SOUNDPRINTS

Final Report

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Team

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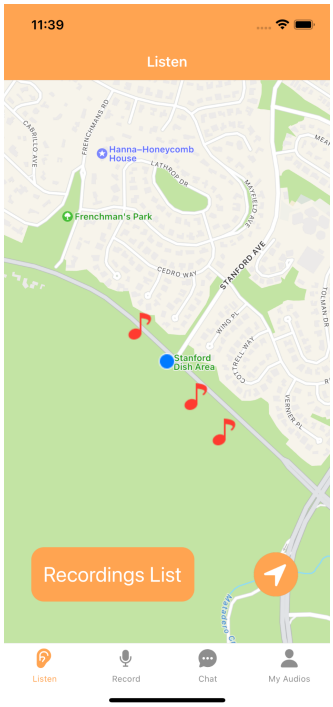
Value Propositions

Audio spaces that connect and inspire.

Problem/Solution Overview

People often encounter many obstacles as they work towards their goals and lack the community they need to help motivate them and celebrate their achievements. SoundPrints is a location-based audio journaling app that enables users to connect with and inspire one another to achieve their goals. We hope users will be inspired by listening to motivational recordings left by others at the places they visit, and that they will celebrate their successes by making their own recordings. Ultimately, we hope users will share their audio recordings with others in their community to inspire others to follow in their "soundprints."



When a users open our app, they will be taken to this screen, where they can listen to recordings made near them by others.

Needfinding Interviews

We interviewed twelve people on the topics of mental health and goal setting over the course of two interviewing rounds. We will focus here on the learnings we gained about goal-setting, since our project is more focused in this direction. We focused interviews on the demographic of young adults, ranging from high school students to graduate students to recent graduates, since we wanted to develop a solution for our generation. However, to gain a greater diversity of perspectives, we also interviewed two people in their fifties. In general, we made sure to emphasize diversity and inclusion in our interview group, including diversity of ethnicity, gender, and age, so that the insights we gained were representative of an inclusive demographic. All our interviewees were selected due to their interest in improving the process by which they achieve goals. The goals of our interviewees were wide-ranging, from fitness-related goals to breaking a bad habit of consuming sugar. From our interviews, we learned how difficult it was for interviewees to consistently make progress towards their goals. A large reason for this difficulty was that achieving goals alone is lonely and discouraging. We found that social support can exponentially increase the likelihood that goals are completed, largely due to positively-reinforced peer pressure and social contracts. For instance, one of our interviewees said “I accomplish things better when my friends are also working on the same goal as me. If I slack off, I’ll feel bad since my friends are all still working towards our mutual goal.” This statement helped us learn that there is a strong need for a platform where peer support is readily available to help people accomplish their goals in a community-driven environment.

To summarize, from our needfinding interviews we gathered a few key insights:

1) People value community and accountability when trying to achieve their goals, but they often struggle to find others with common goals.
2) When people fail to achieve challenging goals, they feel hopeless and disappointed in themselves, even if they are able to make progress towards their goals.
3) People feel more motivated to pursue their goals when they are divided into smaller milestones, because their progress towards achieving them is more transparent.
4) When people receive validation from others, even strangers, about their incremental progress towards their goals, people feel more confident and motivated to continue striving to achieve them.

A software engineer in her mid-20s, who recently ran a half-marathon

Social Work graduate student, Productivity Blogger, Aspiring Mental Health Professional

Figure 4: Megan's empathy map, in which organize what she says, thinks, does, and feels.

POVs & Experience Prototypes

POV 1

We met...Shinu, a woman in her 50s who has been struggling for several years to give up sugar.
We were surprised to notice... even though her overall sugar consumption has reduced over time, she believes that she may never be able to give up sugar because she has been struggling to do so for so long
We wonder if this means...she feels hopeless and disappointed in herself, because despite having made progress, she has failed to achieve her goal
It would be game-changing to...create a way to help Shinu stay motivated to break her bad habit and celebrate the incremental progress that she makes towards that goal.

Some HMWs from POV1

How might we…

1) Make the process of building habits more enjoyable and fun for people?
2) Help people break down a large-scale goal into daily habits that would lead to progress?
3) Make the progress that people have made towards their goals more concrete?
4) Help people track their long-term progress towards a goal?
5) Help people find positive ways to tackle feelings of shame or hopelessness that come from failure?

POV 2

We met... Angelina, a high school student with goals oriented around fitness
We were surprised to notice... Angelina was usually inconsistent with the gym but is now able to keep a more consistent routine after receiving compliments at the gym
We wonder if this means... Angelina feels more confident in herself and thus is more motivated to pursue her goals after receiving validation, support, and feedback from others
It would be game changing to... create a way for people to give and receive encouragement from other people to build their self confidence and achieve their habits and goals.

Some HMWs from POV2

How might we…

1) Create an environment in which validation of goals is freely given, celebrated, and accepted?
2) Give and receive validation?
3) Utilize influencers to provide validation?
4) Create non-traditional forms of validation (not compliments)?
5) Measure increases in people's self confidence?

POV 3

We met... Ashad, a college junior who loves to go to the gym
We were surprised to notice... Ashad is instantly motivated to achieve even higher levels of fitness when he sees his friends performing better than him on a common fitness goal

We wonder if this means... Ashad feels motivated by competition, because he enjoys the feeling of winning, so creates a competition for himself when he meets friends who have similar goals to him
It would be game-changing to... motivate people to achieve their goals by setting up a competition between individuals working towards similar goals.

Some HMWs from POV3

How might we…

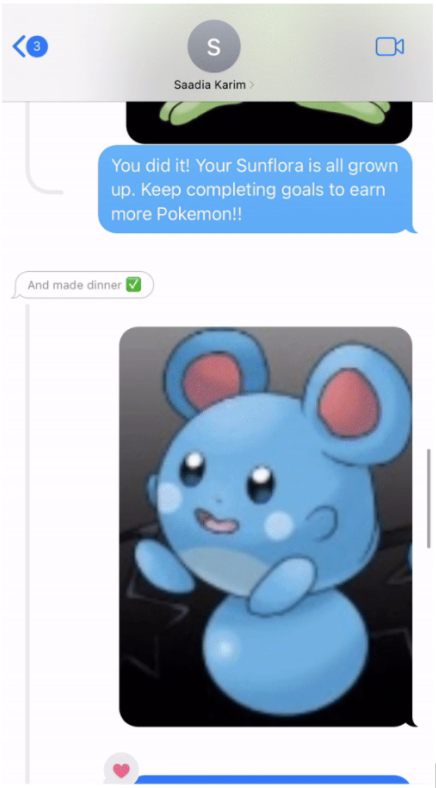
1) Create a competition between friends without making it something that potentially harms their mental health?
2) Connect people with others who would enjoy engaging in a friendly competition to achieve goals?
3) Connect people who have similar passions and goals?
4) Enable people to share their progress towards their goals with one another?
5) Structure competitions to foster accountability?

Top 3 HMWs

From Shinu's POV, this HMW was created: How might we make the process of building habits more enjoyable and fun for people?
From Angelina's POV, this HMW was created: How might we create an environment in which the validation of goals is freely given, celebrated, and accepted?
From Shinu's POV, this HMW was created: How might we help people pursue their goals while also helping them find positive ways to tackle feelings of shame or hopelessness that come from failure?

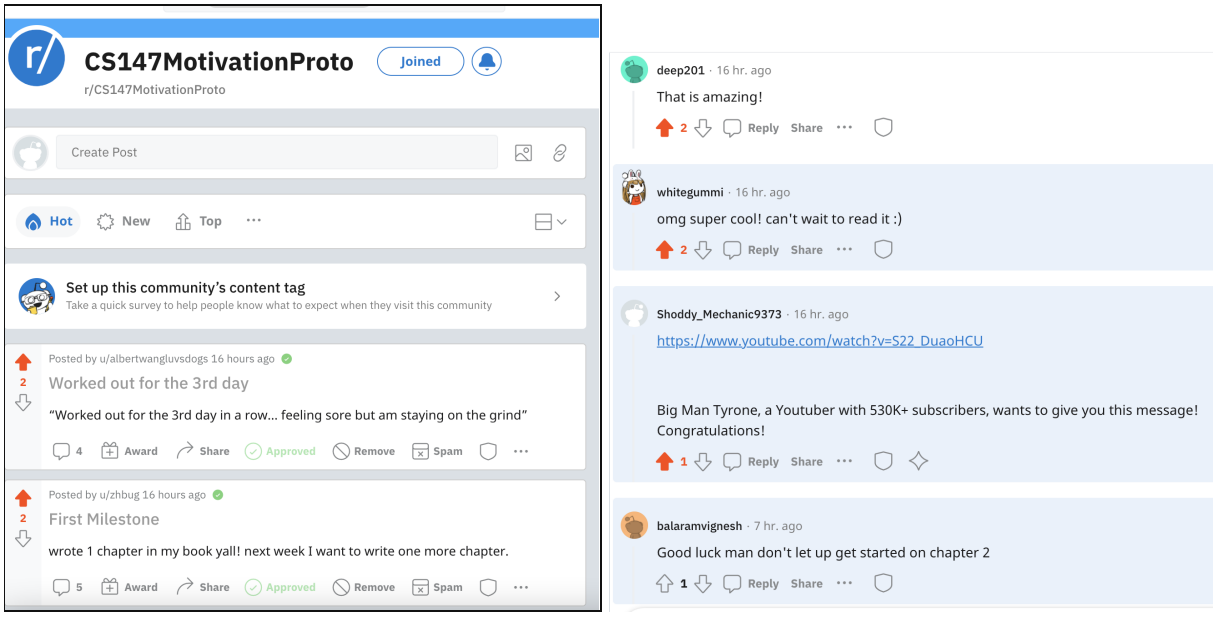
Top 3 Solutions and Experience Prototypes

The first solution was about gamification. The user is assigned a "pet" where every time the goal is met, the pet grows and evolves. The app includes long-term metrics displaying how you've progressed with your habit over time. Also, the assumption tested was that gamification, or having something like a virtual pet/NFT that can track your progress, helps people feel motivated to achieve their goals. For the experience prototype, the user receives a picture of a more grown version of their pet every time they successfully complete their task. For what worked, users felt more accountable overall since they enjoyed watching their pets flourish. Additionally, users found that encouraging messages and writing down goals in the first place made users feel more productive. However, there were a few areas that needed improvement. First, users felt that the magnitude of task/effort required wasn't taken into account. Second, users felt limited by the goals set earlier in the day. Third, users wanted the avatars to grow immediately (instantaneous dopamine) after completing the goal (not possible over text).



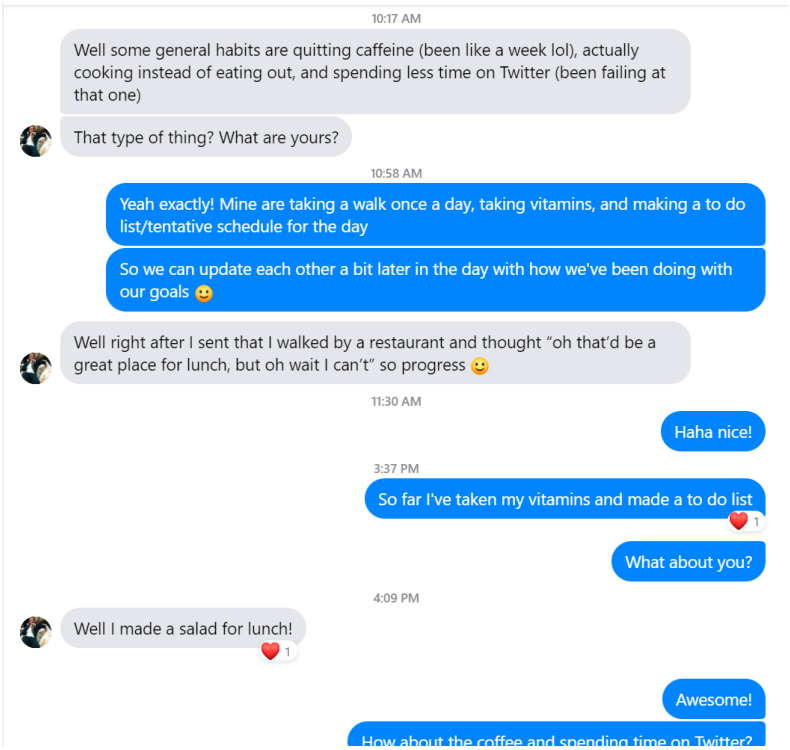
Experience prototype of our solution around gamification, in which the experimenter sent updates over text of an avatar growing.

The second solution was about validation from many people. Strangers, including influencers or influential people relative to certain goals (ie. Chloe Ting for fitness), can validate, provide feedback, and comment on an individual's goals. The assumption tested was that people care about others' support, feedback, and judgment toward them. For the experience prototype, a group of users were added to a subreddit, and they could make posts about their achievements. The experiment moderator and other users left supportive comments on their posts. For what worked, the users felt more confident in achieving their next milestones and appreciated the feeling of someone taking notice of their hard work and efforts. For instance, one user said, "the positive comments validating my goals made me feel good about pursuing it more." However, the user also felt some responses were generic and cliche, and was unsure how long this strategy can keep individuals motivated.



