



ALTiO

Emily H, Po-Ting L., Jared P., Frankie S.

Assignment 5

Low-fi Prototyping & Pilot Usability Testing

CS 147 Accessible Design Studio

01. Introduction

1A. Value Proposition

Reimagining Audio For Everyone

1B. Mission Statement

Our goal is to make digital audio more accessible to the Deaf and hard of hearing communities.

1C. Problem/Solution Overview

Deaf and hard of hearing individuals often miss the nuanced information and emotion presented by audio, and feel left out of spaces where they are unable to have the same experience as their hearing peers.

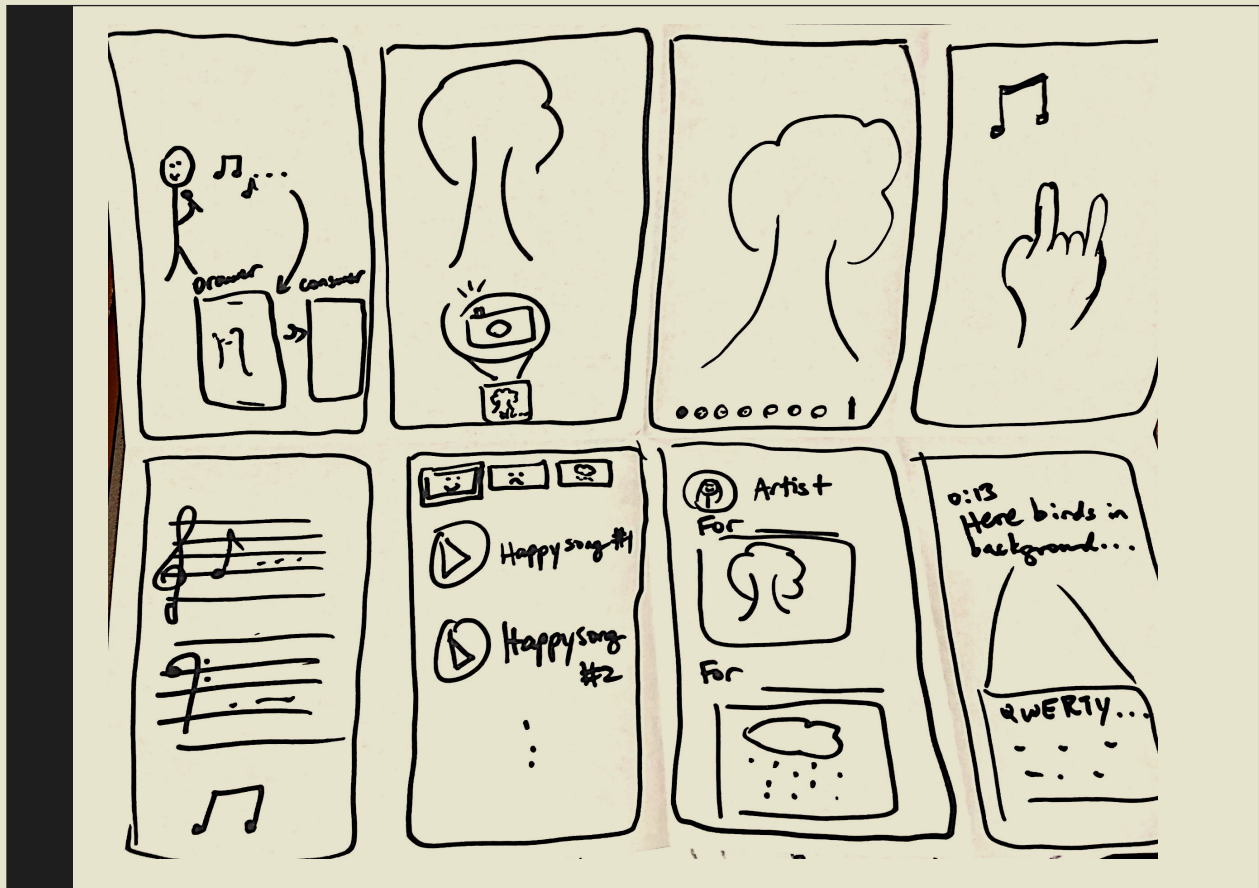
ALTiO requires users to supplement posts with drawings and artwork that conveys these more nuanced ideas in a visual way. Users can explore various “ALTiOs” by artist or genre to discover and engage with different visual content.

02. Sketches

2A. Concept Sketches

Note: all captions are read from left-to-right, beginning with the first row.

