure the number is correct. Design B prevailed in the emergency response phase as well, getting an overall score of 8.8 over Design A's mere score of 3.625. This was due to the fact that users liked the emergency response button when it was on its own instead of in the bottom bar.

Overall the community page did not change much between the two versions and that was evident within the test as users liked both. Design A had a score of 7.2 and Design B had a score of 8.2. One of the people tested did not see the long-term value of the community page. They claimed that, after installing the app, they would likely not return on a regular basis - especially to check out news and personal stories. The mechanisms behind the "referral" system also initially weren't clear - they understood how it worked, but didn't understand its place in the greater app experience. This section got an overall score of 8.2.

One thing that the five users expressed was that they did not like the achievements portion of the app because it downplays the emergency part. Another problem that was consistent across users was that the learn portion was not clear in the first version, but users found it more clear in the second version. Overall, Design A's learn page got a score of 6.4 and Design B's got a score of 8. Most people that were interviewed learned better by watching videos than reading. Users really liked the learn portion that was added in the second version. Users were not confused on how to cancel the request.

One big change that people liked more in the second version was that people found that the bottom bar made the app too crowded and they preferred the side hamburger menu. One user claimed that they wanted the emergency button to be on its own and

they were happy to see that this had changed in the second version. Generally speaking users found both versions pretty clear, but found the second version much more clear and aesthetically pleasing. The profile page was really easy to navigate in the first version, but users were okay with it not being as present in the new version so that they could keep the hamburger version.

## **Final Adjustments**

From our study, we were able to gather some changes we could make to the final design. One thing that we found our users were asking for was that they would like the opportunity to sign out of the application when they are not using it. Users would like the notifications to be less wordy and that the provided statistics as an incentive would either be not included, or that different text messages would have different statistics. Not only that, text messaging should not be the only way to receive a notification for an emergency request. A notification from the CPR Save app would save more time to open, rather than being directed to the text message and then opening the app from there.

In general, there were blocks of text in the app that users suggested could be cut down for the sake of space and for the sake of emphasis. Examples include the onboarding screen after the user chooses their level of CPR training/certification and the learn CPR instruction screens, especially in the case of an emergency. They did not understand why this was necessary to have in an emergency situation. Users would like us to make it more clear that 911 has been called and must be called prior to using the app for emergency response. Users really liked the aspect of referring friends to the app, but they wanted their to be an easy referral code to copy and send.

# Recommendations

When we started this project we were not sure what we would accomplish given the scope of what had to be done and the lack of current designs. We are pleased that we were able to produce a complete design and prototype and iterate on it multiple times based on user testing and our validation study. We were worried that without a current design, the setback in our user testing would prove to be a major disadvantage for our team, but we were able to do a considerable amount of testing given our situation. The preliminary design or current design we are working with is promising, but the team will need to perform a considerable amount of user testing before the app is ready for market. Our client was somewhat against testing originally for the sake of time, as he just wanted the design to be finished and up to his standards, but once we were able to showcase the importance of getting the user's input, he quickly understood why user testing was necessary.

This application would not be possible without a network of responders that are willing and able to jump into a scene and help out when necessary. In order for this app to move forward, they would need to work to build and maintain that responder network. This is key to the apps success moving forward.

One aspect that we have continuously explained to our client, is that the victim's bystander may not want to go through the onboarding process if they decide to use the app for the first time during an emergency situation. We think that the developers should work to create an on-screen widget that allows victims to skip opening the app in order to call for help. This can shorten the time it takes for victims to receive help, and time has proved to be essential as conveyed by our responder interviewees. The development team also needs to ensure that they are able to access the user's phone to call 911 before the user is able to use the app. This will need to be done by doing research on IOS and Android rules and regulations.

We believe that intermittent notifications of local CPR-related stories, news, and events that leads to opening of the app will help maintain that responder network and ensure users remember that the app is still there. Lastly, for future user testing, we recommend using the iOS Adobe XD map to display the prototypes to test. Because the prototypes were designed for iOS and iPhone XS/X, the prototypes should be tested on those devices.

# Appendix

## Appendix A - User Interview Materials

### Client

- We will utilize our clients' past experiences and resources to gain insight on the design problem.

### User Recruitment

- Because this application is targeting anyone who is willing to help a cardiac arrest victim, we first ask a prep question of "Would you help someone in an emergency"
- If interviewees are willing to help we continue with the interview

### Interview Questions ([view response data here](#))

#### Emergency responders (Modify questions based on the type of responder)

**Intro:** We are designing a product using crowdsourcing technology like Uber that would potentially save lives of those suffering from cardiac arrest. We would like to gain more insight on your experience as a responder.

#### Intro questions:

- Tell me about a typical day as an EMT responder/physician/nurse.
- Why did you choose this field of work and what keeps you in this field?
- When dealing with an emergency, what is your thought process?
  - If you would like, please walk me through an emergency situation.
- How do people seeking for help typically respond to emergencies?
- Who usually calls in an emergency? The victim or a bystander?
- What types of technology is used currently within your profession?
  - Are smartphones used in any way?
- What do you like about the current system of responding to emergencies?
  - How are you notified of an emergency?
- What do you not like about the current system of responding to emergencies?