Our experience prototype in which we created a sub-reddit for users to provide validation to one another.

The third solution was about accountability partners. The user was assigned an accountability partner where the user shares progress and the partner holds the user accountable for their progress and completion of goals. The assumption tested was that people will make the time to hold each other accountable. For the experience prototype, the user would exchange texts and receive feedback/progress updates every time they complete one of their goals for the day. For what worked, the user felt that accountability increased motivation to stick to habits. The user also made the time to check in on their accountability partner and hold them accountable throughout the day. For what did not work, our tester mentioned that an accountability partner system requires motivation from both parties, which may be difficult to sustain over long periods of time. Thus, they felt that our assumption would not be true over a long period of time. In addition, having an accountability partner did not work well for vague goals. For example, when the goal was "to spend less time on Twitter," progress towards that goal was difficult to measure. Thus, despite having an accountability partner, our user did not achieve goals that were vague.



Experience prototype in which a user and the experimenter were accountability partners for the day. Users gave each other updates over text when they accomplished their goals and checked in on one another.

Design Evolution

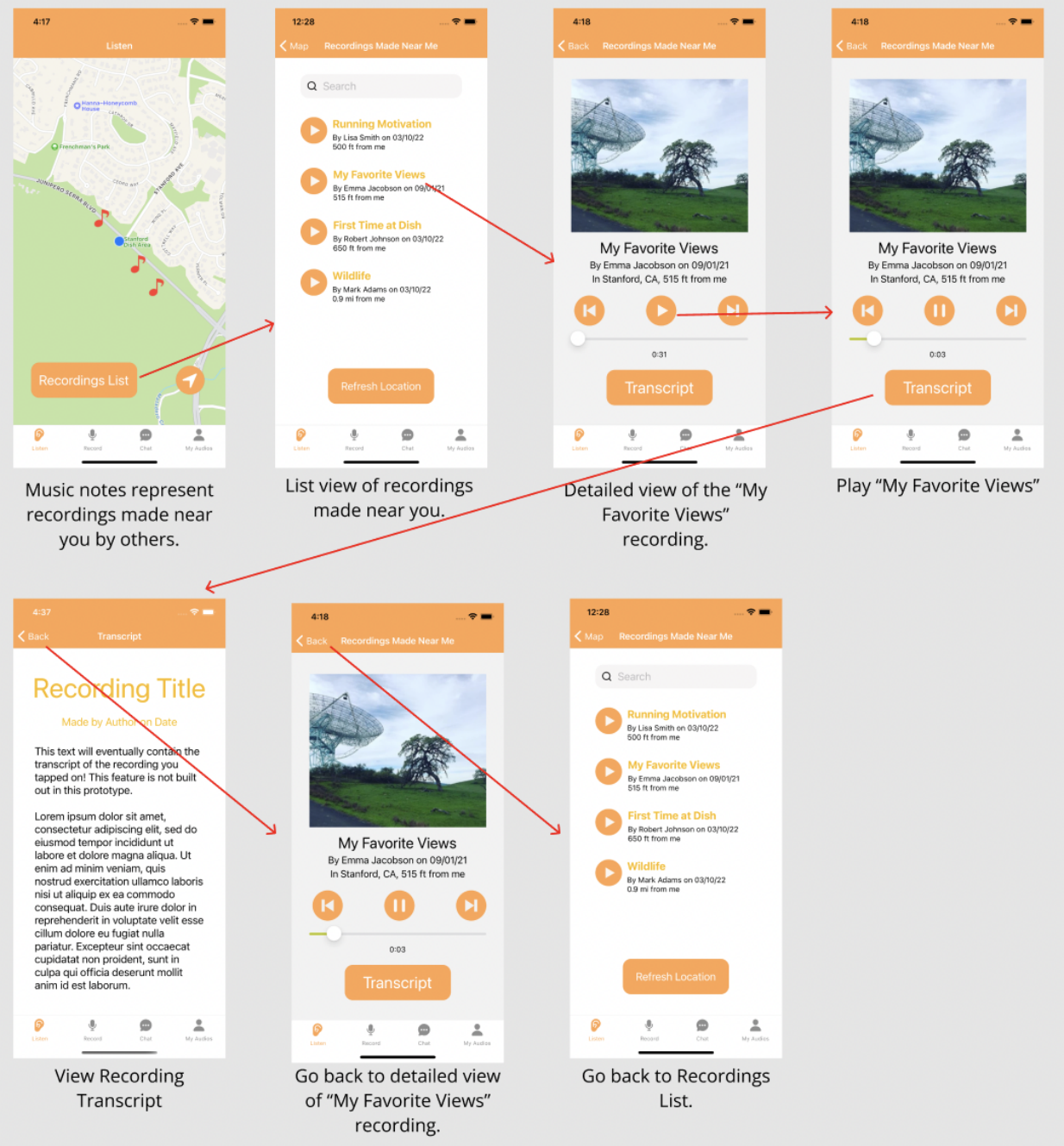
The solution we decided to create is SoundPrints, a location-based audio journaling app that enables its users to connect with and inspire one another to achieve their goals. Based on feedback from our classmates and our CAs, we realized that the solutions we had run experience prototypes on were not unique, since many solutions similar to those were already in the market. SoundPrints was one of the solutions we had brainstormed in response to the How Might We question: "How might we make the process of building habits more enjoyable and fun for people?" From our needfinding and our experience prototypes, we also learned about the importance of community and validation from others in achieving goals, which influenced us to emphasize connection and community when we created SoundPrints. By listening to recordings made by others, as well as creating and sharing recordings with others, users of SoundPrints can inspire one another across space, even if they do not personally know each other. We decided to pivot to this solution, because it was much more unique than the solutions we had previously selected. but it was still designed to address the strong needs that we learned about in our needfinding interviews.

Tasks

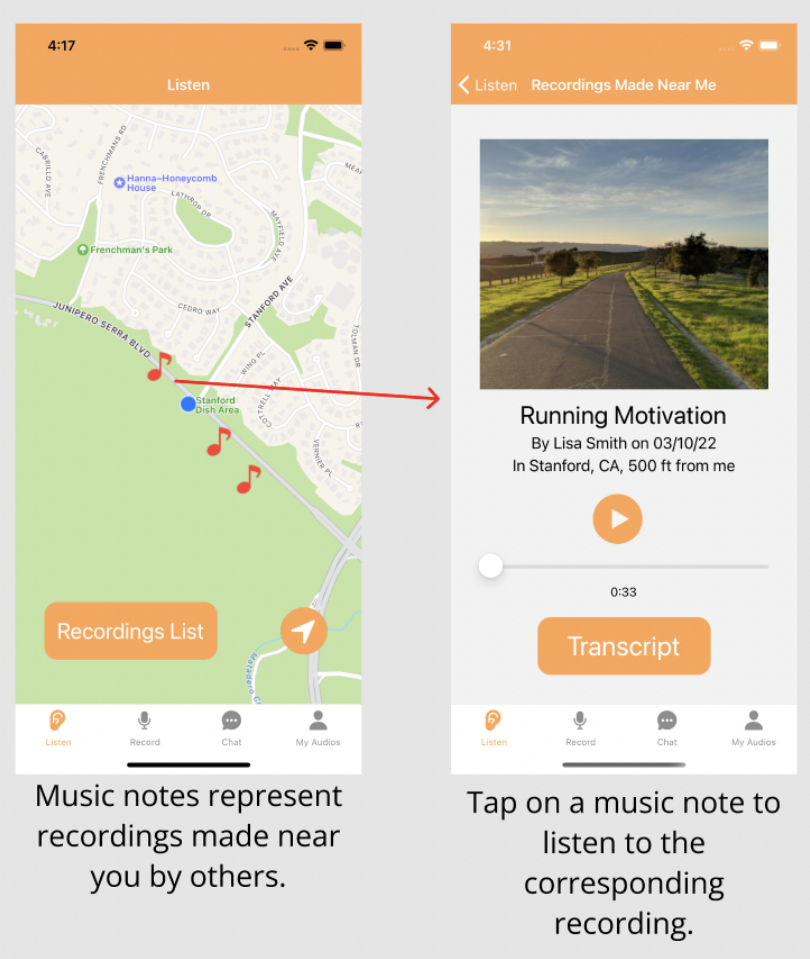
Simple: Listen to recordings made near your location by others.

We chose this task because the ability to listen to recordings made near your location by others is critical to the social audio space component of the app. We want to make it so that people are able to motivate and inspire others, and we do this by allowing them to peer into each other's goal-setting journeys through listening to their recordings. This task is a simple task since it is a high frequency task that is basic and fundamental to the functionality of the app and is a feature that all users will use. Because users are listening to recordings made *near their current location*, this creates an immersive experience for users to listen to motivation recordings related to the activities they are engaging in.

Below, you can see a task flow walk–throughs of our simple task for our high fidelity prototype. Note that in all task flow walkthroughs, red arrows represent user taps on the screen.



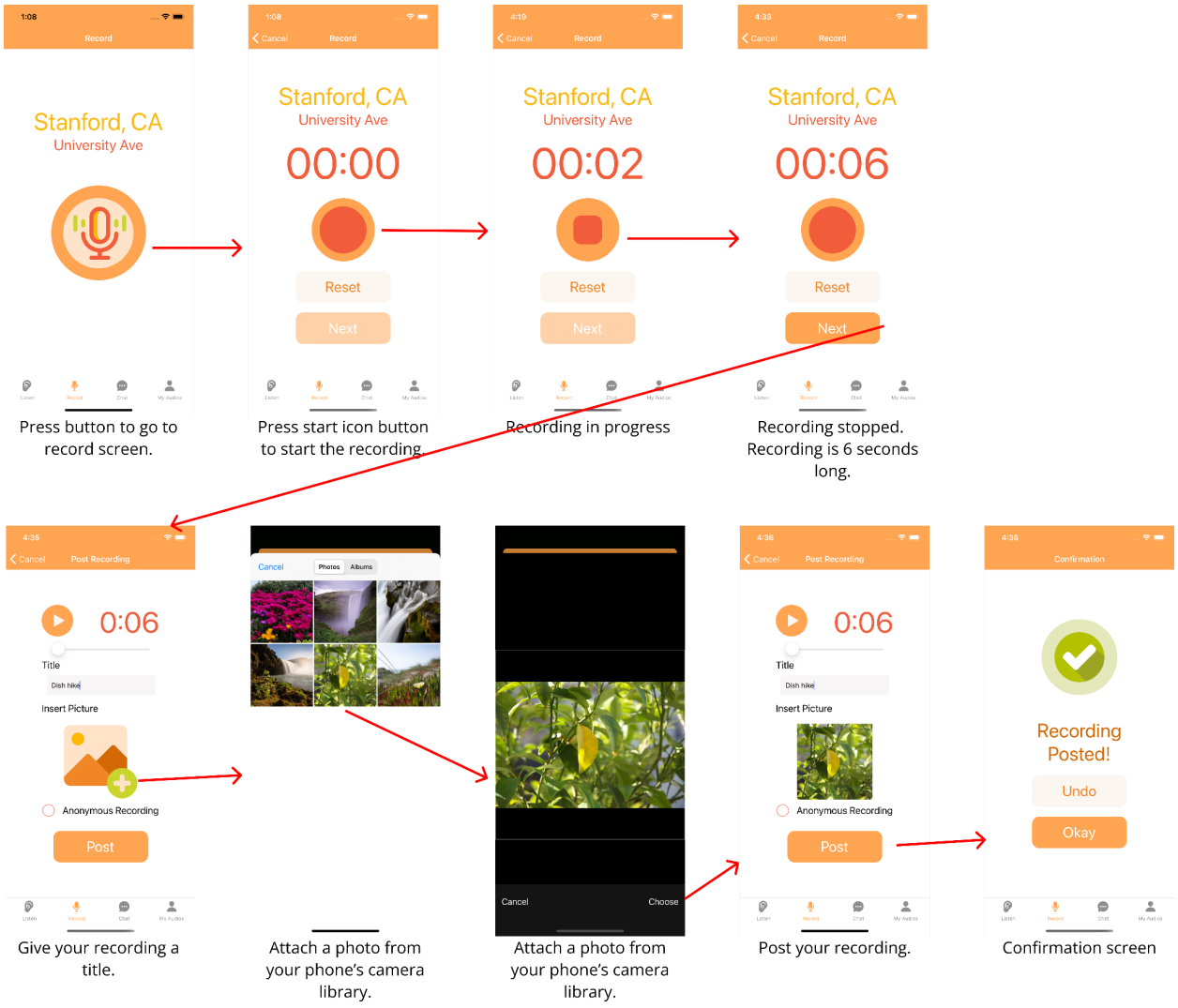
Task flow walk-through of our simple task with images from our high-fi prototype.
This task flow depicts how users can listen to recordings by using the Recordings List button.



Alternatively, tap on a music note on the map to listen to the corresponding recording.

Moderate: Make your own recording and post it to the public database of recordings in the app.