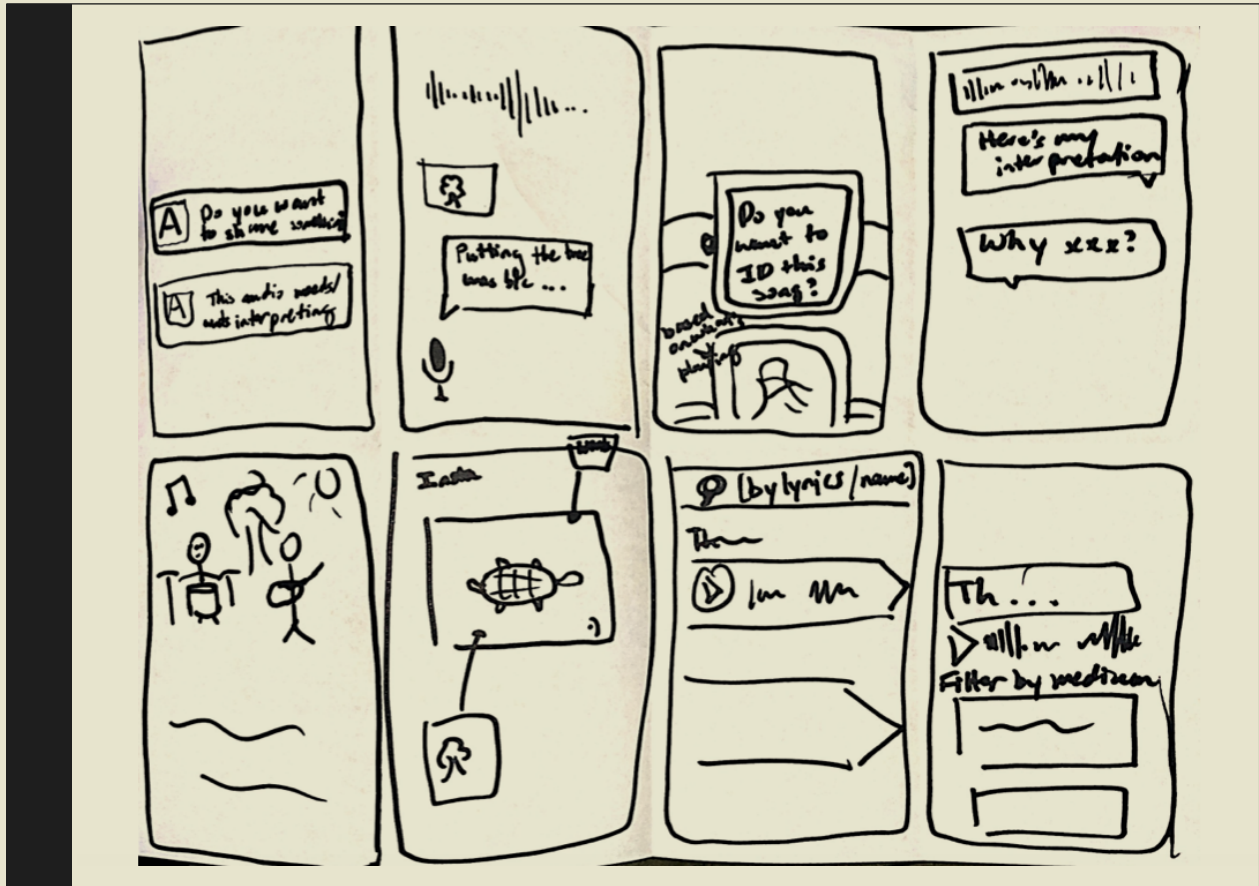
FIG. 1: CONCEPT SKETCH A



Real time audio interpretation - someone draws, someone consumes; taking a picture reminding you of an audio; drawing interpretation; sign language interpretation; music transcription interpretation; organizing audio by mood; sending personalized interpretations; real time description of background

02. Sketches cont.

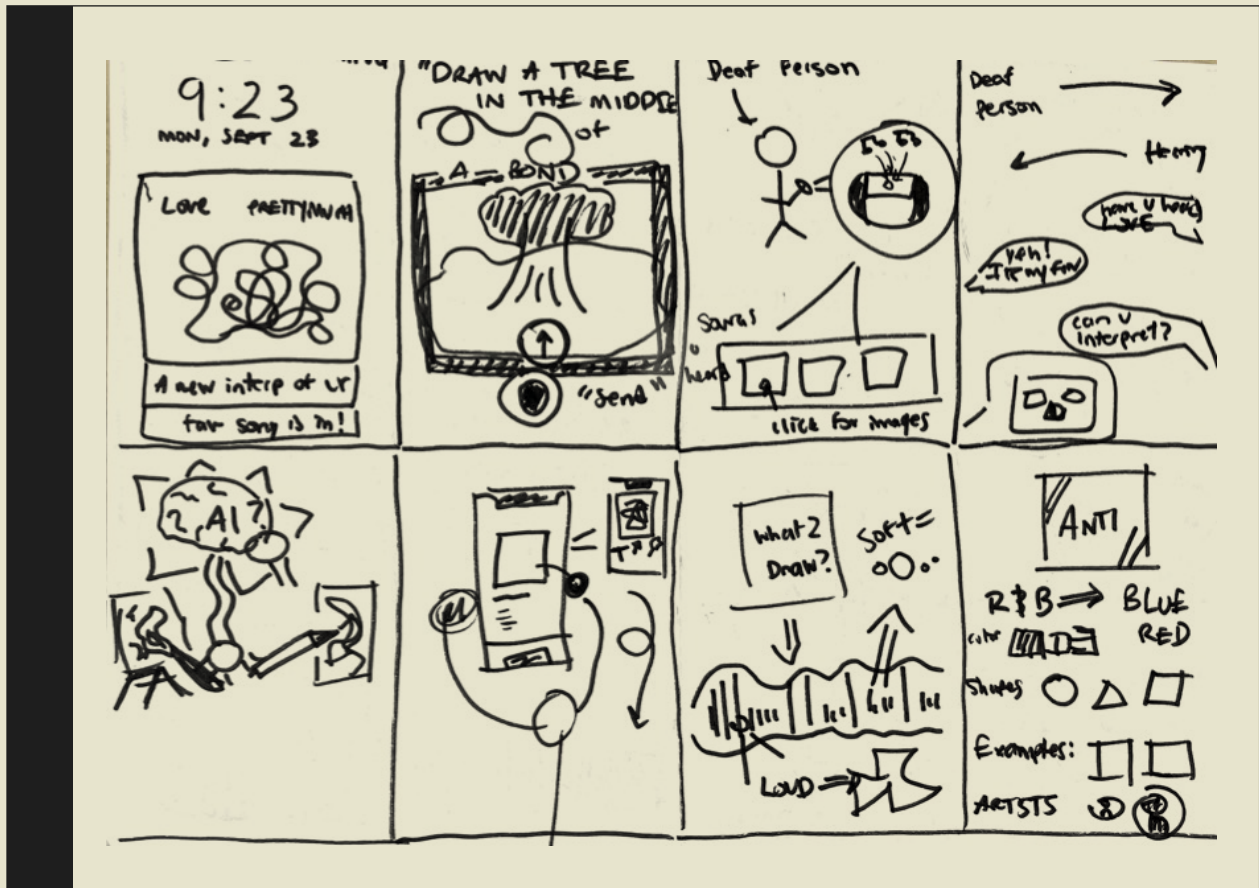
FIG. 2 CONCEPT SKETCH B



Notifications asking user to share interpretation; voice transcription for explanations; wearable to identify songs and provide interpretations; chat for people to expand on interpretations; visualization of concert; annotating Instagram posts with interpretations; search songs by lyrics or name; filtering interpretations by medium