#### CPR Related Questions:

- How many years of experience do you have in performing CPR?

- How often do you do CPR?
- How confident are you in your CPR training?
- Are you comfortable in performing CPR for strangers?
- What are the negative side effects to someone untrained performing CPR on someone? What medical issues might that victim have?
- How do you know if someone is actually having a heart attack? What are the signs?
- What are the most critical parts of cardiac arrest emergencies?
  - What advantages do you think a mobile app would have in these critical parts?
- How much time do you typically spend responding to CPR emergencies?
- How much time does someone have before they are unresponsive after having cardiac arrest?
- Tell me about the last time you performed CPR
- Under what circumstances would you not be comfortable in responding to someone in need of CPR?
- What are some best practices of CPR?

**App related questions:**

- Have you heard of crowd sourced CPR applications? If so, can you tell me about them?
- How far would you travel to respond to a call for volunteer CPR assistance?
- What modes of transport would you consider?
- What do you think is the most important aspect of CPR that would make or break this application?
- What are some potential problems that you see may occur with this app for emergency responders? What about for victims?
- Do you have any alternative ideas to tackle the issue related to CPR?

## Appendix B - Competitive Analysis Materials

### Competitors Websites and applications

- [www.pulsepoint.org](http://www.pulsepoint.org)
- <https://www.apple.com/apple-watch-series-4/health/>
- <https://www.goodsamapp.org/>
- <https://www.bemyeyes.com/>
- <https://www.uber.com/>

## Competitive Matrix

We analyzed features that we thought were important within emergency response technology. From the matrix below, we can notice which application has comparable features to what we hope to implement in our app. As we can see PulsePoint has the most similarities to our expectation, so it is the primary competition. However, Apple watch and Uber both have features that we would like to replicate, so we'll look into the design of Ubers notification and map system. Along with Apples calling 911 system.

	Pulsepoint	Apple Watch	Be My Eyes	Uber		
Target User	Victims and Responder	Customer	Blind Person and Helper	Driver and Customer		
<b>Notifications</b>					Unsure	-
Sound	●	∅	-	●	Non-existent	∅
Vibration	∅	∅	-	●	Poor	∅
Lock Screen	●	●	●	●	Acceptable	●
Calls 911	-	●	∅	∅	Good	●
<b>Map</b>						
Route	●	∅	-	●		
Distance	-	∅	-	●		
AED Locator	●	∅	∅	∅		
<b>Directions</b>						
CPR How to	●	∅	∅	∅		
AED How to	●	∅	∅	∅		
Status Report	●	●	-	●		
Onboarding	∅	∅	●	∅		
<b>Number of apps</b>	2	0	1	1		

## Competitive Analysis Questions

- What are the key features competitors are using?
- What is the onboarding process like?
- Who is considered a responder on these application?
- What type of notifications are responders receiving?

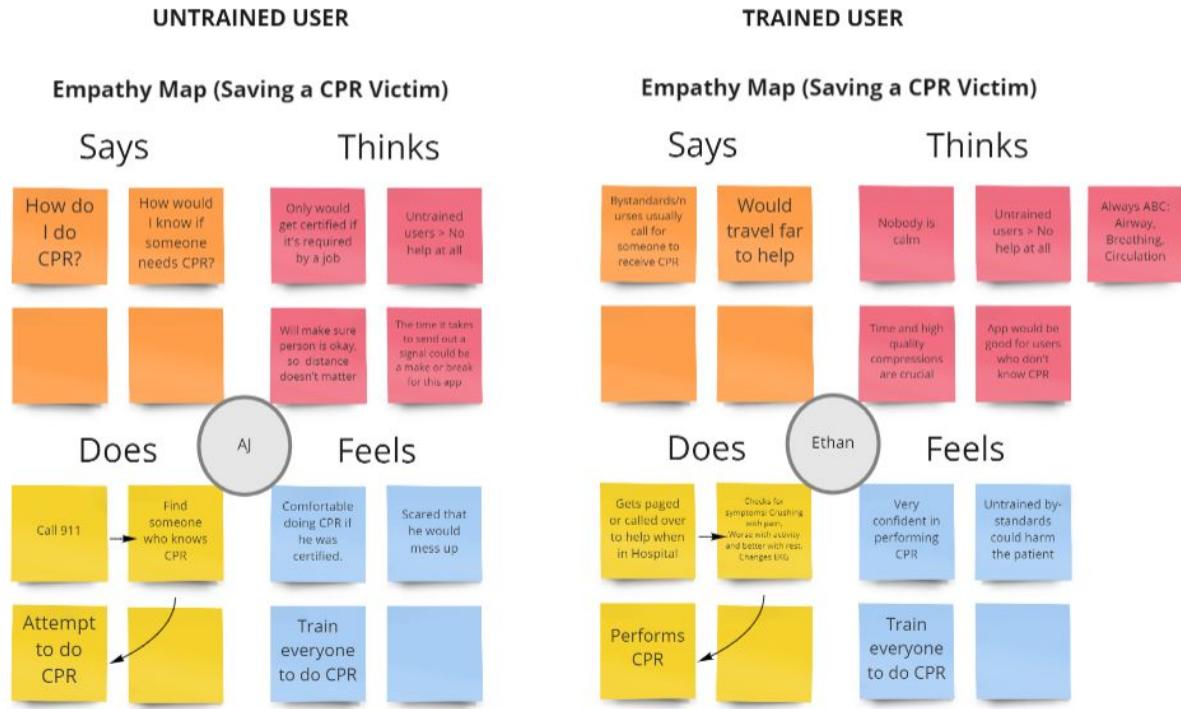
- How many steps the victim/responder goes through to obtain/offer help?
- How is the status of a user monitored or communicated through the app?
- How are these applications mobilizing their users to create promoters of their app?