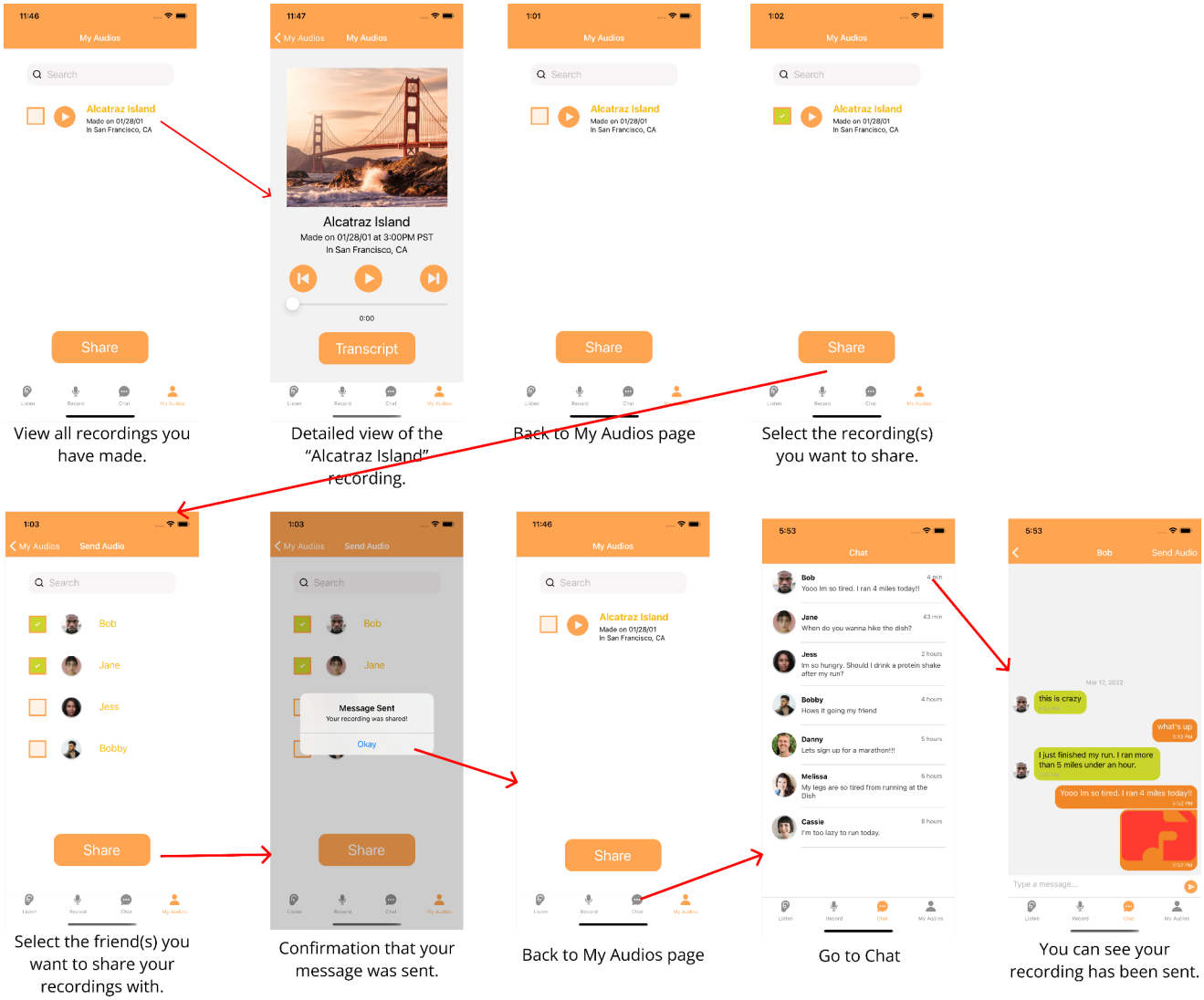
We chose this task because the ability to make your own recording and post it to the public database of recordings is essential to how users record and document their goal-setting journey. Just as important as the ability to listen to other's recordings, we made it so that users are able to store their recordings to the public database of recordings in the app. This way, users can celebrate their achievements as well as help inspire others in the SoundPrints community. This task is a moderate task because less users will use this function, but it is still a frequently used feature in the app since users will want to store their recordings for either their own personal use or to be shared with others.



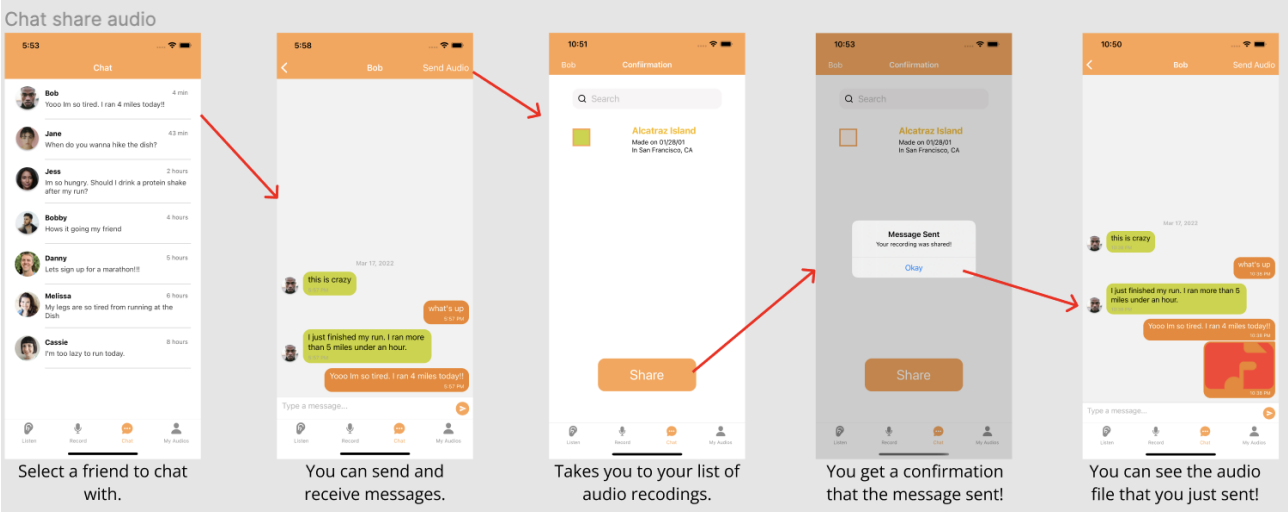
Task flow walk-through of our moderate task with images from our high-fi prototype. This task flow depicts how users can create and post their own recordings.

Complex: Share recordings that you have made with friend(s).

The ability to share recordings that you have made with friends is significant because we want users to feel proud and a sense of achievement for completing their goals and sharing it with like-minded peers. Their peers can also provide validation and encouragement by texting one another through the chat feature. The goal of building a social community through audio spaces can only be done through the ability and frequency of people to share their goal-setting journeys. This task is a complex task since the act of sharing recordings will be a less frequently used feature since it requires users to have friends who are using the app. However, for those who do share their recordings with their peers, we want to make that functionality as social and communal as possible.



Task flow walk-through of our complex task with images from our high-fi prototype.
This task flow depicts how users can share recordings with their friends starting from the My Audios tab.

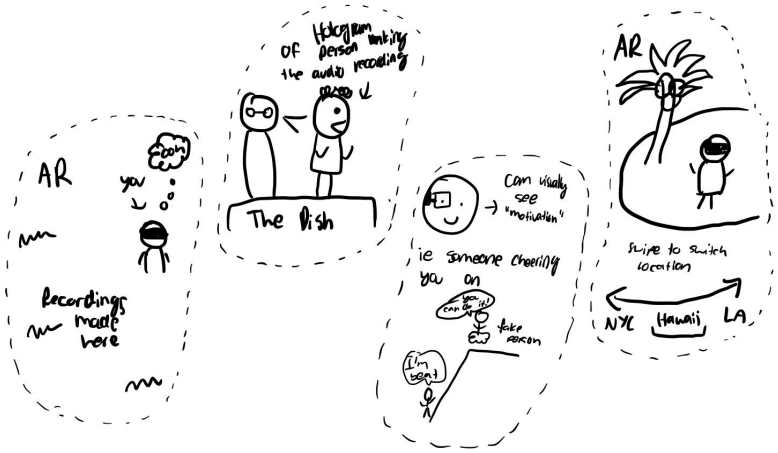


Alternatively, this task flow depicts how users can share audios starting from the Chat tab to individuals.

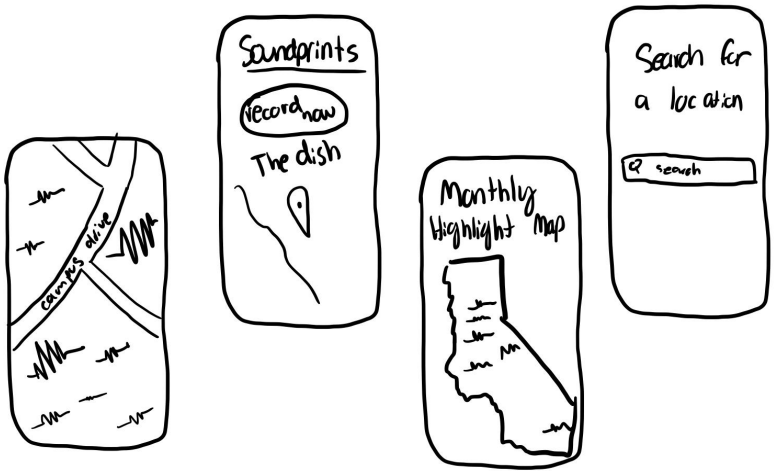
Sketches to Lo-Fi Prototype

We started our design by drawing numerous sketches inspired from our needfinding and other initial conversations.

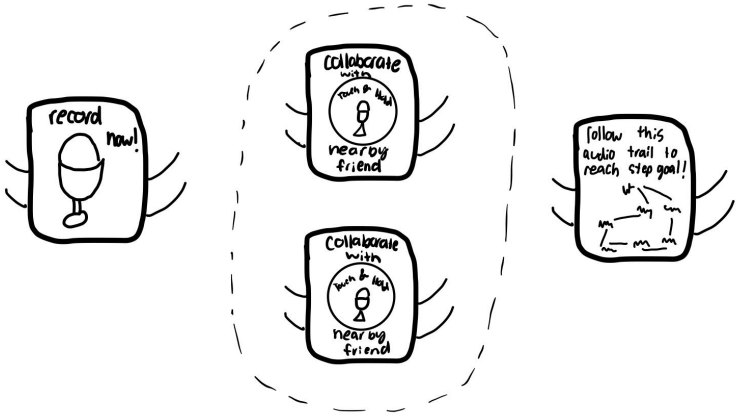
Below, we share some of the concept sketches we drew to inspire our app design.