02. Sketches cont.

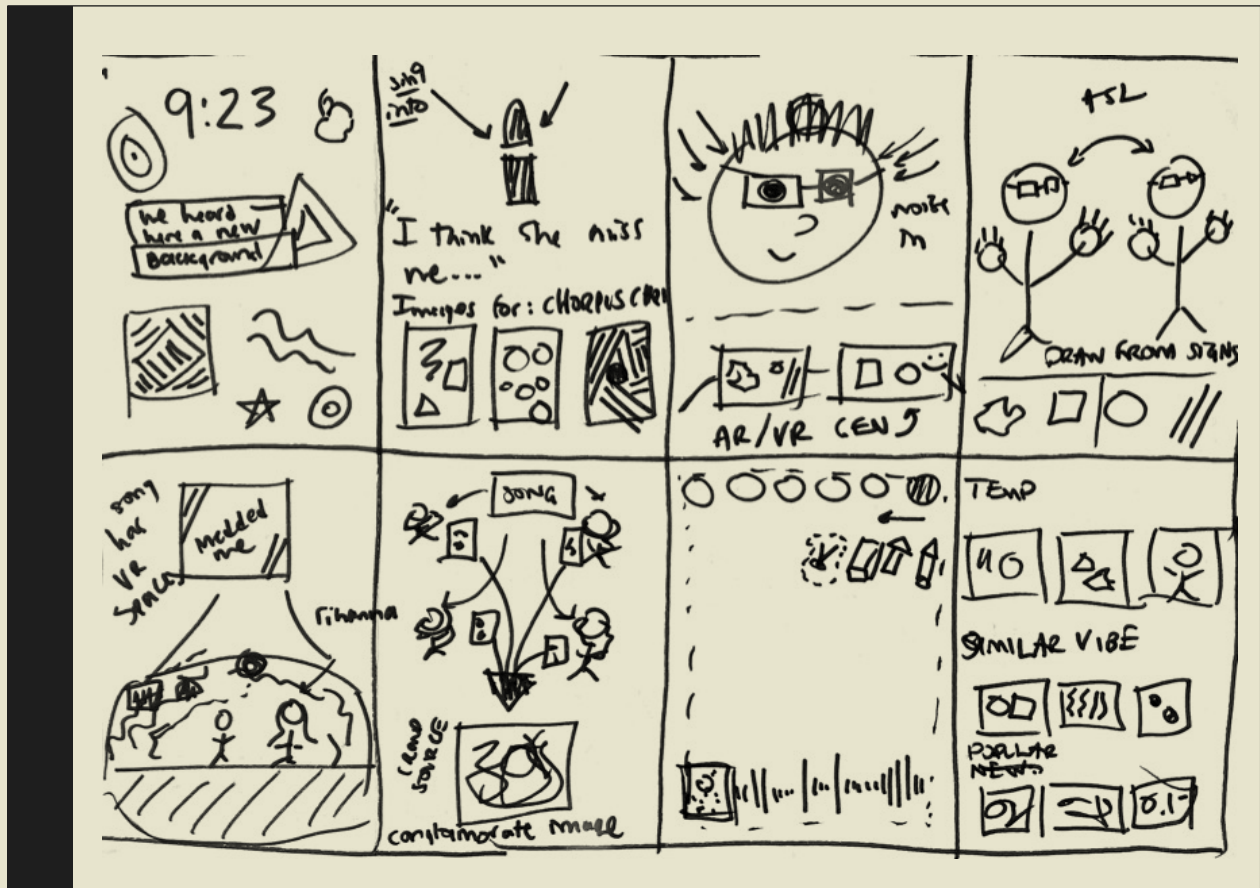
FIG. 3: CONCEPT SKETCH C



Notification of interpretation for song you like; draws what you speak; watch detects songs and relevant interpretations; chat connecting those wanting interpretations with interpreters; AI generated art from audio input; instagram for interpretations; waveform-based drawings for songs, suggestions based on volume; crowdsourced suggestions for song interpretation

02. Sketches cont.

FIG. 4: CONCEPT SKETCH D

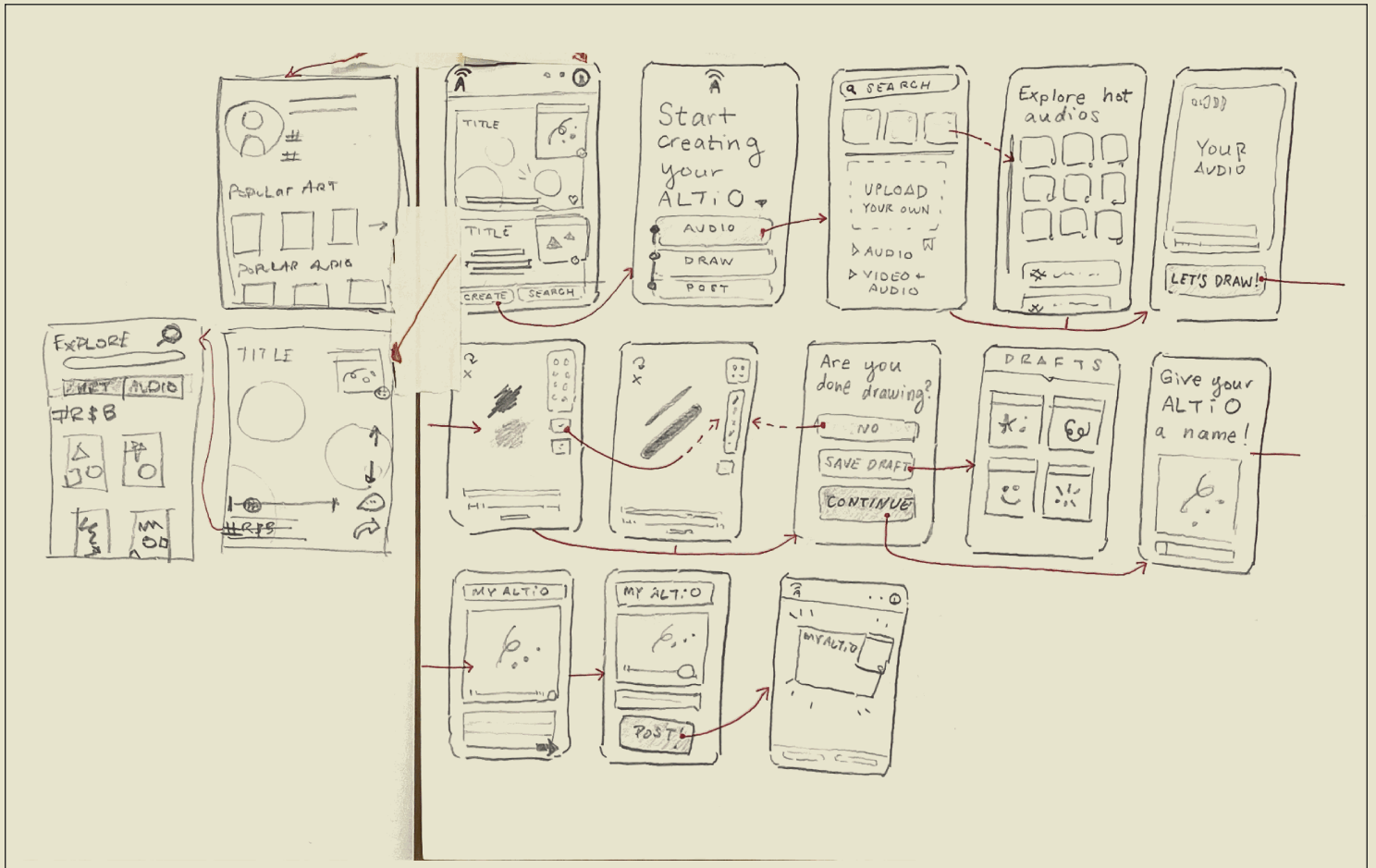


Changes background based on surrounding music; listens to songs and displays relevant interpretations; VR displaying interpretations for sound; VR generating drawing interpretations based on ASL; VR environments created for each song; collaborative system synthesizing one drawing; drawing interpretations; templates and drawing suggestions