## CPR Class/Certification Training

### Point of view

User	Need	Insight
An adult who lives in a crowded city who sees someone collapse.	To check if the person is okay and identify what's wrong easily.  Call 911 for help.  To find someone more capable of performing CPR.  To know how to do CPR on demand	This user does not know how to identify whether or not someone needs CPR. They prefer to find someone else who is more capable because they don't want to hurt the person further. If no one can help they would do CPR, but would need to be talked through the steps.
An adult who lives in a crowded city who receives a loud notification requesting CPR help.	Easily navigate to reach the victim/scene in < 2 minutes  Understand where specifically the victim is.  To know CPR and be confident in their abilities.	This user wants to help others and is motivated to do so because their family/friend has been in cardiac arrest before. They know how to identify when someone is in cardiac arrest.

## Empathy Map



*Figure 1. Example of users Empathy map for Untrained user (AJ) and Trained user (Ethan)*

### Participant group 1: CPR Certified Responders

- ABC thought process of checking Airway, Breathing, and Circulation
- Remains calm

### Participant group 2: Untrained Responders

- More likely to find someone who knows CPR and call 911
- If last resort they would attempt CPR
- Would feel uneasy/panicked

Both

- Believe the best solution to this problem is to CPR train everyone

## Appendix C - User Testing & Validation Materials

### Procedures - Test setup script

We tested five subjects for all variations and used either the desktop prototype link or the iOS Adobe XD preview app.

### Identify metrics

- Success/Error Rate - the number of times that the user passes or has an issue with a given screen; their facial expressions and the words they say out loud are measured
- Perceived usability - how understandable and clear the different user flows (onboarding, emergency request process) are
  - Post-test survey questions - on a scale of 1-10, what is your level of usefulness of...
- Comprehension - did the wording of the content in onboarding and especially the emergency request process make sense under a limited of time
  - Post-test survey questions - on a scale of 1-10, what is your level of understanding of...

### **Intro: Introduce what CPR Save is and its purpose**

Hi \_\_\_\_\_, thank you again for taking the time to participate in this study. Before we begin, I'm going to give you a brief overview of the test and how it will work.

This session is pretty straightforward — I'll be giving you a broad task to complete and then asking questions as we go along. Before I tell you the task, I'll be giving you a little bit of context behind it, such as why you might be doing it and what you hope to achieve.

It's really important to know that we are only testing the site, not you. You can't do or say anything wrong here. Please feel free to let me know at any time if there's something you like, dislike, if you're confused, etc. I promise you won't hurt my feelings.

Also, I'd like you to "think aloud" as much as possible. By that, I mean that I'd like you to speak your thoughts as often as you can. For example, you may be looking at a page, suddenly see something you didn't see before and want to click on it. In that case, saying something like "this caught my eye so I'm going to see what it is" would be very useful.

If at any point you have questions, please don't hesitate to ask. Do you have any questions so far?

### **User goals: Walk through the onboarding process**

- Notice any difficulties in understanding the content of each step

### **Task: Create an account**

## **BYSTANDER SCENARIO TEST**

**User goals: Utilize the app to request help in case of an emergency**

- Notice what buttons they press
- Ask user what the screen means to them on every screen they click to

**Task 1:** Request help from responder.

- Describe what the confirmation page means to you -

**Task 2:** How would you learn CPR?

- What form of media do you learn best from (videos, reading, Gifs)?

**Task 3:** Cancel Request for help.

## **RESPONDER SCENARIO TEST**

**User goals: Utilize the app to respond in case of an emergency**

**Tasks 1:** Someone next to you has collapsed, what do you do next? How would you get help?

**Task 2:**

You receive a notification on your phone (set up by adding a contact named CPR Emergency Near You on our phone). Indicate how you'd respond. Please describe what the message means to you.