Augmented and Virtual Reality based concept sketches

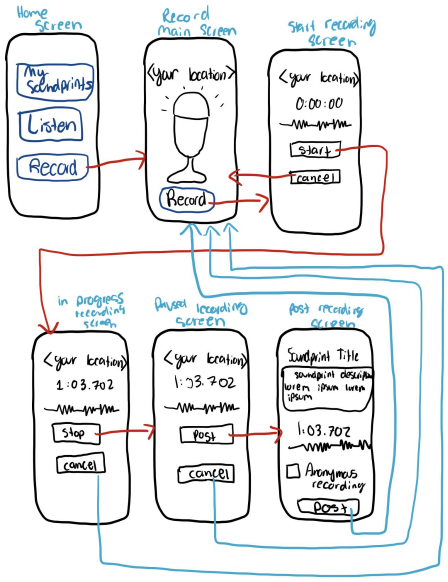


Map-based mobile interface concept sketches

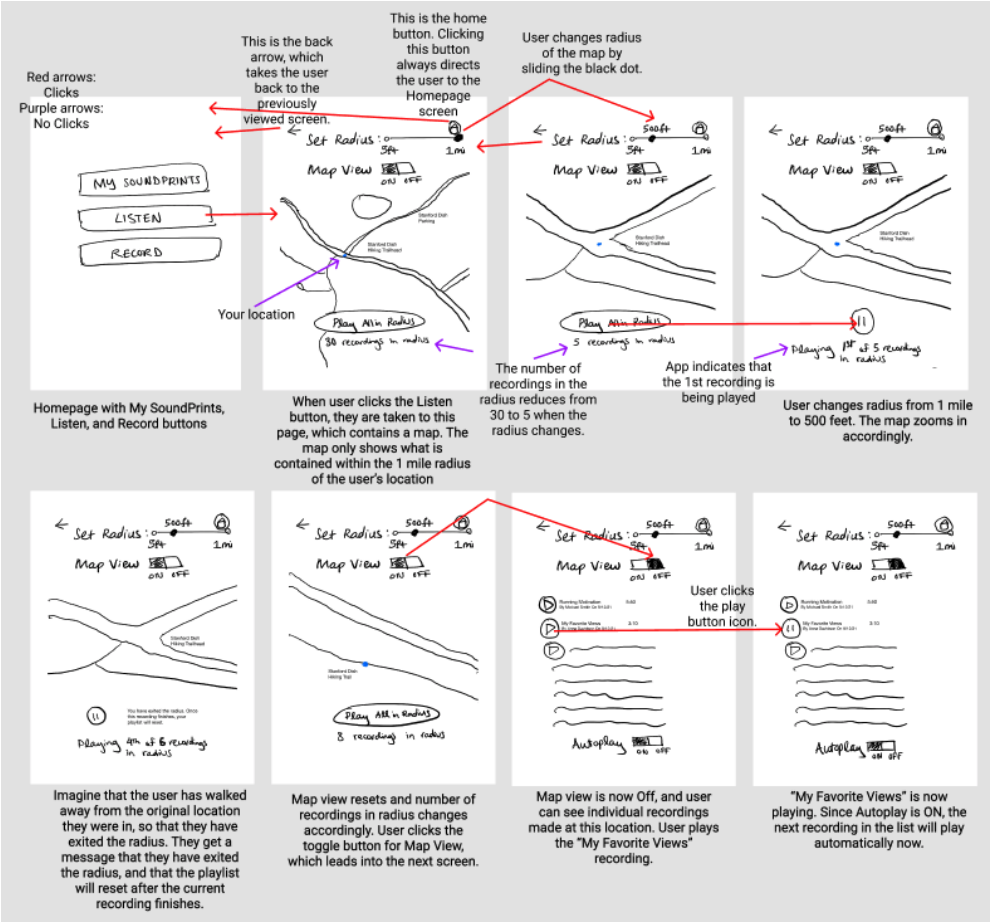


Wearable technology concept sketches

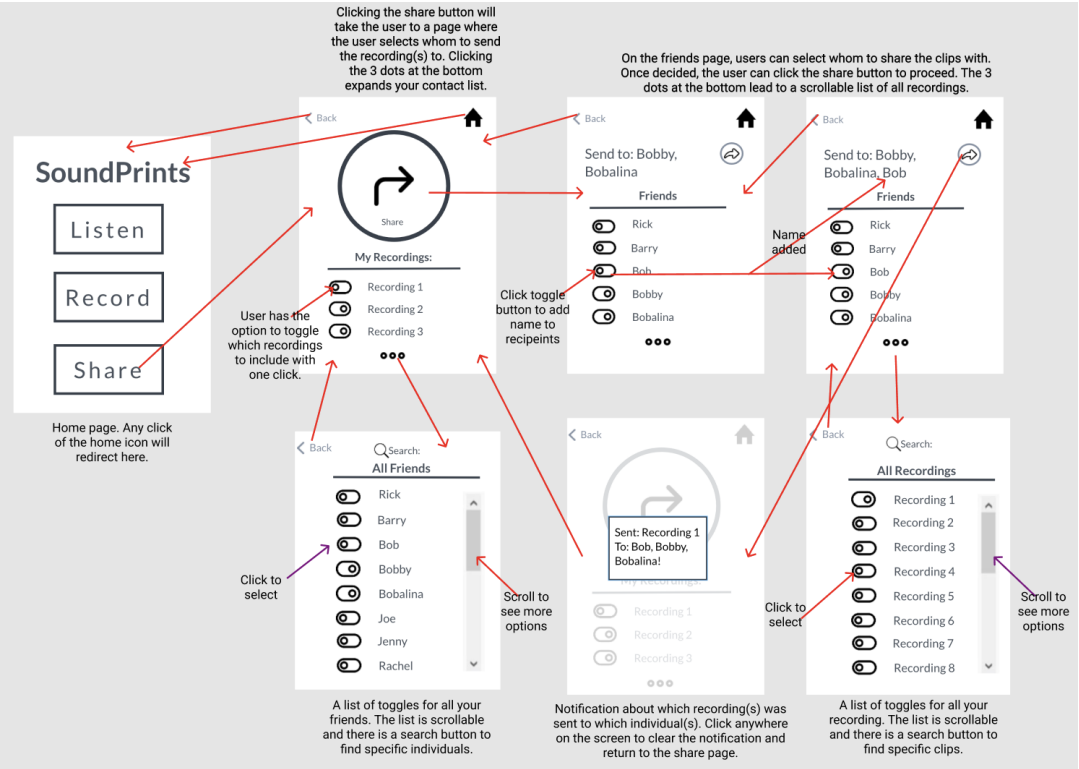
After creating our concept sketches, we created two storyboards based on a map-based mobile app design and an Augmented reality design. After weighing the pros and cons of the different possible designs, we chose to combine our three tasks into a single smooth-flowing lo-fi prototype inspired by the map-based mobile app design.



Record Lo-fi Task



Listen Lo-fi Task



Share Lo-fi Task

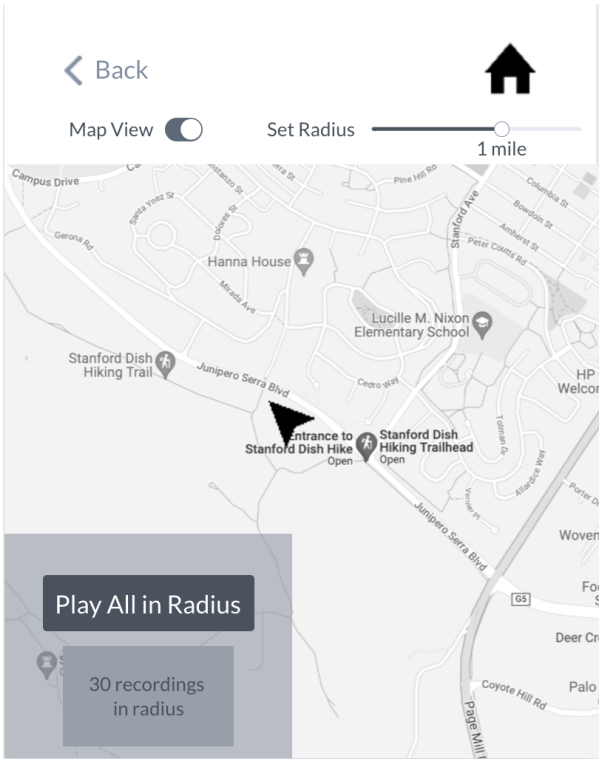
Major Design Changes (Lo-Fi to Med-Fi)

We sought out individuals in their 20s and 30s to test our lo-fi prototype, because we were trying to target young people who use their devices often. They gave us good feedback and hearing what they liked and disliked led us to make major changes to three different screens of our app in the med-fi prototype stage. One of our usability goals was how robust our app is, meaning there should be minimal error rates. The primary metric for this was seeing how often the user completes the task without going down the wrong path and the secondary metric was how often the user asks us questions due to confusion about what to do. Our other usability goal was how pleasing the interaction is, meaning that there should be high user satisfaction. The primary metric for this was noting moments during the prototype test when users appear to find an experience enjoyable or confusing and the secondary metric was feedback we receive from users in our follow up questions about how they found the overall experience to be, and what they liked, disliked, and found frustrating or confusing.

1. **The Map View**

We made drastic improvements to our listen task based on feedback from lo-fi prototype testing and interviews. We found that users struggle to play individual recordings of their choice in the map view, and that the map view was confusing in itself. We saw that not everyone who used our lo-fi prototype understood our intentions behind designing the map view as a toggle between views of the list of recordings and aerial view of the map. So, we removed the toggle and decided to implement a button

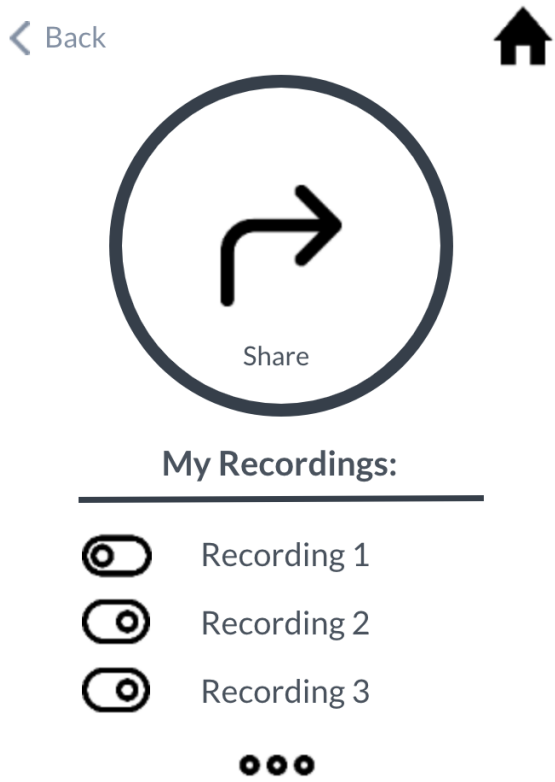
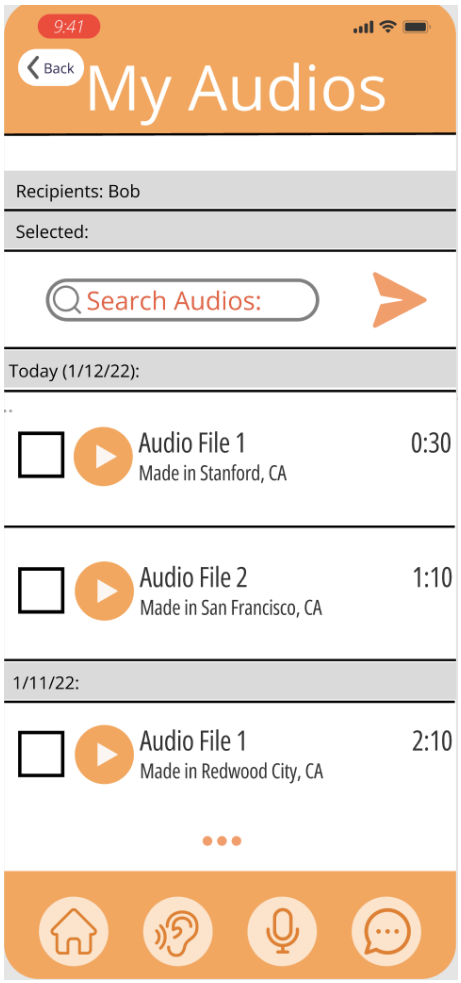
titled “View List of Recordings Made Here,” which allows users to see recordings in the area. This was much clearer for users to understand and we also were able to display both the list of recordings and aerial view of the map without any confusion. Making this change helped us to achieve our usability goal of making the app more robust by reducing confusion.

Before (Lo-fi)	After (Med-fi)
	

We made a new map interface within our listen task.

2. Interactions with the Interface

From our lo-fi prototype testing, we found that users struggle to use some of the buttons which we included. For one, we had feedback that people did not find our many toggle buttons intuitive, and that they were confused how to use them especially in our lo-fi prototype setting without color. While users liked some toggles such as the autoplay function, the abundance of toggles in the selecting friend view was overwhelming for some. In response to our user feedback, we decided to incorporate checkboxes instead because it allowed us to clearly see who was selected or not selected. Making this change helped us to achieve our usability goal of making the app more robust by reducing confusion.

Before (Lo-fi)	After (Med-fi)
	

We switched up the buttons we would use for our interface.

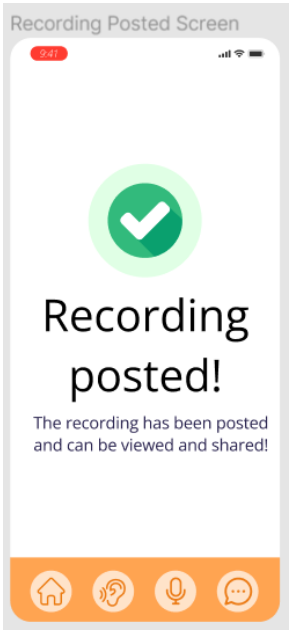
3. Navigation Bar

We made a big change that now appears on nearly all of our screens: the navigation bar. Previously, we had linked all our tasks and pages with a single back button or “Home” button. After seeing that users did not like this layout due to confusion about the home and back buttons’ placement, we integrated all homepage buttons as a bottom navigation bar in all frames so that they can be quickly accessed from any other screen. Low fidelity prototype testers suggested that a bottom navigation bar would increase efficiency and make user experience more enjoyable. Making this change helped us to achieve our usability goal of making the app more pleasant to use.

This is the navigation bar that we added onto each screen in our med-fi prototype.

4. **Record Confirmation Screen**

From our lo-fi prototype testing, we saw that users sometimes did not have a lot of clarity whether their recording was posted or not, as the confirm button simply looped the interface back to the home screen in our lo-fi prototype. In response to this feedback, we decided to make it clear whether a recording has gone through or not by adding a screen confirming the recording was posted, which allows for a graceful transition which makes the experience more pleasant. Additionally, for easy transitions backwards, we added a back button in all screens. Before, the back button was only present in some screens. Making the back button available on all screens prevents user confusion, and this addresses our usability goal of increasing robustness.

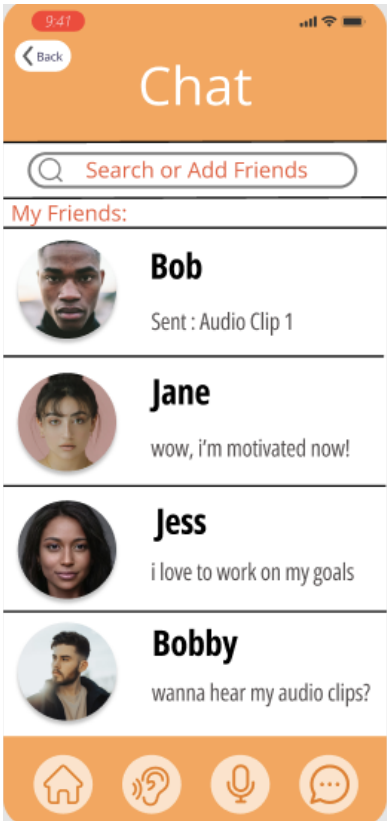


The Recording Posted screen we added onto our med-fi prototype.