02. Sketches cont.

2B. Top Two Storyboards

FIG. 5: STORYBOARD 1 NATIVE MOBILE APP UI

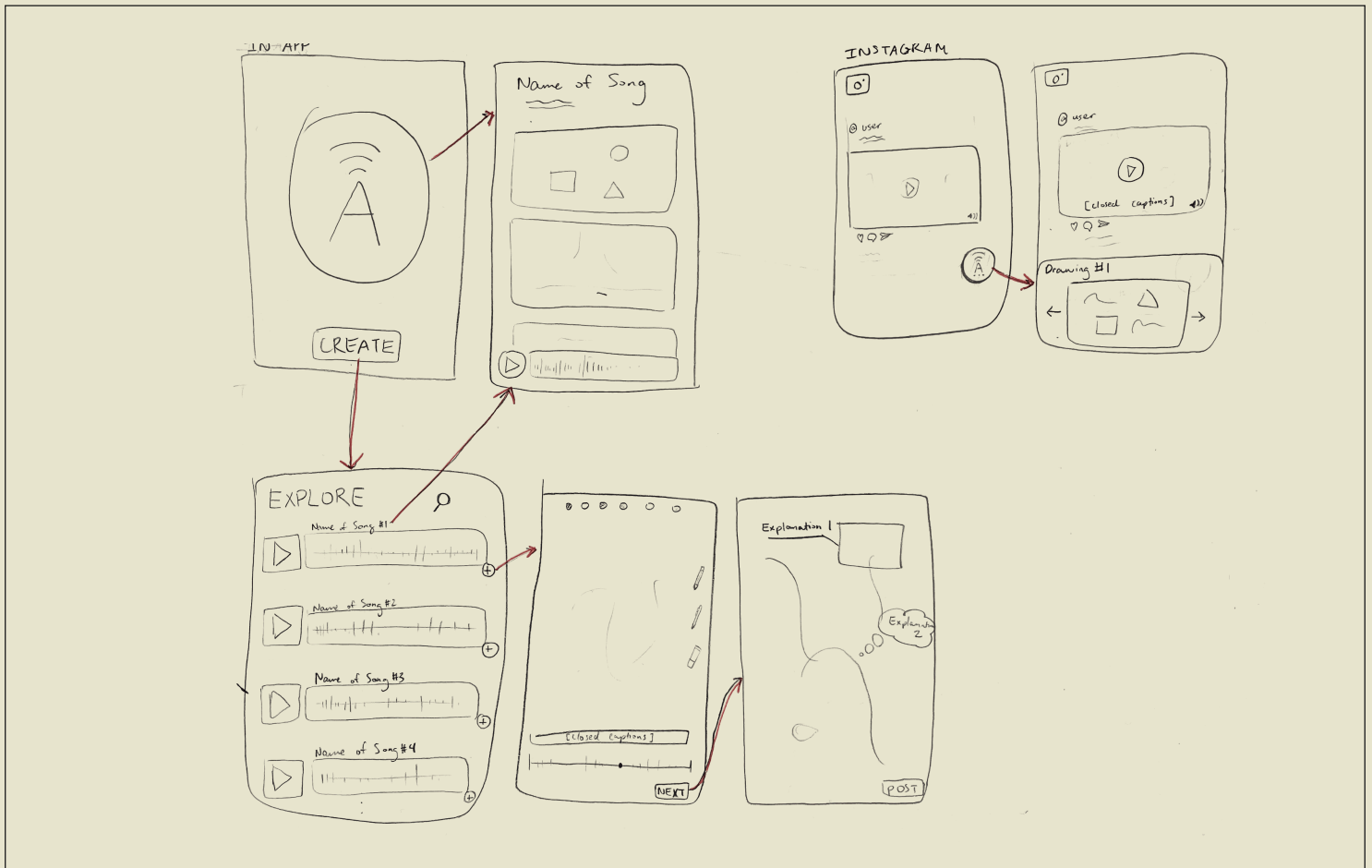


Interface A: User flow for social media platform that requires ALTiO interpretations be posted as a supplement to all content with audio

PROS	CONS
<ul style="list-style-type: none"> ▪ Easy to customize drawing to video's audio ▪ Full control of content types ▪ Every video will have a drawing 	<ul style="list-style-type: none"> ▪ Only for users on the app ▪ Takes long to post content (interpret on top of post) - may discourage people from posting

02. Sketches cont.

FIG. 6: STORYBOARD 2 SOUND RECOGNITION APP/PLUG-IN



Interface B: Application/plug-in that recognizes songs on press and displays interpretations. It requires that volunteers interpret songs of their choosing to generate interpretations.

PROS	CONS
<ul style="list-style-type: none"> ▪ Versatile for all apps ▪ Access to music in real life ▪ Drawing interpretations is a “buy-in” activity ▪ Focus on the music (audio) itself 	<ul style="list-style-type: none"> ▪ Potential for fewer drawers/interpreters ▪ May be difficult to implement ▪ Artists pick which audio to interpret for -- not all content will have interpretations

03. Selected Interface Design

After considering the pros and cons of both interfaces, we selected Interface A. What ultimately influenced our decision was that Interface A **ensures that every post will have an audio interpretation.**

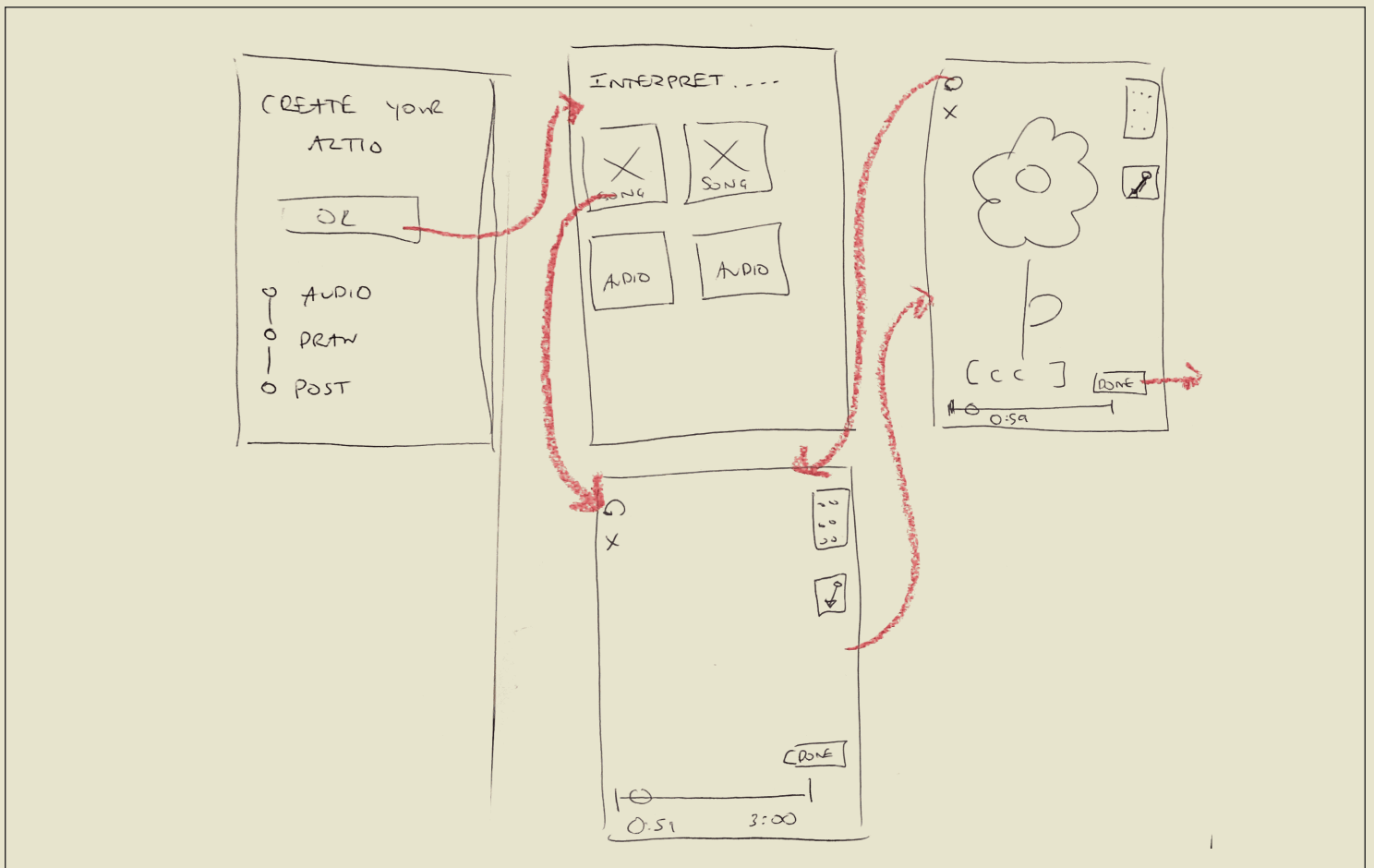
Since our goal is to make digital audio more accessible to the Deaf and hard of hearing communities, we want to make sure that every single post on our platform is Deaf/hard of hearing-friendly.