**Task 3:** Go through a CPR training page and see how effective our instructions are

**User goals: Practice CPR/Learn in non-emergency case**

**Task 1:** How would you learn how to do CPR?

**Task 2:** Learn about how to respond in emergencies ("Learn how to answer a call")

**User goals: Customize app to fit their needs**

**Tasks 1:** Go through the onboarding process

1. Learn about what is going on in their community
2. View your profile on CPR Save
3. Change your availability and notification preferences

What we are looking to gain:

- See if all of the features we included make sense to a hypothetical user who is going to be using the app in a non-emergency situation
- Does the information we provide offer value to the user?
  - Values include incentivizing the user to stay active within the CPR Save community, the usage of CPR training videos

### **Post Test Questionnaire:**

<https://forms.gle/sT9GbwKiDzyV2jBb6>

### **Materials**

We have two Adobe XD interactive prototypes that we will present to our subjects.

*Variation A:*

<https://xd.adobe.com/view/00652043-ab73-4d2d-5e7b-668ab3bd1720-7654/>

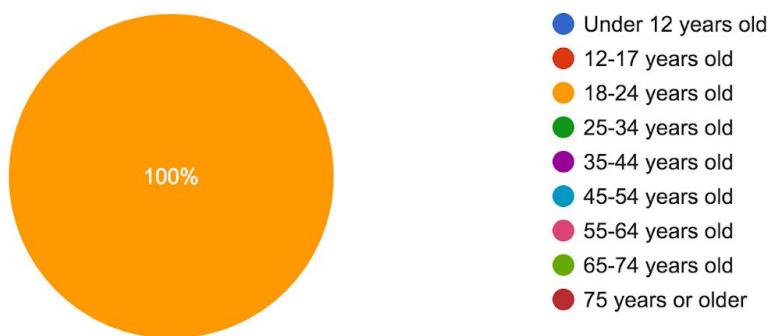
*Variation B:*

<https://xd.adobe.com/view/d81c221c-dbe5-4ceb-7d04-647fce29b705-ae2d/>

### **Demographics**

**What is your age?**

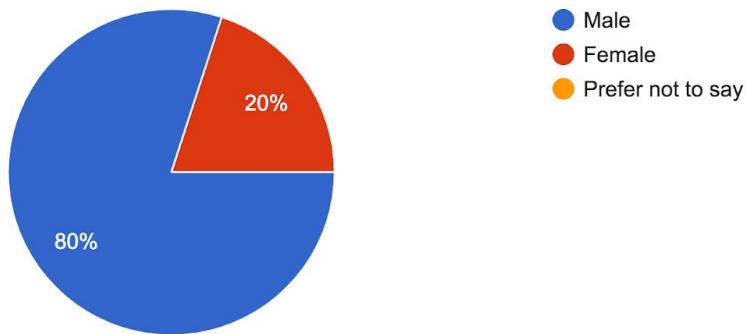
5 responses



During the planning phase of our validation tests, we estimated that most, if not all of our subjects would be college students. We speculate that testing older subjects may affect our results.

## What is your gender?

5 responses



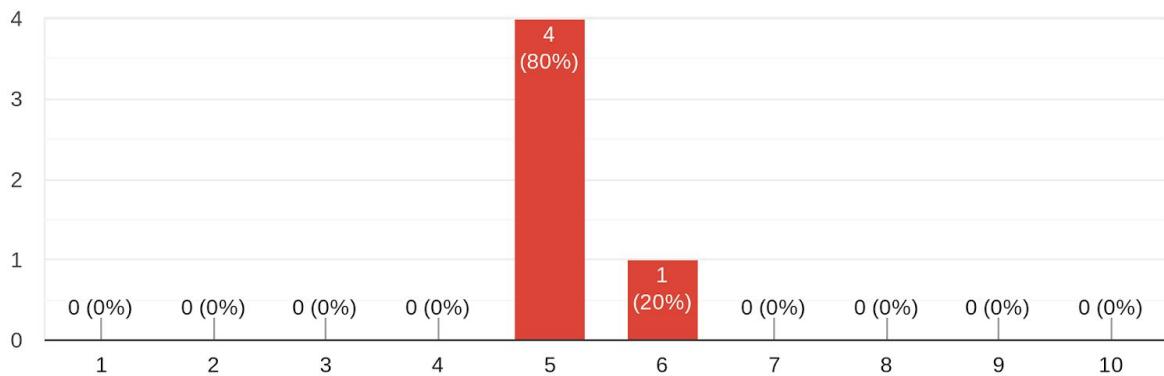
We do not think there are any patterns in the gender of our subjects, but we still wanted to collect this information for demographic purposes.