5. **Sharing Recordings via Chat**

Our “Share” task went through significant changes from our lo-fi prototype to our med-fi prototype. In our lofi prototype, we had screens of toggles that could determine whom to send recordings to, but never any option to view what was sent. Although it was very straightforward, users mentioned that it felt extremely limiting and did not actually feel like they were “sharing” anything. In response to the feedback, we added a “Chat” feature with friends instead of only sharing recordings. Here, users are able to share audio, exchange text messages, and keep conversations they have with others. Our new interface is much more similar to modern texting apps. We decided that users could only add friends from their contacts list to

better promote inclusion and privacy. This change overall makes the user experience more pleasant overall and it helps the user feel more as part of the community.

Before (Lo-fi)	After (Med-fi)
	

We made a new chat interface to connect with friends in our med-fi prototype.

Major Design Changes (Med-Fi to High-Fi)

Our peers conducted a heuristic evaluation of our medium fidelity prototype. Based on this feedback, we made many updates to our design that we incorporated into our high fidelity prototype.

Our peers found a total of twenty-seven severity 3 and 4 violations in our medium fidelity prototype. We addressed violations with appropriate changes. Our peers also found 40 severity 1 and 2 violations that we addressed many of. Overall, the most violated heuristics in our med-fidelity prototype were H8: Minimalist Design, H4: Consistency and Standards, and H1: Visibility of Status.

Below, we detail the severity 3 and 4 violations that were found and the changes that we made in response.

Navigation Bar:

- H11: Accessible / Severity 3
    - Violation: The navigation buttons do not include any text, which makes the app inaccessible for visually impaired audiences as the cues are completely visual.
    - Fix: We included text on navigation buttons with the name of the screens they should direct to.
- H3: User Control & Freedom / Severity 4
    - Violation: Once users click on the "Record" screen, they cannot leave because the tab navigation does not work. They can only exit this page if they go through the entire process of recording something.
    - Fix: This was an accidental bug in our wiring of the med-fi prototype. In our high-fi prototype, the navigation bar icons are always clickable.
- H4: Consistency & Standards / Severity 4
    - Violation: After pressing stop while recording, the ear navigation icon changes to a microphone icon. Users may be unsure on whether the navigation button leads to the same screen or not after it changes
    - Fix: This was a bug in our med-fi prototype. In our high-fi prototype, all icons in the navigation bar are always in the same order.

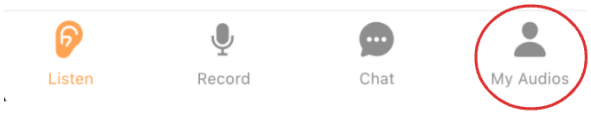
Before (Med-fi)	After (High-fi)
	

Note that each icon in our updated navigation bar has a text label underneath it.
Icons are always clickable.

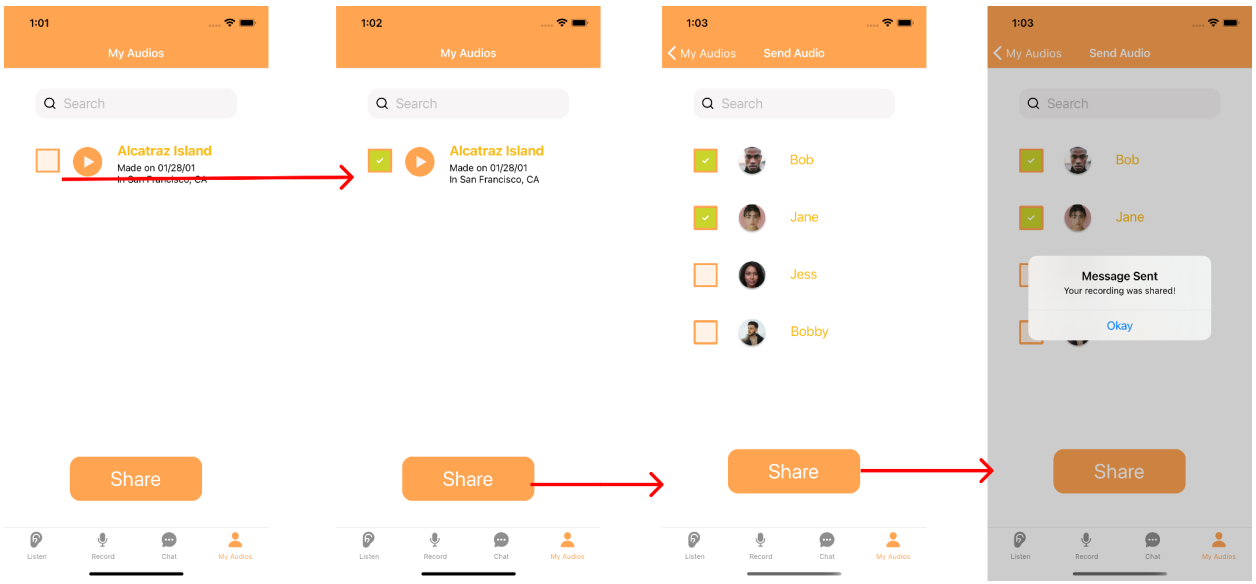
My Audios:

- H7: Flexibility & Efficiency of Use / Severity 4
    - Violation: Users can only see "My Audios" if they are in a chat with someone and choose to send them audio, which provides low flexibility. Users want easy access to be able to see "My Audios" even if they are not ready to send them to someone.
    - Fix 1: Add a "My Audios" page to the navigation bar to enable easy access.
    - Fix 2: Enable users to send audios to friends starting from the My Audios page *in addition to* sending audios starting from Chat page. This is consistent with existing chat apps like Messenger, Whatsapp, etc.
- H6: Recognition rather than recall / Severity 4

- Violation: Users cannot tell which recording they have posted or how many through any of the UI available in the prototype.
- Fix: This violation is not accurate, because in our med-fi prototype, the author of all non-anonymous recordings was already shown in the “Recordings Made Near Me” page. In addition, the My Audios page could be accessed in our med-fi prototype via Chat. However, we have made it more apparent which recording the user has posted by adding an icon in the navigation bar for recordings a user has posted. In the high-fi prototype, we also implement the functionality for a user’s recording to appear in the Recordings Made Near Me page and My Audios pages.

Before (Med-fi)	After (High-fi)
	

Note that in our updated navigation bar,
there is a new icon for “My Audios” and the home icon has been deleted.



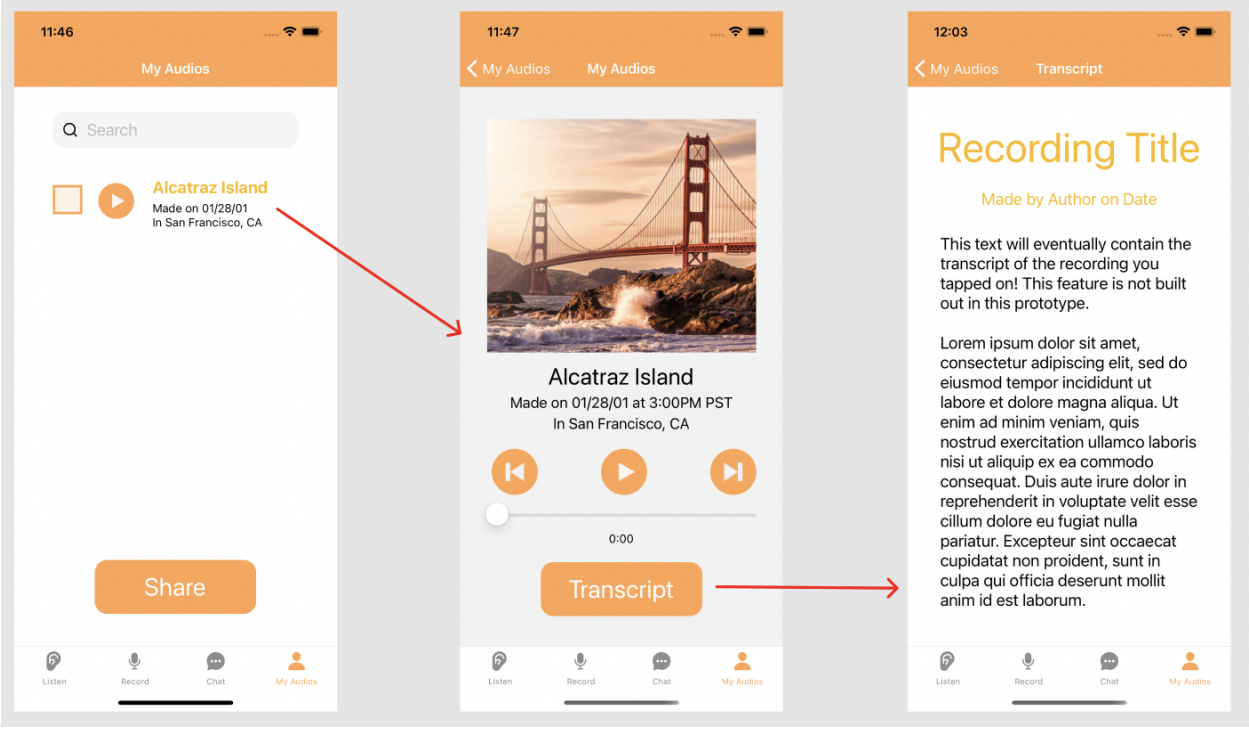
In our high-fi prototype, we added a second way to accomplish the task of sharing an audio with a friend starting from the My Audios tab in the navigation bar.

Recording Progress and Metadata:

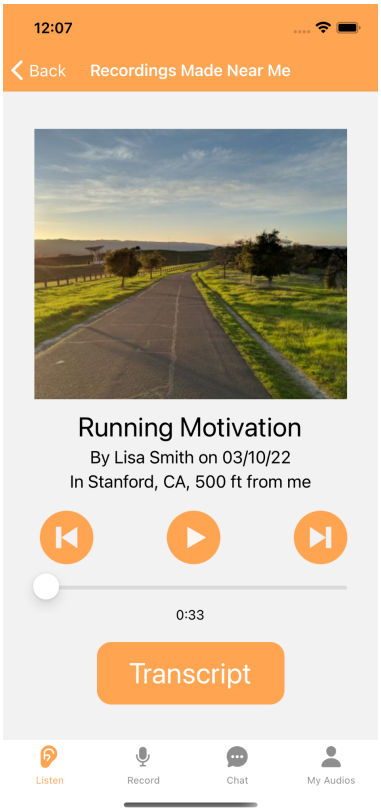
- H7: Flexibility & Efficiency of Use / Severity 3
  - Violation: On the “My Audios” page when sending Bob a message, the audio clips do not include details such as the time it was taken at and the specific location. If a user took

multiple recordings around the Stanford Dish and the Oval last afternoon, for example, it would be difficult for the user to distinguish what recordings were taken where and when if all they see is “Made in Stanford, CA” and the duration.
    - Fix: For all recordings in My Audios, when a recording is tapped on, the user can see additional metadata about the recording, including the time it was taken, the photo they uploaded while posting it, and a transcript. We do not include this information on the page with the list of “My Audios” recordings so as to not overwhelm the user. This design is consistent with other music streaming apps like Spotify and YouTube music.
- H1: Visibility of System Status / Severity 3
    - Violation: There is no progress bar while playing recording on “My Audios” and “Recordings Made Near Me” pages
    - Fix: When a user is playing a recording, they can see a progress bar for how far along they are in their recording.
- H11: Accessible / Severity 3
    - Violation: The app is inaccessible to audiences who have difficulty hearing, because they will not be able to listen to our recordings.
    - Fix: Include a transcript for all recordings. While we have not fully implemented this feature, we added a “Transcript” button for each recording, which takes the user to a page with a dummy transcript.

The below image displays how we made these fixes in the My Audios page. The Recordings Made Near Me page operates very similarly.



In our updated “My Audios” and “Recordings Made Near Me” pages, when a recording is tapped on, the user is taken to a page where they can see the recording’s progress, a photo taken by the user who posted the recording, and other metadata. There is a “Transcript” button that they can press to view the recording’s transcript. This design is consistent with streaming apps like Spotify and YouTube music.