Interface B would not have interpretations for all audio content, and the distribution of interpretations might depend on the popularity of songs. Our app would be constrained by the number of users creating posts, as well as the helpfulness of interpretations and the ease of making them.

03. Selected Interface Design cont.

3B. UI Task Flows

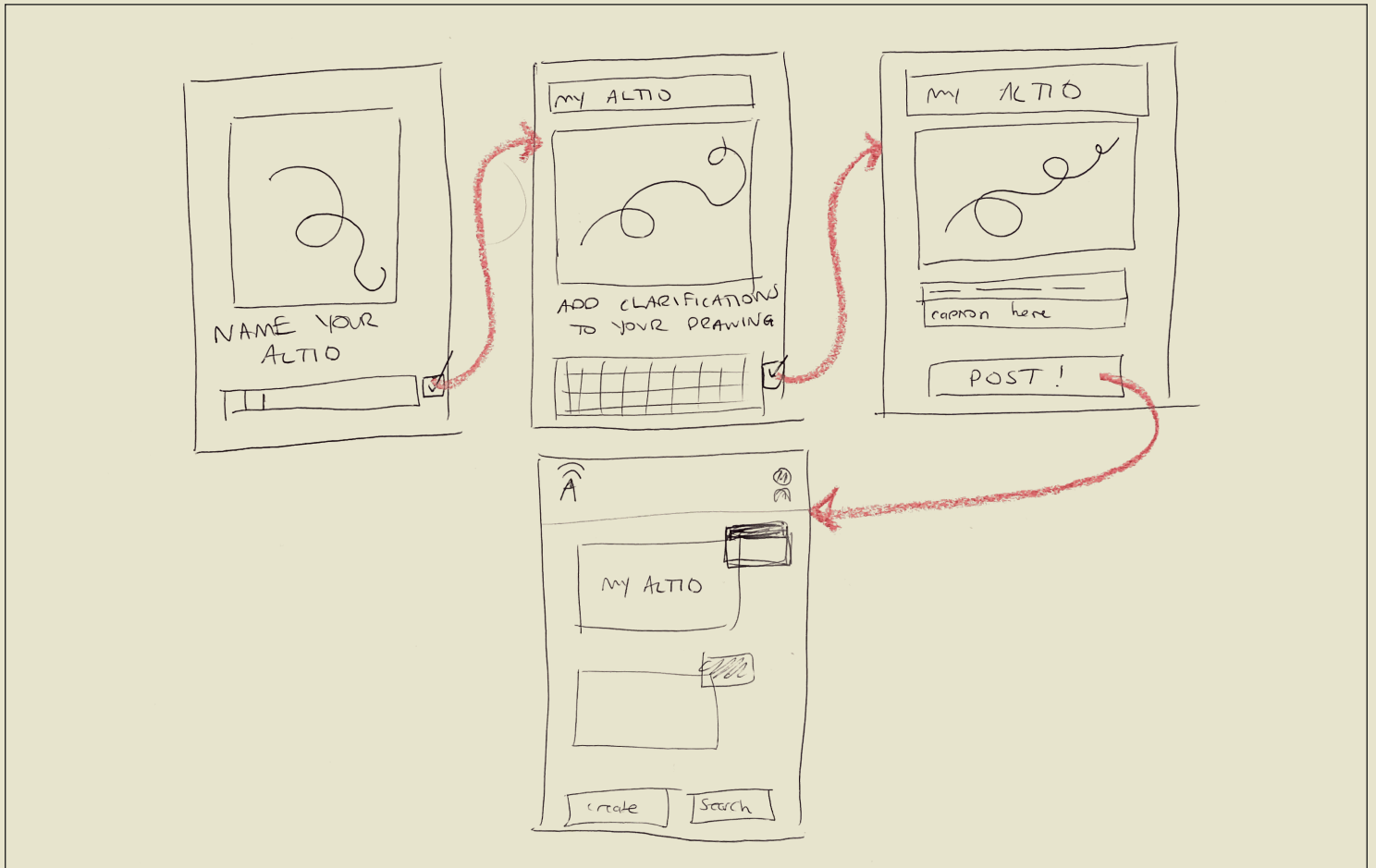
FIG. 7: SIMPLE TASK INTERPET AUDIO



A task flow to create an audio interpretation

03. Selected Interface Design cont.