## Descriptive Statistics

### Metric - Perceived usability

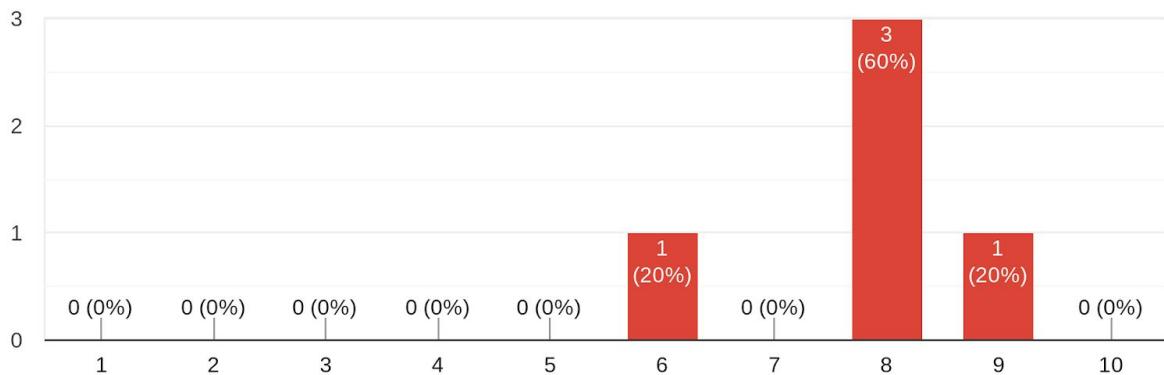
**IN GENERAL, on a scale of 1 to 10, what do you think is the usefulness of DESIGN A?**

5 responses



**IN GENERAL, on a scale of 1 to 10, what do you think is the usefulness of DESIGN B?**

5 responses



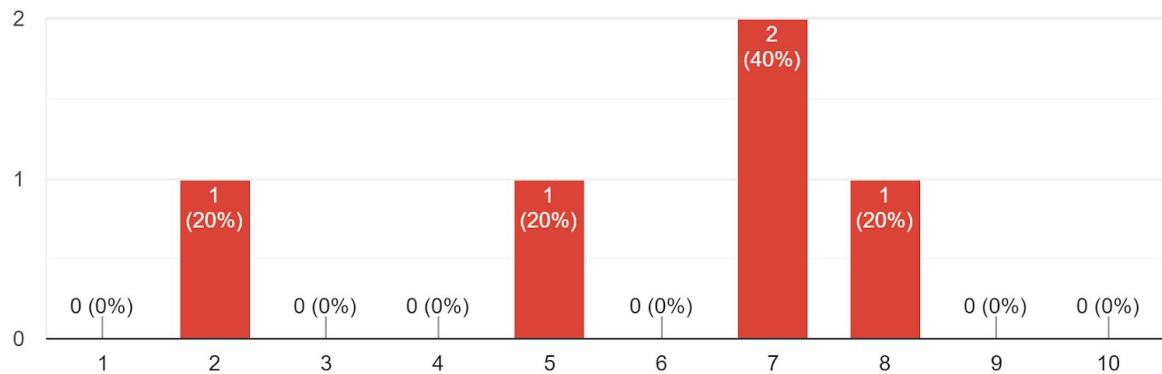
At a first glance, it is clear that design B is the preferred design.

Regarding more specific pages, however, our results were more varied with overall higher ratings given to Design B.

## Metric - Comprehension

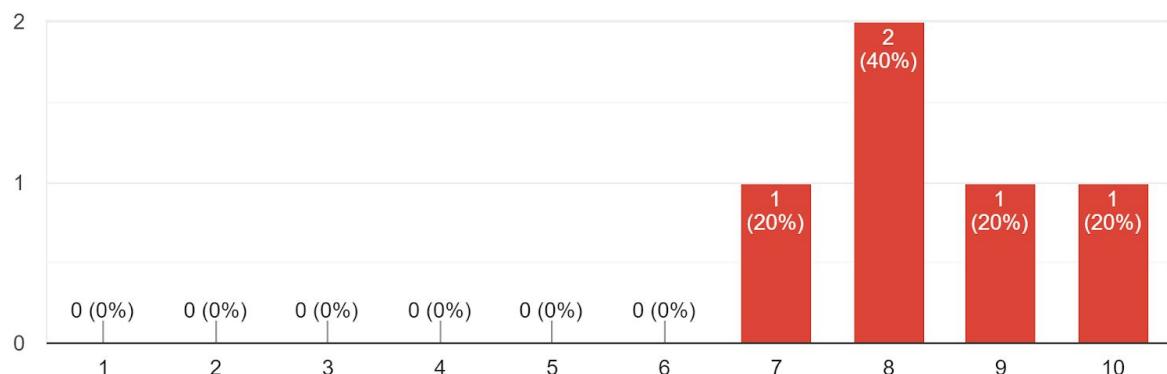
EMERGENCY REQUEST PROCESS - On a scale of 1 to 10, what do you think is your level of understanding in DESIGN A?