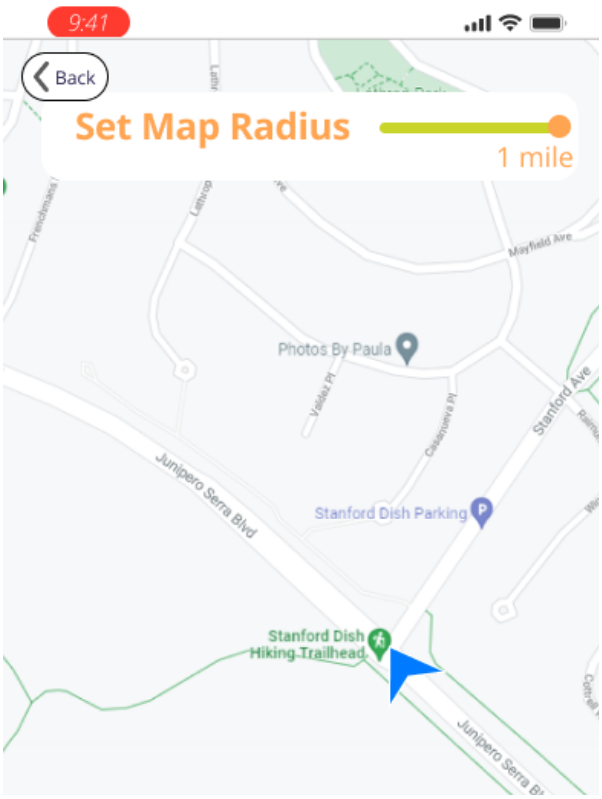
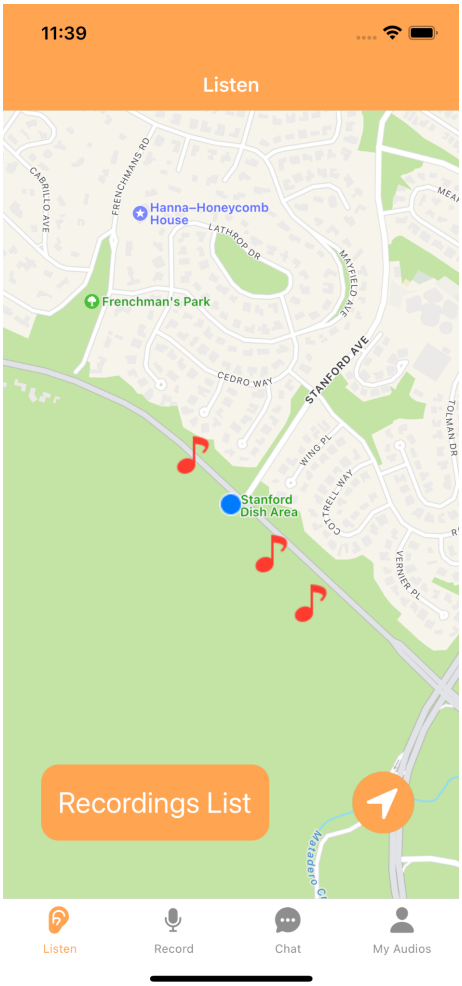
This is an example of a page for a recording in the “Recordings Made Near Me” list.
We display the recording’s author (Lisa Smith) and how far away from the user’s current location the recording was made (500 feet).

Map:

- H5: Error Prevention / Severity 4
    - Violation: The slider for setting the map radius is prone to user error. For instance, the user may want to set the radius to 0.5 miles when they would not be able to do so easily using a slider.
    - Fix: Remove the slider and instead allow users to pinch and drag to zoom in and out on the map. Allow users to pan around the map by dragging the map. Add a button that the user can press to re-center the map around the user’s current location. This design is much cleaner and more consistent with map-based apps on phones, such as Google Maps and Apple Maps.
- H12: Fairness and Inclusion / Severity 3
    - Violation: Apps that rely on users and locations are more likely to be used around populated, public areas. The “Set Area Radius” slider bar has a maximum radius of 1 mile

(i.e. the users can only listen to recordings made at most within a mile of their current location). This is not inclusive towards people who live in rural or less-populated areas.

- Fix: Users can pinch and drag to zoom the map in and out as much as they want to. We assume that users can adjust some settings to specify the radius in which they want to be able to listen to recordings in, so that users would not be listening to irrelevant recordings. This settings page is not built in our high-fi prototype. We assume in our high-fi prototype that the radius is set to 1 mile.

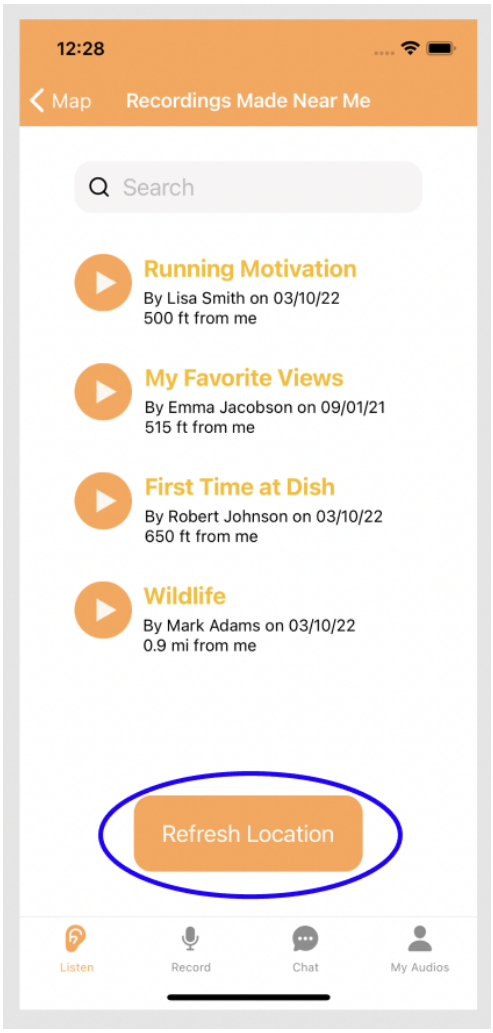
Before (Med-fi)	After (High-fi)
	

There is no slider bar in our high-fi prototype, because we instead enable the user to pinch and drag the map to zoom in and out. The re-center button is to the right of the “Recordings List” button.

User’s playlist resetting:

- H7: Flexibility and Efficiency of Use / Severity 4
  - Violation: The playlist resetting when the user is outside of the original radius is way too

punishing for users that may want to continue listening to the original playlist.
    - Fix: As the user's current location updates, the map view will also update to be centered around their current location. The user can still listen to any recording made within the radius that they specified in their settings, which they can update at any time. We have not built out a settings page in our high-fi prototype. The playlist shown on the "Recordings Made Near Me" page will remain constant regardless of the user's current location, unless the user presses the "Refresh Location" button, or the user goes back to the Map View and then back to the "Recordings Made Near Me" page again after moving. In our prototype, we have hard-coded the user's current location, so we have not fully built out these features, but we have displayed the "Refresh Location" button.
- H11: Accessible / Severity 3
    - Violation: When "Play All in Radius" is clicked and the audio has "finished" playing, the red text that pops up on the screen is only there for a brief moment. It does not appear for enough time for the user to read and comprehend it.
    - Fix: This message in red text told the user that their playlist would reset, assuming they had been moving and their current location had changed. We removed this message altogether, as it is no longer needed after the design changes that we explain in the previous fix.

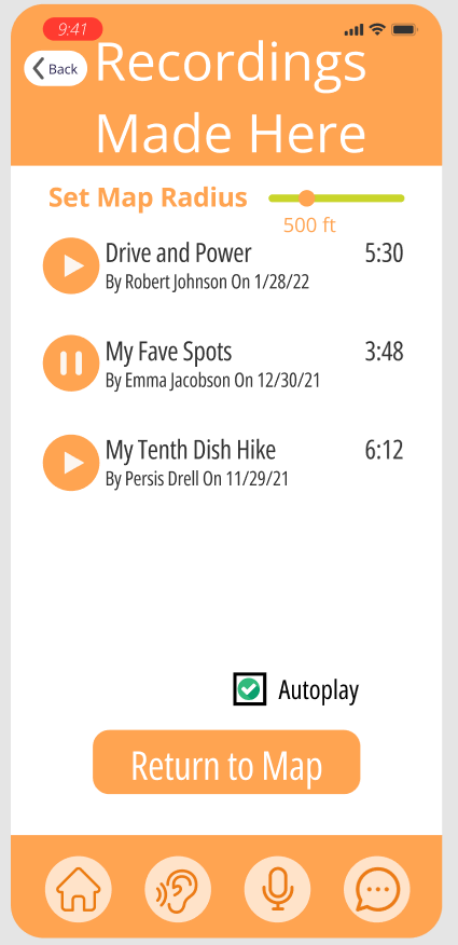
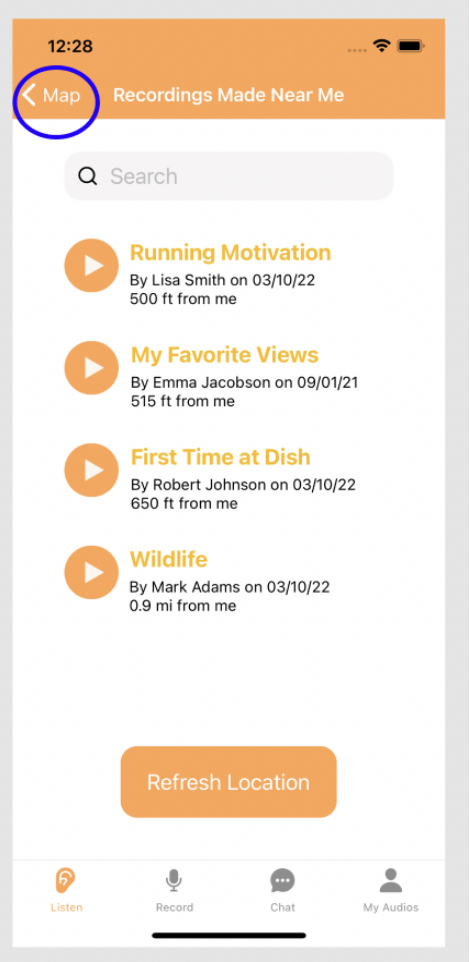
Before (Med-fi)	After (High-fi)
	

In our med-fi prototype, the users get a message in red text when they "exit the radius" due to moving. In our high-fi prototype, we remove this message altogether from the map view and add the "Refresh Location" button in the "Recordings Made Near Me" page.

"Recordings Made Near Me" page:

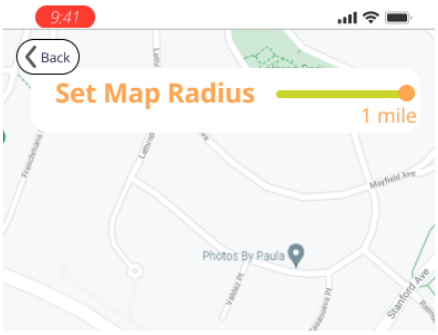
- H8: Aesthetic and Minimalist Design / Severity 3
    - Violation: Having the Set Area Radius slider bar on both the map and "Recordings Made Near Me" page (which was previously named "Recordings Made Here") is repetitive and confusing.
    - Fix: Remove the slider bar on the "Recordings Made Near Me" page.
- H7: Flexibility and Efficiency of Use / Severity 4

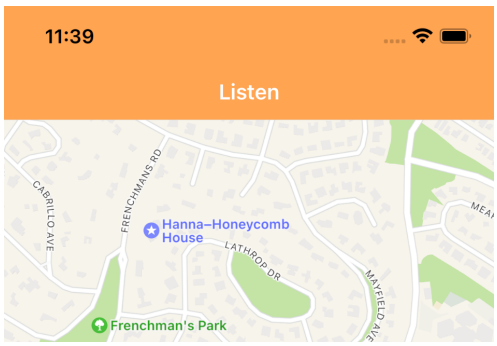
- Violation: The Back button on “Recordings Made Near Me” takes users back to the map, and the back button on the Map page takes users back to “Recordings Made Near Me.” This is confusing to users, as it is not clear to them that the back button takes them back and forth between these two pages. It is also repetitive as we have other buttons that already accomplish this function.
- Fix 1: Remove the “Return to Map” button and instead label what was previously the Back button as “Map.”
- Fix 2: Remove the Back button on the Map page, as we already have the Recordings List button that accomplishes the same thing.

Before (Med-fi)	After (High-fi)
	

In our high-fi prototype, this page has no Set Map Radius slider bar and no Return to Map button. The Back button has been renamed to Map to better communicate its purpose.

Before (Med-fi)	After (High-fi)

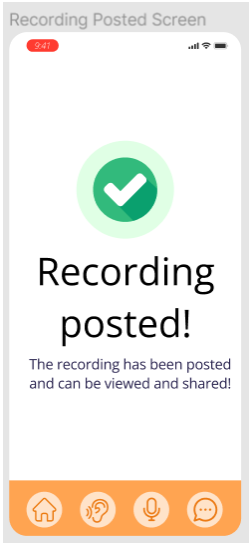
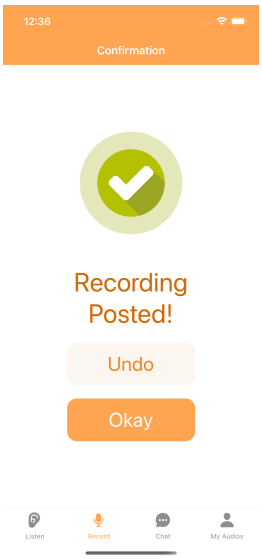




In our high-fi prototype, the back button is removed from the Map page, as this is repetitive and confusing since we already have the Recordings List button.