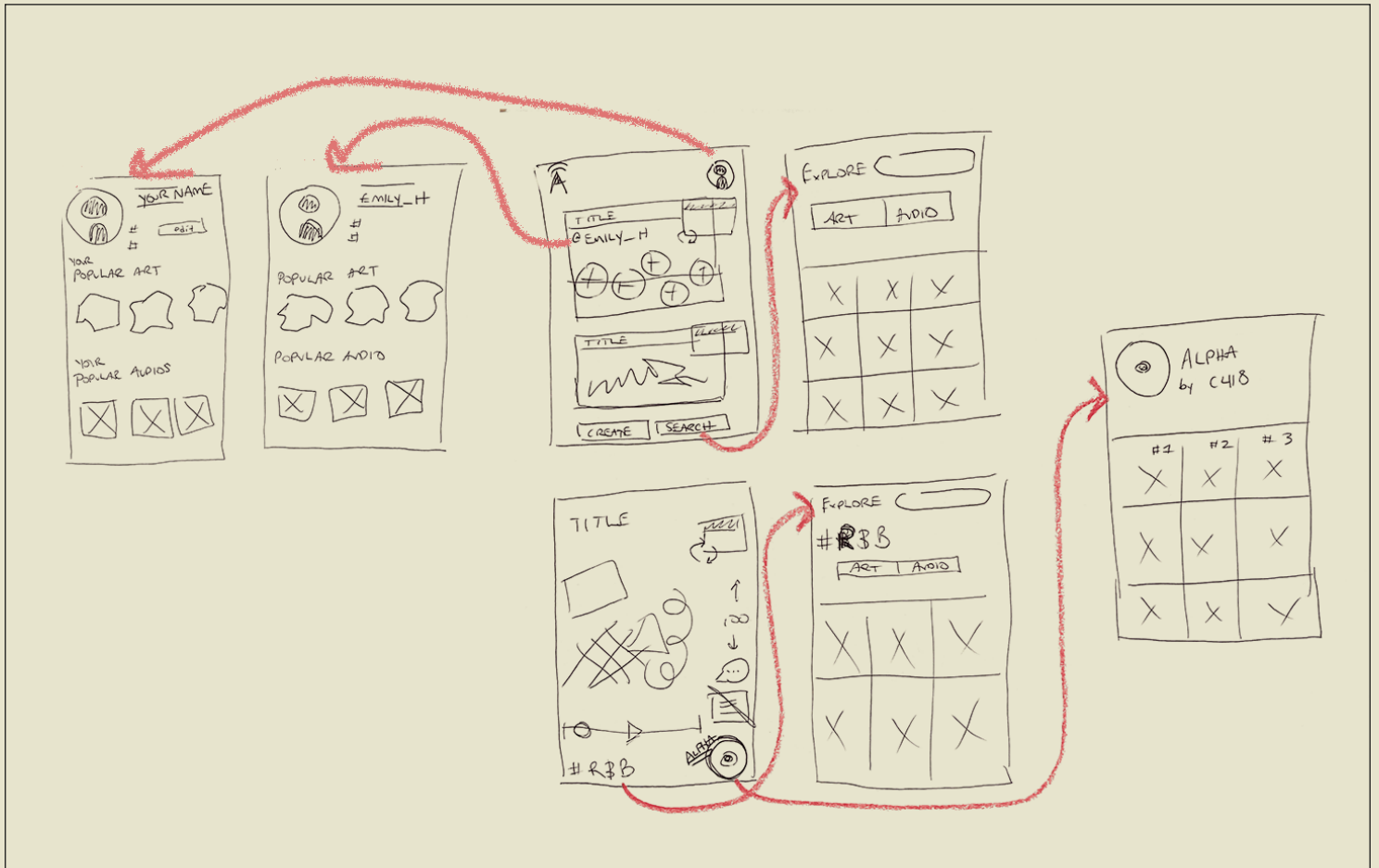
FIG. 7: MODERATE TASK EXPLAIN & CLARIFY INTERPRETATION



A task flow for user creating clarifications on their interpretation

03. Selected Interface Design cont.

FIG. 8: COMPLEX TASK INTERACT WITH OTHER INTERPRETATIONS & ARTISTS



A task flow to find different ALTiOs through the use of hashtags and user profiles

04. Prototype

FIG. 9: PROTOTYPE FULL VIEW

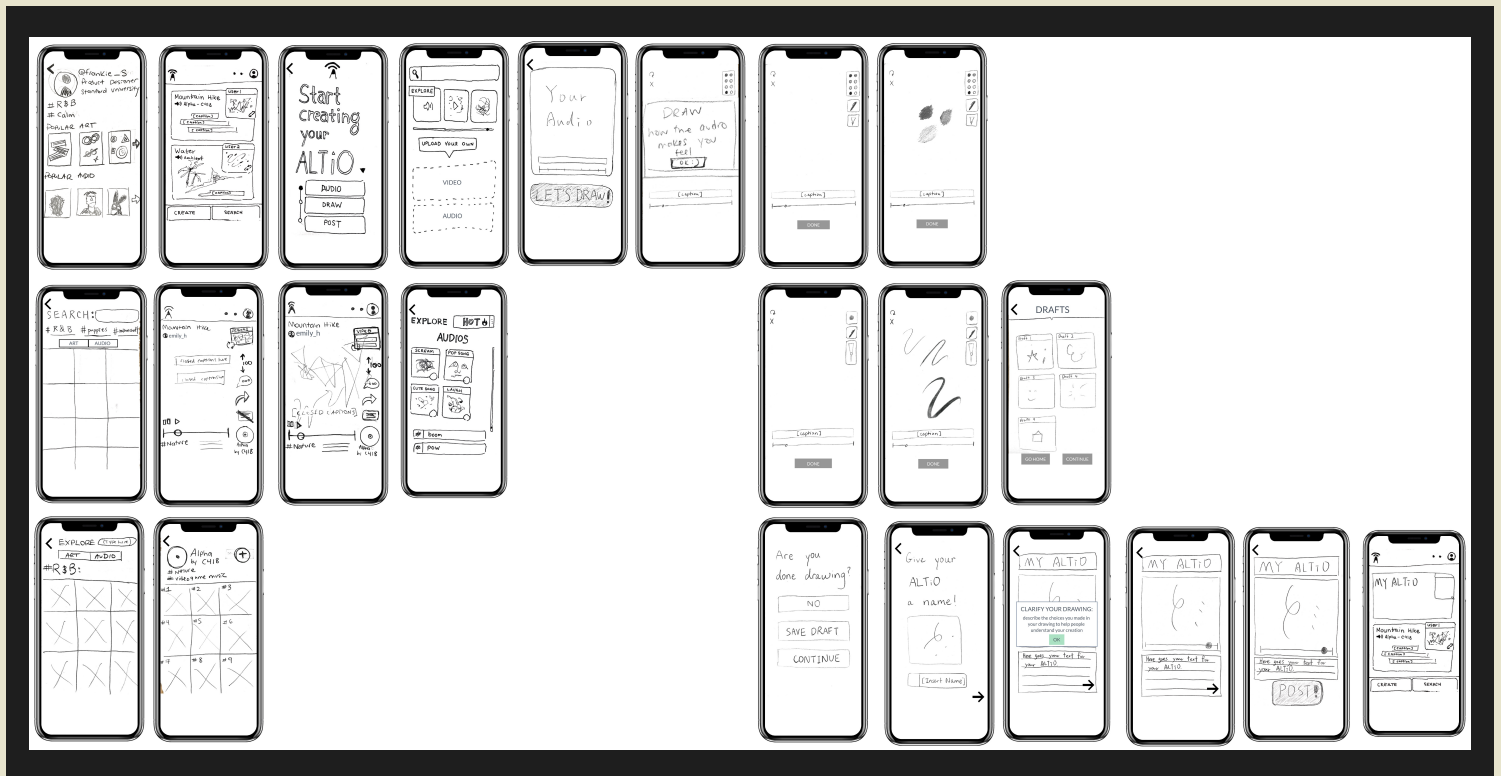
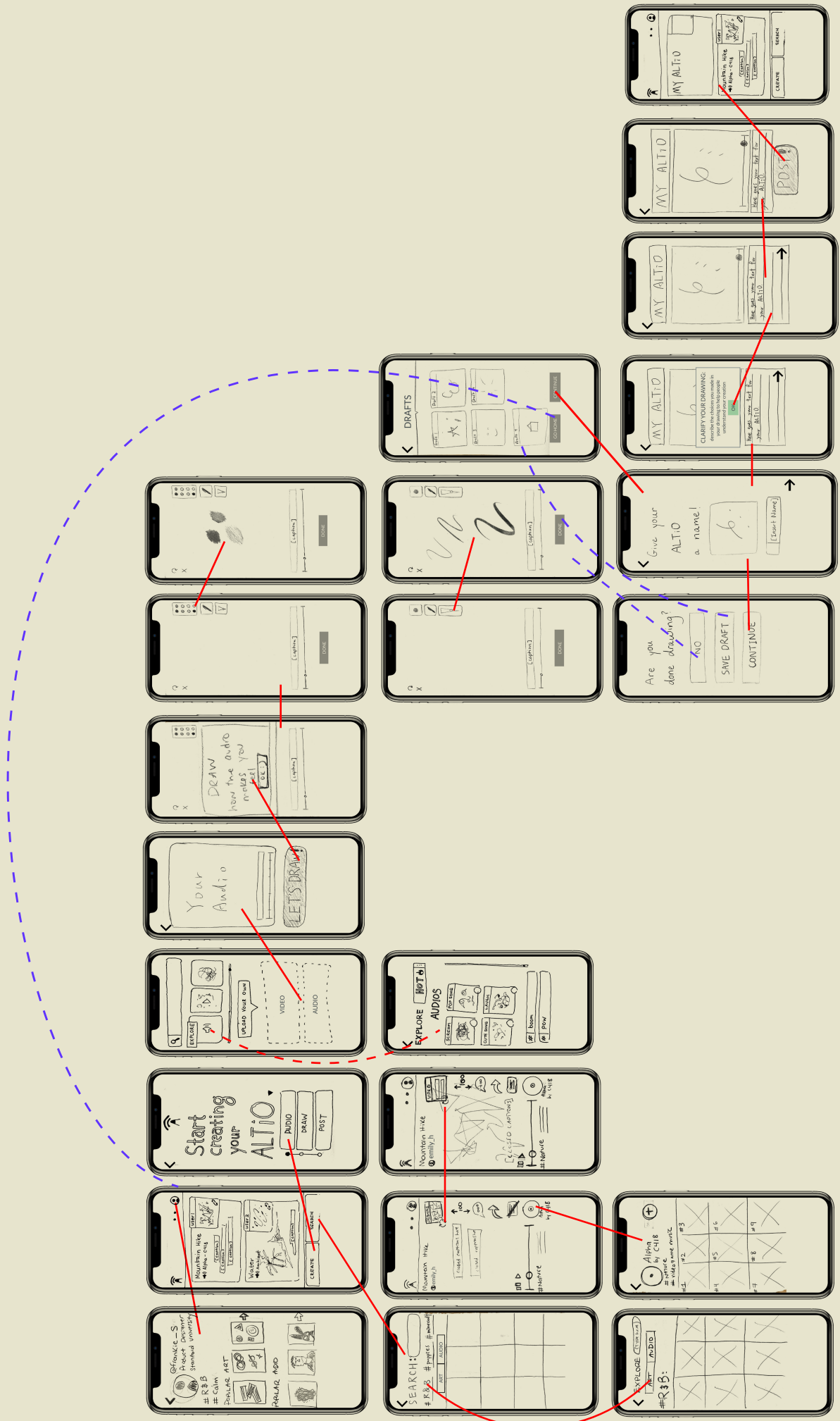