5 responses



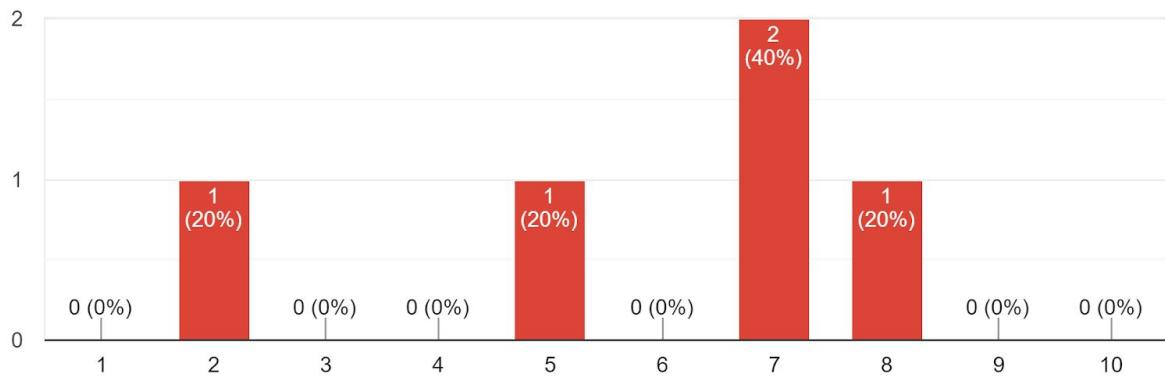
ONBOARDING PROCESS - On a scale of 1 to 10, what do you think is your level of understanding in DESIGN B?

5 responses



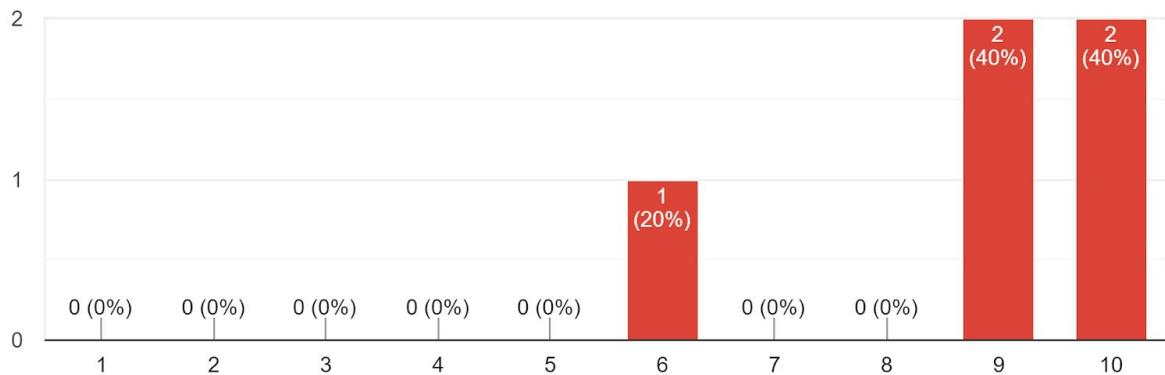
**EMERGENCY REQUEST PROCESS - On a scale of 1 to 10, what do you think is your level of understanding in DESIGN A?**

5 responses



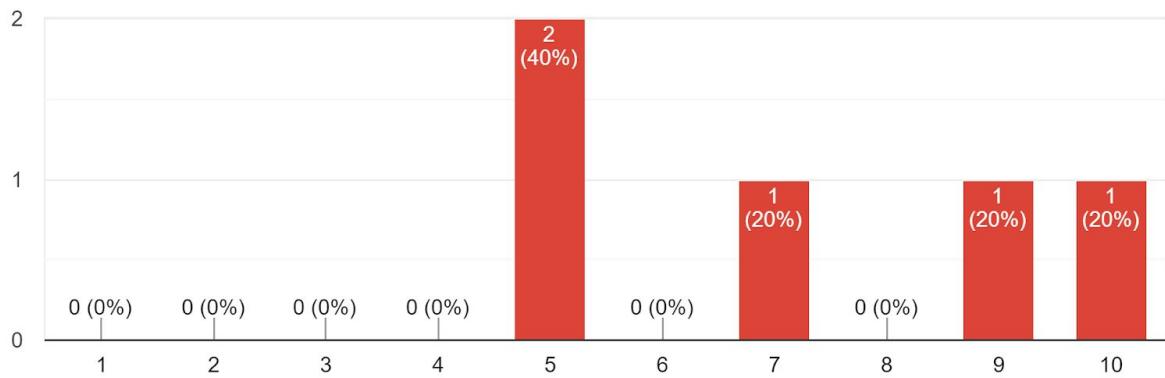
**EMERGENCY REQUEST PROCESS - On a scale of 1 to 10, what do you think is your level of understanding in DESIGN B?**