Post Recording:

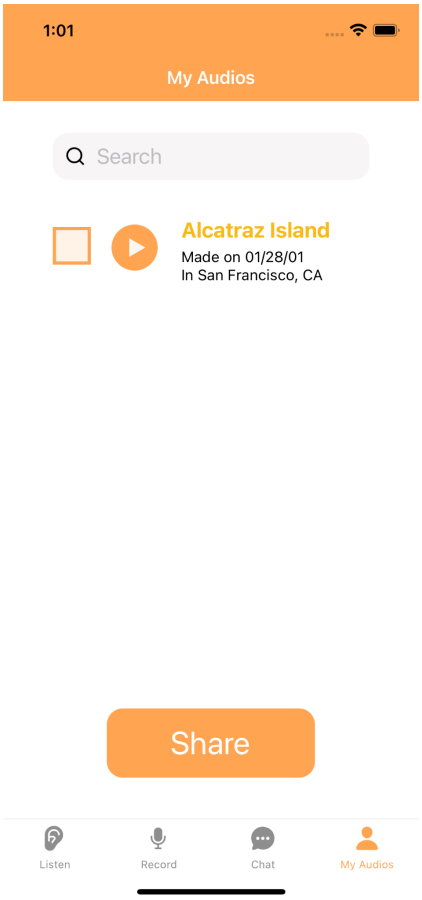
- H5: Error Prevention / Severity 4
    - Violation: Posting a recording is an action that cannot be undone if the user accidentally posts a recording they did not mean to post.
    - Fix: Add an "Undo" button that appears after the user has posted their recording that enables them to undo this action.

Before (Med-fi)	After (High-fi)
	

In our high fidelity prototype, users can tap the "Undo" button if they accidentally posted a recording and would like to undo this.

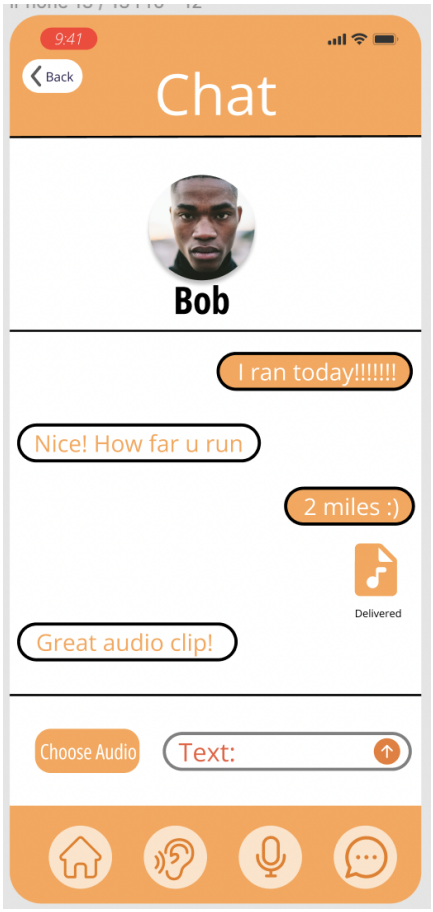
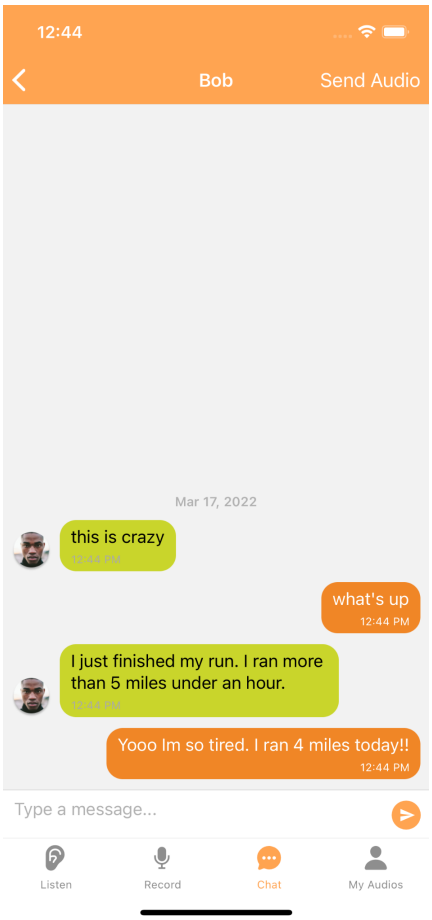
Sharing Audio:

- H4: Consistency & Standards / Severity 4
    - Violation: Inside “My Audios” there is a plus button. Users would expect this to be a place to add another audio, given the screen title, but instead it takes you to a page called “Friends”. This is inconsistent with what users are accustomed to.
    - Fix: Replace the “plus” button with a “Share” button, to communicate the button’s purpose more clearly.
- H1: Visibility of System Status / Severity 4
    - Violation: A cluttered UI creates confusion on purpose of the search bar on the My Audios page.
    - Fix 1: Simplify the UI of the My Audios page by making the process of selecting Friends be on a separate page, which occurs after the Share button has been pressed. Remove the “Recipients” field along with the “Plus” button from the My Audios page.

Before (Med-fi)	After (High-fi)
	

Instead of having a recipients field along with a “Plus” button, on our updated My Audios page we have a “Share” button which directs the user to select recipients of the audio.

- H11: Accessible / Severity 3
    - Violation: On Bob's chat page where you individually message Bob, the light orange text against the white background is very difficult to read.
    - Fix: We used different colors for the text and its background for greater readability.

Before (Med-fi)	After (High-fi)
	

In our updated Chat, the color of the text and its background for both sent and received messages are more easily readable.

Button Functionality:

There were three heuristic violations due to the fact that not all buttons were functioning on all frames when they should have been. These violations were the following:

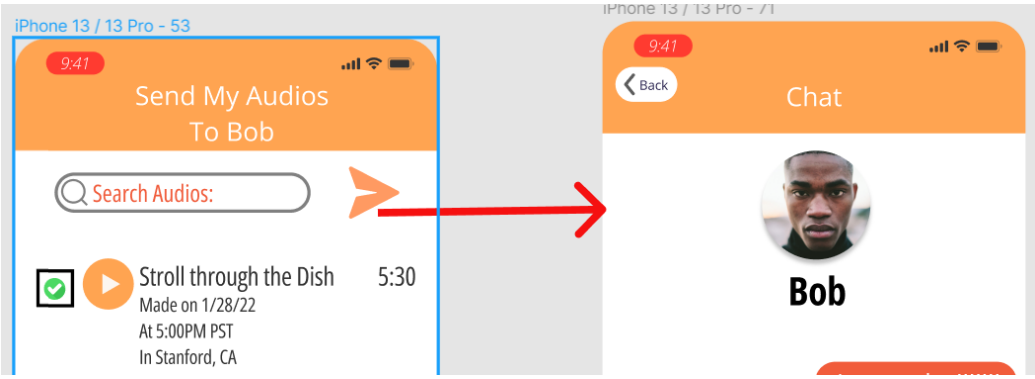
- H3: User Control & Freedom / Severity 4
    - Violation: Users are unable to pause the recording once it starts playing.
- H7: Flexibility & Efficiency of Use / Severity 3

    - Violation: User cannot click on “View List of Recordings Made Here” until after the user has played all recordings in radius.
- H3: User Control and Freedom / Severity 3
    - Violation: For “My Audios,” users cannot un-select an audio file once they have selected it. Users may change their minds and not want those files anymore.

All these violations have a common fix. In the high-fi prototype, we made all buttons referenced in above – pause/play, checkboxes, and “Recordings List” – fully functional and clickable at all times. In general, for any buttons that are not functional in our high-fi prototype, we include an alert in the prototype explaining that those features are yet to be built out. We had already planned to implement this fix for our high-fi prototype, since we did not have the capacity to make all buttons functional at all times in Figma.

Violations that we did not fix (share audio):

- H4: Consistency & Standards / Severity 3
    - Violation: After you click the send button to send an audio file to Bob, it takes you to a confirmation “Sent” page instead of the specific chat page with Bob. If you click the screen again to get rid of the confirmation page, you are taken to the main chat page with every person you’ve chatted with. This does not maintain consistency with other chat platforms that the user may be used to.
    - Fix: After a file is sent to a specific user, the next screen should be the chat with that specific user, showing that the file was sent in the message box. Although we designed the task flow for this fix, we did not have the chance to implement it in our final prototype. We felt that the other issues were of greater importance to implement, and this was a difficult fix to implement given that we have two flows to share audios (one starting from Chat, and another starting from My Audios).



This is how we would redesign our sharing audios mechanism that begins from the Chat screen if we had time to implement it.

Violations that we did not fix (make recording):

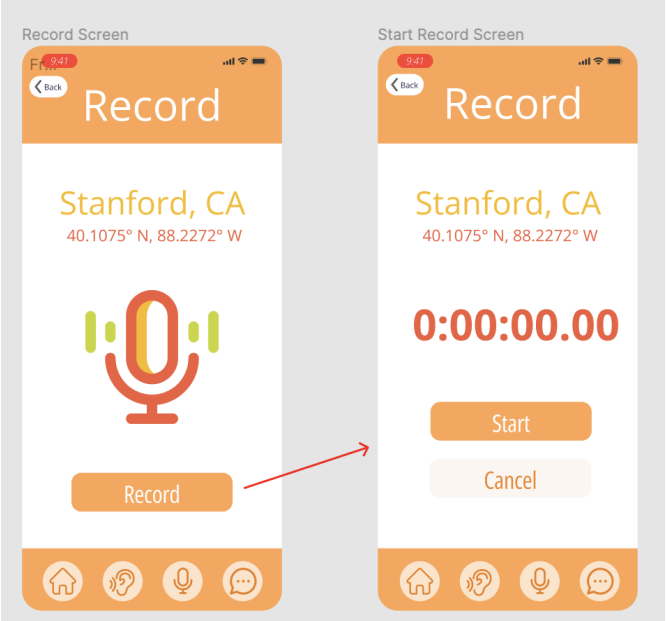
- H12: Fairness and Inclusion / Severity 3
    - Violation: The color scheme of the main icon on the first “Record” frame is red, orange, and green, which may result in confusion for an individual with red-green color

blindness.

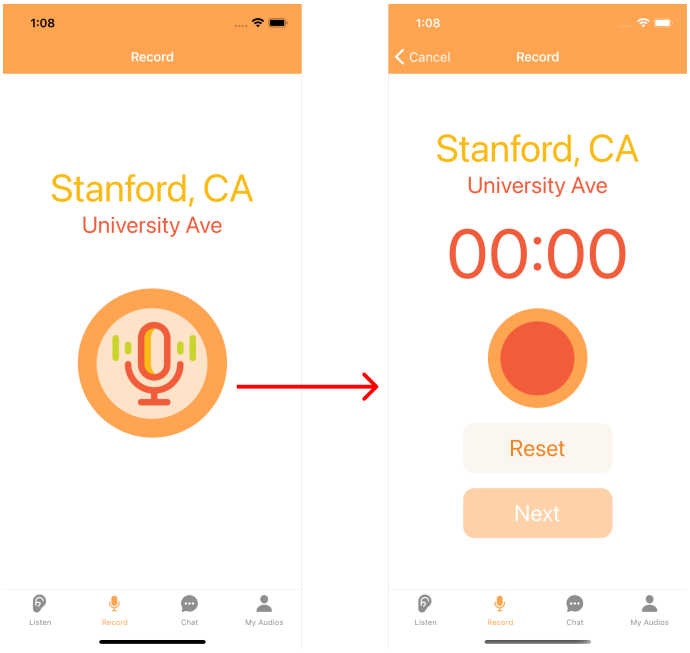
    - Not fixing: We converted this frame to grayscale to test how it would appear to a user with red-green color blindness. We felt that there was no confusion caused by our use of red and green, so we decided not to fix this violation.

- H8: Aesthetic and Minimalist Design / Severity 3
    - Violation: If a user wants to make a recording, they have to hit the “Record” button and then the “Start” button, which feels like too many steps.
    - Not fixing: Apple Voice Memos, a popular existing recording app, does not immediately take you to the recording screen. We felt that our current interface is more inviting despite the extra step required. However, we did remove the record button and make the icon clickable instead to reduce potential confusion.

This is how the red, green, and orange icon on the first “Record” frame screen looks in greyscale, despite containing both red and green. We decided not to make any changes to our color scheme.



In our med-fi prototype, users have to tap “Record” and then tap “Start” to actually start recording.



In our high-fi prototype, users tap the button
and then are taken to the screen where they can make their recording.

Violations that we did not fix (help and documentation):

- H10: Help and Documentation / Severity 4
    - Violation: The “How to Use” section does not include any of the three tasks, or a clear indication of what the tasks might be based on the description of the functionalities of the different screens.
    - Not Fixing: We decided to prioritize design changes over changes to the med-fi README.
- H10: Help and Documentation / Severity 4
    - Violation: Users cannot click on “View List of Recordings Made Here” until after they have played all recordings in the radius. This is not documented in our med-fi README.
    - Not Fixing: We decided to prioritize design changes over changes to the med-fi README.
- H10: Help and Documentation / Severity 4
    - Violation: There are no help resources, links to private policies, or FAQs. Some users would definitely want an easy-to-find link to a private policy, for example, if their voices are being shared online to strangers.
    - Not Fixing: Help resources, privacy policies, and FAQs are not part of our tasks. This is important to fix for something being pushed to an app store, not a prototype.