FIG. 10: DIAGRAM



04. Prototype cont.

We constructed our prototype through paper sketches uploaded onto Marvel's POP. Our prototype is a social media app where all audio-based content is accompanied by an interpretation. Users interact with the app through touch input to move through screens.

A key component is for the user to draw on the screen while listening to audio and reading captions to create interpretations. There is a social feed where users can interact with posts and others.

EX. HOME SCREEN

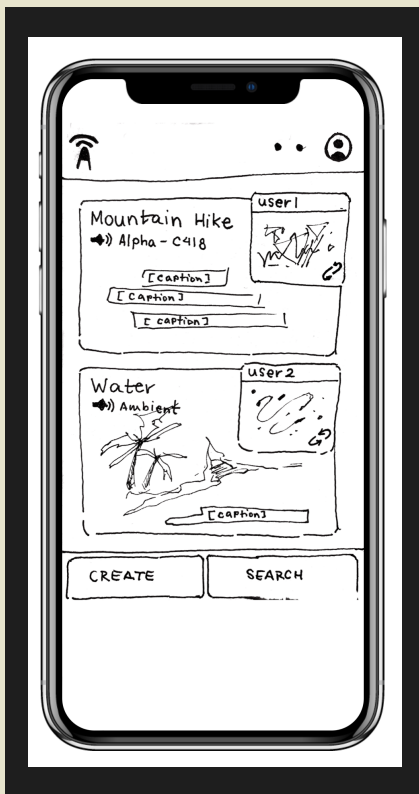


Fig. 11

EX. PROFILE



Fig. 12

EX. ARTBOARD



Fig. 13

05. Testing Methodology

5A. Participants

Our three participants had varying degrees of hearing abilities, frequency of engagement with music and art, and familiarity with social media.

Katie is a middle-aged Deaf woman who doesn't listen to music anymore, and depends on visuals and art in her daily life. A former participant referred her to us.

Catherine is a middle-aged hard of hearing woman who engages with music, art, and visuals daily. We recruited her through social media.

Matthew is a graduate student who listens to music daily and is not interested in visuals/art. He is Po-Ting's acquaintance.

Katie and Catherine are not as familiar with social media apps, while Matthew is a frequent Instagram user.

5B. Environment

All interviews were conducted over Zoom, and used POP for testing. Katie's and Catherine's interviews used the POP web app, while Matthew used his phone and shared his screen.

For Katie, the facilitator communicated using an interpreter through a phone call interpretation app. Zoom was used to view Katie's interaction with the prototype and record the meeting.

05. Testing Methodology cont.

5C. Tasks

SIMPLE	MODERATE	COMPLEX
interpret an audio	explain and clarify your audio interpretation	interact with other posts and users by finding a user page and exploring a hashtag

5D. Team Roles

GREETER/FACILITATOR	NOTETAKER
EMILY PO-TING FRANKIE	EMILY PO-TING JARED

5E. Procedure

We followed the interview script and adjusted as we navigated technical issues and necessary accommodations.

We introduced our app concept at a high level and asked about their background with music, social media, and visuals/art. Next, we instructed them to explore the prototype tasks on POP.

We asked for thoughts and feedback along the way, and at the end we thanked them for their time and asked about their overall experience!

05. Testing Methodology cont.

5F. Usability Goals

“DISCOVERABLE”	“ENJOYABLE”
User taps into many different features, and has minimal questions in performing task Learning curve is manageable	User shows or voices signs of excitement/enjoyment

5G. Test Measures

06. Results

6A. Aggregated Results

Two users mistook the scroll bar for something else

Three users were confused by the “Start creating your ALTiO” screen

The Deaf and hard of hearing users both gave feedback on the closed captions

The two users who did interpretations were very focused and enjoyed it

The two users who did interpretations were not entirely sure what to draw initially

Two users were confused by either the explore page or hashtags

User page was easy to access and intuitive for all

Posting process was intuitive and easy to tap through for all

All users were interested in and enthusiastic about the concept

No users fully understood the intent of the clarification section

06. Results cont.

6B. Specific Results

Katie was confused about “popular audio” and its relevance to her as a Deaf person

Katie took around 15 minutes to understand the point of the app

Katie was concerned about using an audio in her post

Matthew said he “randomly drew something”

Catherine mistook the thickness control icon for a volume control icon

Catherine’s explanation centered around her interpretation of lyrics

07. Discussion

7A. Learnings

The intuitiveness of our UI was related to how familiar the user was with other social media apps, such as with hashtags.