5 responses



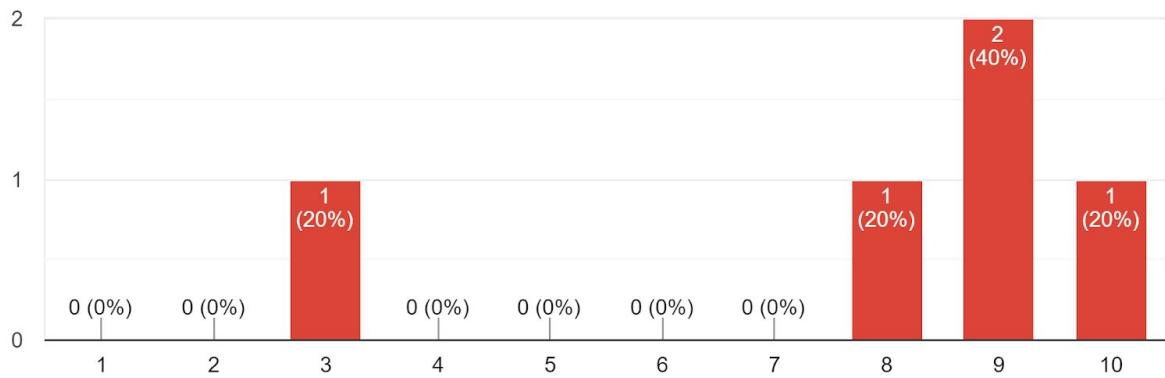
**COMMUNITY PAGE - On a scale of 1 to 10, what do you think is your level of understanding in DESIGN A?**

5 responses



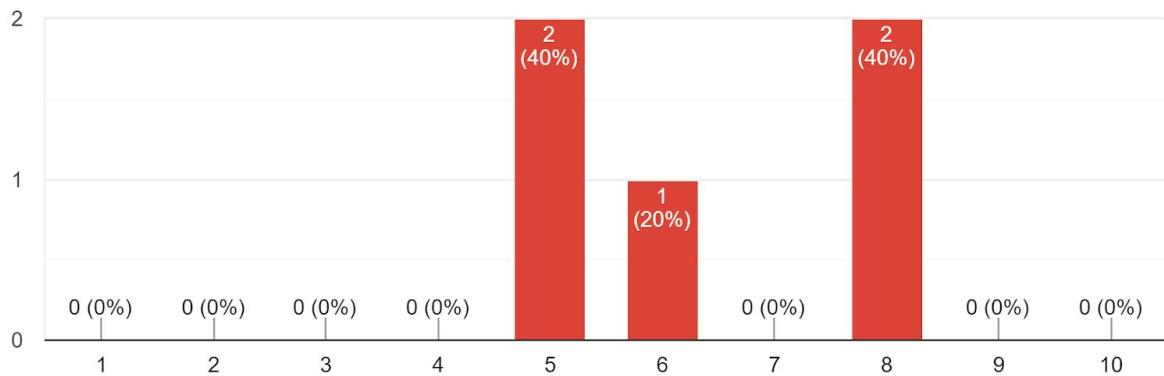
**COMMUNITY PAGE - On a scale of 1 to 10, what do you think is your level of understanding in DESIGN B?**

5 responses



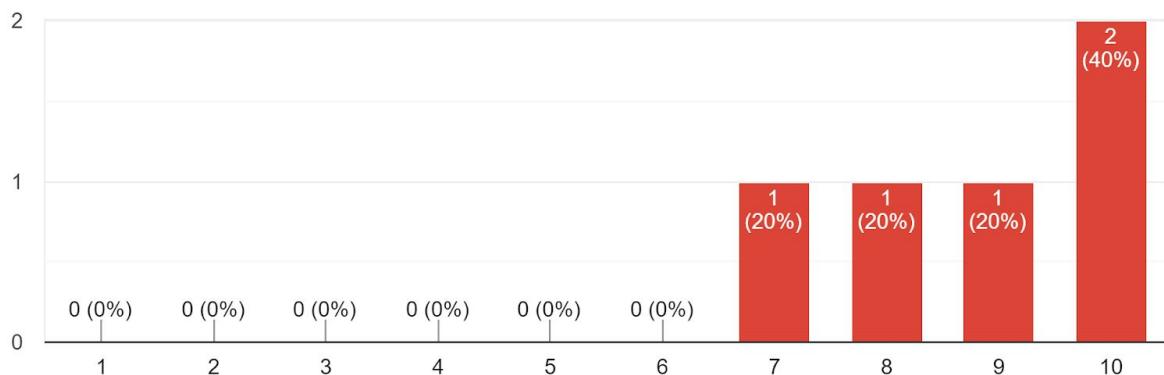
**LEARN PAGE - On a scale of 1 to 10, what do you think is your level of understanding in DESIGN A?**