Additional Design Changes

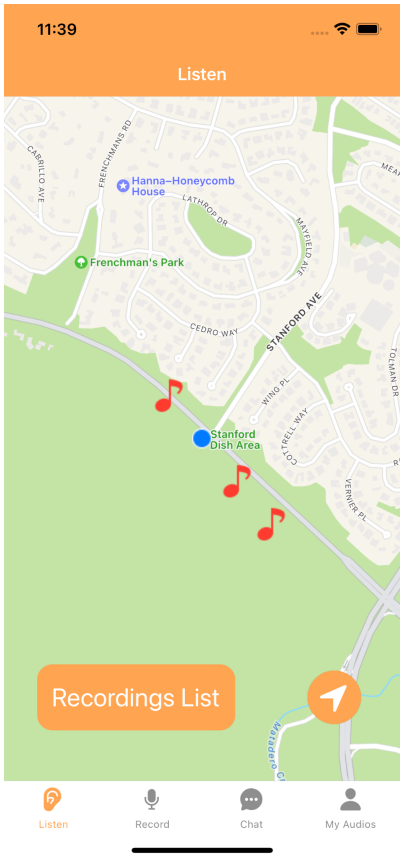
We also made several design changes based on severity 1 and 2 heuristic violations, as well as feedback we received from our classmates and our CA. Below are the key changes that we made.

Key changes we made based on severity 1 and 2 heuristic violations are the following:

1. We reduced the wordiness of the "View List of Recordings Made Here" button to "Recordings List" to enhance the visual appeal of our Listen page.
2. We removed the home icon from the navigation bar because the homepage felt repetitive and was not adding any value to users.
3. In our med-fi prototype, users could enter Descriptions of their recordings while making a post, but there was no place to view the description. We replaced the Description field with an "Attach Photo" field, as this is more consistent with other streaming platforms. In our high-fi prototype, when users play a recording, they can now see the recording's associated photo and transcript. We felt that with a photo and transcript, the Description field was no longer necessary.
4. Many of our buttons, headers, and other components were off-center or shifted location across frames. We fixed these alignment issues in our high-fi prototype.
5. We addressed some concerns about inconsistent visual design in our app. Our usage of fonts seemed inconsistent across frames. We removed the Condensed font style from our high-fi prototype altogether, as it was not serving any purpose and creating a more inconsistent look and feel for our app. We also simplified our Back buttons, not including any black borders around them, so that they were more consistent with our app's design.

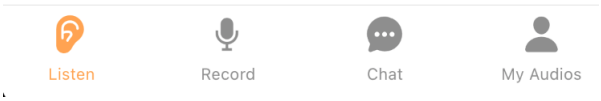
Key changes we made based on feedback from our CA and classmates are the following:

1. We reduced the size of each of the headers as well as the font size of their corresponding text, so that they were not the first read. Instead the user's eye is more likely to be directed towards the more important aspects of each page.
2. We added music notes to the map page, so that we have a visual indicator of where recordings are made, and thus can create a more immersive experience with greater flexibility. Each music note corresponds to a recording made by a user of the app, and the location of the music note on the map is the location at which the recording was made. When the user clicks on a music note, they can listen to the corresponding recording.

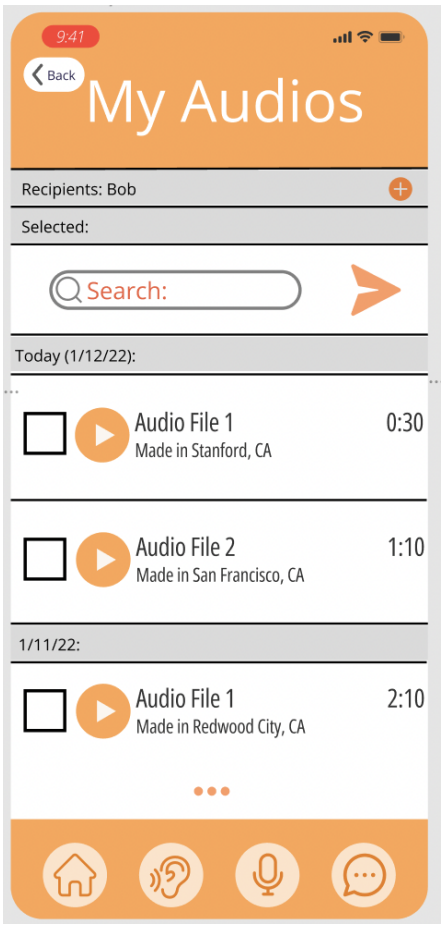
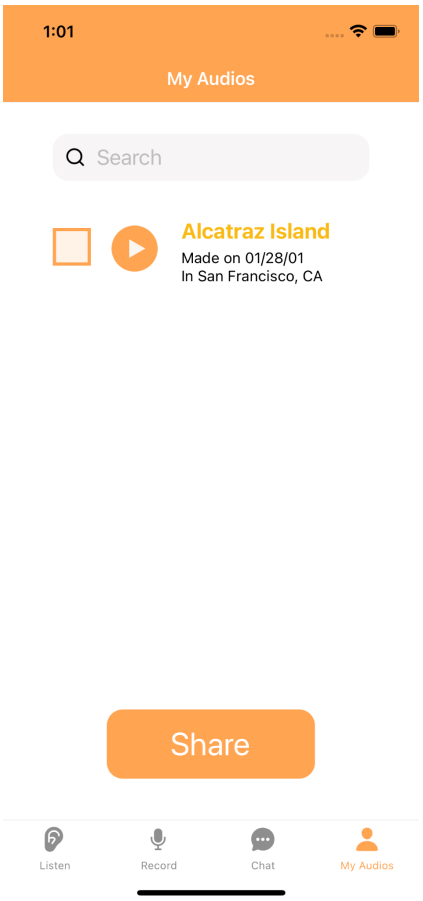
Before (Med-fi)	After (High-fi)
	

Note that we have added music notes onto the map that are clickable.

3. We changed the color scheme of the navigation bar to make it visually apparent which page the user is currently on. In the image below, the user is currently on the listen page, so that icon is orange while the others are grayed out.



4. We removed the black borders from the My Audios page to better utilize Gestalt's principles of using proximity to group items. We instead made the layout of this page look more similar to the "Recordings Made Near You" page. Now, the page looks much more aesthetically pleasing.

Before (Med-fi)	After (High-fi)
	

Several aesthetic changes were made to the "My Audios" page to better utilize Gestalt's principles.

6. We changed the thick black borders on the Chat page to light gray borders for a more aesthetically pleasing look. In general, we removed all black borders from the interface for a cleaner look, except where we felt they were necessary.

Values in Design

The values we encoded into our app are inclusion, giving and receiving motivation, and privacy.

The first value is inclusion which means ensuring all users feel connected, safe, and included in the SoundPrints community. We enable users to feel connected by making it so that users can listen to the recordings left by others, users can leave their own audio recordings that will inspire others, and users can chat with and share their audio recordings with their friends. All of these three tasks involve engaging

with and developing community. When users listen to recordings made by others, they can gain motivation and feel connected to others who have similar goals as them, even if they are strangers. When users post their own audio recordings, those recordings can later be listened to by others for inspiration. Finally, when users chat with and share their recordings with their friends, they can develop a deeper connection with their friends and gain validation and support from them. We help users feel safe by only allowing users to chat with users who are in their contacts (like Whatsapp) to avoid potentially uncomfortable contact with strangers.

The second value is giving and receiving motivation which means enabling users to motivate one another to achieve their goals. We encoded this into our app by allowing users to listen to motivational audio recordings left by others near the location they are in. This creates an immersive experience for users to listen to motivation recordings related to the activities they are engaging in. Additionally, we allow users to make their own recordings to inspire the next person who visits that location. Finally, we allow users to share their recordings and chat with their friends on the app, providing personalized support, accountability, and validation.

The third value is privacy which means enabling users to have privacy while still enjoying the benefits of the app. We encoded this into our app by allowing users to post their recordings anonymously in case they want to preserve their privacy while still enjoying the recording feature and allowing users to only chat with users who are in their contacts (like Whatsapp) to better protect their privacy from strangers.

One potential way our values could conflict is between inclusion and giving/receiving motivation. Since we allow users to share their recordings in a public database to help users feel connected and create greater inclusion, users can abuse this function by leaving hateful or psychologically damaging recordings. This is contradictory to the value of giving/receiving motivation since the words can be abusive and demotivating. We can resolve this conflict by enabling a report function which allows users to report psychologically damaging recordings, have a moderator team which monitors recordings for abuse, and run an AI-based hate speech detector on each recording posted in the app. We were unable to implement these features in our prototype due to time constraints. We believe that with sufficient time, we can certainly implement these features to resolve this conflict. However, these features are still challenging to maintain. Ultimately, they require a human moderator, so if this app were pushed to the app store, we would need to dedicate the time to manage the reported recordings or monitor the posted recordings.

Final Prototype Implementation

Our high-fidelity prototype was built with React Native and Expo, and Apple's Xcode Simulator was used to test the app. React Native was incredibly helpful. Since React Native allows developers to create mobile apps using website technology, developers who are already proficient in web development can easily develop a mobile app using React Native. Also, it allowed us to build cross-platform apps that look and feel entirely Native since it uses JavaScript components that are both built on iOS and Android

components. It saved us a lot of time, since we did not have to create the same app for multiple platforms. The downside of React Native is that since React Native is built using Javascript, this makes debugging bugs more difficult because it requires basic knowledge of the native language of the platform. Additionally, React Native has inferior native support for Android. Expo was also very helpful. Expo is easy to use, provides immediate results, and everything we needed to know is covered by Expo documentation. Additionally, it allowed us to test directly on our mobile devices. The few limitations include the fact that native modules are not supported and the app size is quite large because Expo is including all libraries in the App. The third tool, Xcode Simulator, was extremely useful. Xcode made the deployment to the simulator much faster than to a real device. Being able to see changes on a local emulator meant it was easy to see how even single lines of code affected our interface, and helped us catch any coding errors early on. Additionally, it allowed us to experiment with different screen resolutions which would not be possible if we were limited to physical devices. The downsides are very few to none. One downside is that, of course, a real device is much more accurate than a simulator since there are situations where the simulator behaves differently than the real device. Also, all hardware functions like the camera and bluetooth are available on real devices which are not available on Xcode.

During the development process, we needed to hard-code some aspects of the app in order to create a fully immersive experience.
1. The text messages are hardcoded to show example use cases of the chat. Users can add new chat messages though, as the chat feature is functional.
2. The recordings shown on the map and on the “Recordings Made Near Me” page are hardcoded in advance.
3. The transcript button leads to a page with a placeholder for the eventual recording transcript.
4. The user’s current location is hard coded because our hard-coded recordings are placed around the Stanford Dish area.

The design integrates the Wizard of Oz technique by simulating the functionality of the real application. Currently the map is hardcoded to represent a user at the Stanford Dish so that users can simulate listening to recordings made near them. The user needs to imagine they are at the Dish while using the prototype. Since we needed to hardcode the recordings shown on the map, we also needed to hardcode the user’s location, so that the user would “be near” our hard-coded recordings.

Summary and Next Steps

Many people want to go out there and achieve their goals, but the journey to attain that goal is often hard and lonely. SoundPrints allows them to feel capable of being able to connect with other like-minded individuals and achieve their goals. Throughout this class, we designed, prototyped, and evaluated SoundPrints and were able to create something special. We received amazing feedback along the way from interviews, sections, as well as heuristic evaluations.

If we had more time, we would have:
1. Enabled functionality to add new friends and new chat channels.
2. Added recordings on the map outside of the Stanford Dish area.

3. Created a demonstration of the user moving so that we could also demonstrate having the recording appear on the map after it is posted and the use of the “Refresh Location” button. We did not implement this feature because we thought it would be confusing for a music note to cover the user’s current location (which is hardcoded).
4. Allowed recordings to be shared through chat messages using the Send Audio button.
5. Added a help page, including privacy policies and FAQs, if we wanted to push our app to the app store.

Some of our key learnings from this quarter were the following:

1. To effectively engage with the design thinking process, we have to repeatedly go broad in our thinking and focus in. For example, after our needfinding, we began with a broad generation of How Might Wes, then selected our top three, then broadly brainstormed solutions, and finally focused on only a few solutions to experience prototype. Once we narrowed in on a solution, we used the Crazy 8 technique to generate a variety of ideas for the interface of our chosen solution.
2. We learned about the importance of engaging with users and gathering feedback at each stage of the design process. From needfinding to lo-fidelity prototype testing to heuristic evaluations, the feedback we received at each stage of the process helped us make key decisions and improvements to our solution.
3. From our studio theme, Caring From Within, we learned that, after the pandemic, a new trend has emerged towards simplicity and accessibility. For example, senior citizens are a group that has often not been accommodated by modern design. We were encouraged by our classmates to make SoundPrints more accessible, for example by adding a transcript to each recording.
4. People often lack the community they need to motivate them to achieve their goals, and they can be more successful at achieving their goals if they are provided enjoyable ways to easily connect with others and celebrate their successes.

Overall, we learned a great deal about the design thinking process, our studio theme, and our project. We look forward to continuing exploring design thinking in future classes at Stanford!