5 responses



**LEARN PAGE - On a scale of 1 to 10, what do you think is your level of understanding in DESIGN B?**

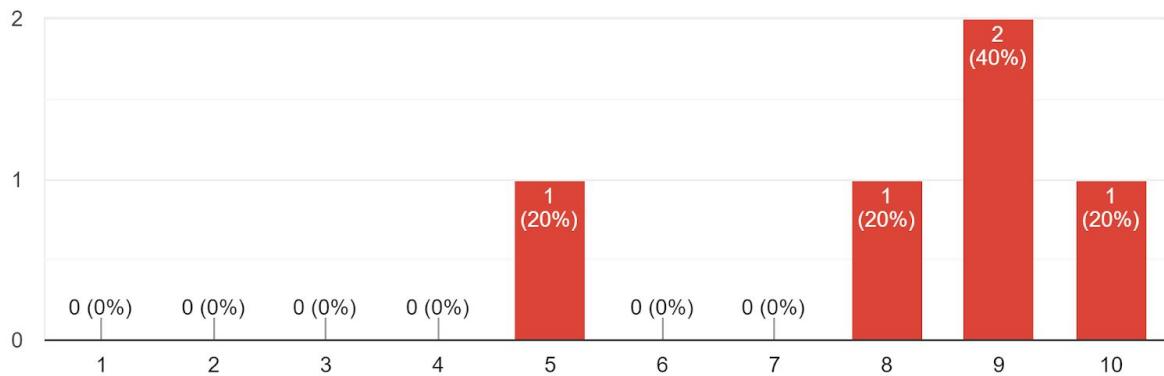
5 responses



Because of the changes we made between the two variations, the following graphs are do not have identical information.

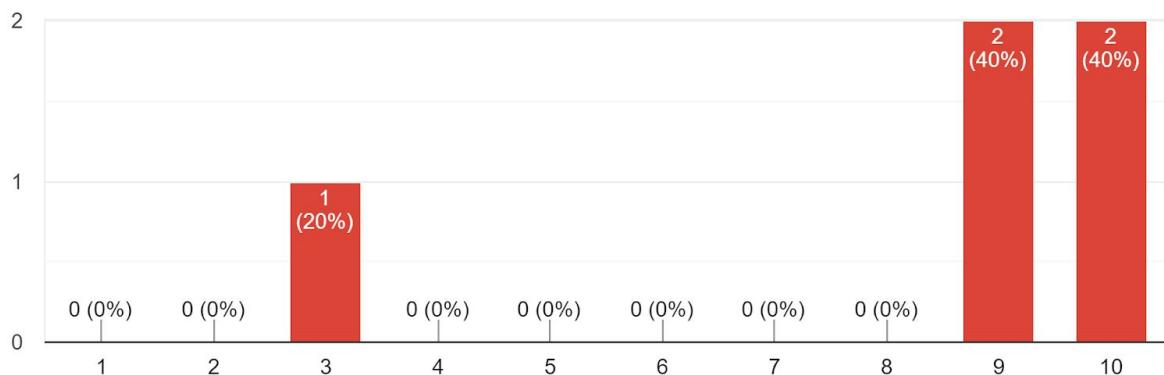
**PROFILE PAGE - On a scale of 1 to 10, what do you think is your level of understanding in DESIGN A?**

5 responses



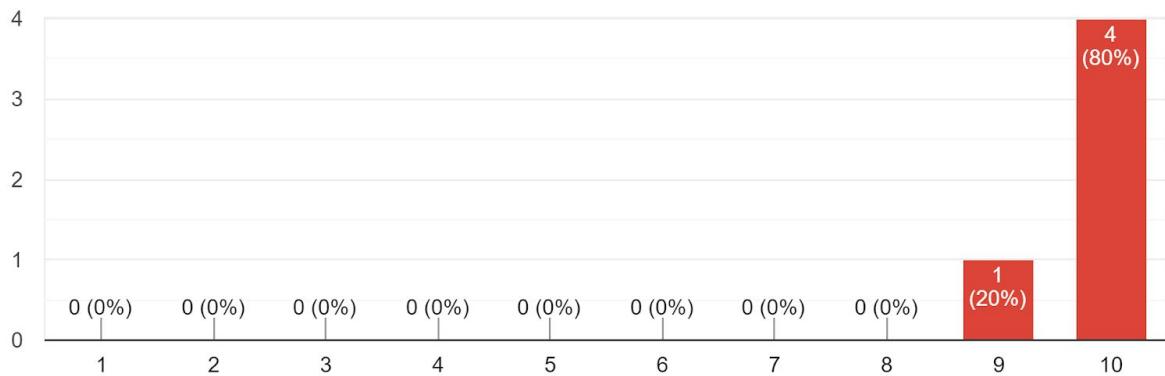
**REFERRALS PAGE - On a scale of 1 to 10, what do you think is your level of understanding in DESIGN B?**

5 responses



SETTINGS PAGE - On a scale of 1 to 10, what do you think is your level of understanding in DESIGN B?

5 responses



## Statistical Analysis

Design A - Mean rating: 5.2 out of 10

Design B - Mean rating: **7.8 out of 10**

Design A Onboarding process - Mean rating: 5.6 / 10

Design B Onboarding process - Mean rating: **8.5 / 10**

Design A Emergency request process - Mean rating: 3.625 / 10

Design B Emergency request process - Mean rating: **8.8 / 10**

Design A Community - Mean rating: 7.2 / 10

Design B Community - Mean rating: **8.2 / 10**

Design A Learn - Mean rating: 6.4 / 10

Design B Learn - Mean rating: **8 / 10**

Design A Profile - Mean rating: 8.2 / 10

Design B Referral - Mean rating: **8.2 / 10**

Design B Settings - Mean rating: **9.8 / 10**

After we calculated these averages, Design B is the clearly preferred variation. We expect to receive similar results if we expand our sample size.