The position and size of closed captions are important to consider to not obstruct content.

As this app is a social media platform, it's important we are inclusive in both posting and consuming content.

7B. Achieving usability goals in terms of key measurements

Discoverability was achieved as all users were overall quickly and easily able to find features and perform most tasks on the app.

However, speed of discovery and understanding depended on their familiarity with social media apps; Katie and Catherine had more questions and confusion compared to Matthew.

Enjoyableness was also achieved - all users voiced or demonstrated enjoyment, especially in exploring and interpreting.

07. Discussion cont.

7C. How our design will change

Our most important design change will allow interpretations and/or content to be shared by Deaf and hard of hearing people for whom listening to audio is not accessible. After Katie's prototype, we realized the importance of providing alternative options for interpretations. Based on feedback, we will also more deeply consider the positioning and sizing of closed captions.

We would like to include a clearer explanation of the app's intent and goals upon launch, as this was unclear when not explained fully prior to testing. Additional description of the clarification/explanation page would be useful, as it wasn't fully understood by some of the users.

7D. What our experiment couldn't reveal

We didn't test interpretation for our Deaf user, Katie. We would need to test out ideas of alternative ways of interpretation or posting content with other Deaf users.

The experiment couldn't reveal the process of drawing while listening to audio or reading captions on one device.

Overall, we think we are in a good place with our prototype. With concrete feedback, we can improve our prototype with, and will continue to test it.

08. Appendix

Consent Form

This student team is interviewing and observing as part of the coursework for Computer Science course CS 147 at Stanford University. Participants provide data that is used to understand the possible opportunities of the design. Data may be collected by interview, observation and questionnaire.

Participation in this experiment is voluntary. Participants may withdraw themselves and their data at any time without fear of consequences. Concerns about the experiment may be discussed with the researchers (Jared Poblete, Kyle (Po-Ting) Lin, Franklin Sperka, Emily Huang) or with Professor James Landay, the instructor of CS 147:

James A. Landay
CS Department
Stanford University
650-498-8215
landay at stanford.edu

Participant anonymity will be maintained by the separate storage of names from data. Data will only be identified by participant number. No identifying information about the participants will be available to anyone except the student researchers and their supervisors/teaching staff.

I hereby acknowledge that I have been given an opportunity to ask questions about the nature of the research and my participation in it. I give my consent to have data collected on my behavior and opinions in relation to the Accessible Design - Team 1's research. I understand that I may withdraw my permission at any time.

I give consent to be videotaped during this study:

Yes No

I give consent to be audiotaped during this study:

Yes No

I give consent for video or audio recordings from this study to be shown to people not directly involved with this research during/in class, seminars, reports, or scientific presentations.

Yes No

Name _____

Participant Number _____

Date _____

Signature _____

08. Appendix cont.

Critical Incident Log

Scale ranges from 0-4, with 0 being the least severe

Participant #1

Very confused initially about what she is looking at and the idea of the app	4
Voices the user page is cool	0
Easily navigates to the user page	0
Unclear about what popular audio means	4
Voices it would be interesting to have more personalized user pages	2
Music doesn't appeal to her	4
Not sure what a tag is	2
Very quickly clicks on tag	0
+ Thinks explore page looks like tic-tac-toe (due to X formation in grid)	2
Comments she always looks at pictures and icons	0
Voices understanding of what she is looking at now	0
Quickly gets back to home screen without misclicks	0
Takes some time to figure out how to create a post	3
Misclicks "draw" and "post" frequently	4
Voices she is excited to draw something	0
Clicks through explanation screens quickly without paying too much attention	2
Says it would be hard for her to post something with audio	4
Voices being afraid to click on audio	4
Says she thinks a screen is pretty good	0
Says it's pretty easy to follow along and play around	0
Confused scroll bar was volume control	2
Prefers captions on bottom	3

08. Appendix cont.

Critical Incident Log

Scale ranges from 0-4, with 0 being the least severe

Participant #2

Successfully enters the profile page.	0
Asks if the contents in the profile page is that person's posts.	1
Successfully explore a hashtag.	0
Asks for random music to draw.	0
Focuses on the drawing.	0
6 colors are used for the drawing.	0
Uses 4 words to describe the drawing.	0
Has no confusion or questions about the app.	0

08. Appendix cont.

Critical Incident Log

Scale ranges from 0-4, with 0 being the least severe

Participant #3

Attempts to scroll through	0
Clicks on a post to investigate it more	0
Says it reminds her of a reel	1
Says closed captions should not be obstructing content	3
Associates person icon with user page	0
User page makes sense, but design could be more unique	2
Voices enthusiasm about concept	0
Confused about hashtags	3
Thinks explore page looks like tic-tac-toe (due to X formation in grid)	2
Says explore page could stand at more	2
Quickly goes back	0
Thinks user page is home page	3
Laughs while explaining her drawing	0
immediately presses create button when prompted to create post	0
Misclicks audio instead of draw	3
Somewhat confused about audio screen	2
Says "that's really cool" in response to guidance text	0
Correctly identified colors	0
Mistakes thickness icon for volume control	3
Thinks scroll bar is zoom	3
Says "that is really cool" in response to scroll bar	0
Moves quickly through prompts and posting it	0
Says could've gotten deeper with more time	2

08. Appendix cont.

Demo Script

Tasks:

SIMPLE: users interpret an audio

MODERATE: creators explain and clarify their audio interpretations

COMPLEX: users can interact with various interpretations and artists on the platform

Roles:

- Speaker / clarifier
- Note-taker

Questions to Answer:

- Does this process / UI facilitate easy and efficient creation of audio interpretations?
- How interesting would this process be for creators? Could we make it more so?
- How helpful are the interpretations for the Deaf / HoH community? How could they be made more helpful?

Hi! Thank you for taking the time to talk to us today. Before we get started, we'll start off with some introductions. We'll share our names, pronouns, and you can share anything else you'd like us to know!

Intro:

This project is for a class we're all taking on creating a digital product to improve accessibility for the Deaf and Hard of Hearing communities in relation to Internet audio. We really appreciate all the input you'll give us and can't wait to learn from you! Any questions before we get started?

[RECORD]

App Description:

Our project is trying to create a social media platform posting audio and video content, and supplementing the audio with drawings and/or text, to help describe what users experience when they listen to an audio. These are intended to show at different times to describe sounds they hear along with captions for the audio.

Background Questions:

- How frequently do you engage with music?
- What is most important to you when engaging with music?
- What is most helpful when engaging with music?
- What are some barriers for you when engaging with music?
- What is your experience with social media that has audio content? (i.e. Instagram, Facebook, TikTok)
- How important are visuals and/or art in your life?

08. Appendix cont.

Demo Script

Demo:

BRIEF: We're going to send you the prototype link now - please open [this link](https://marvelapp.com/start-user-test/e8Gy2KeO42s3i3vfn3VM) (<https://marvelapp.com/start-user-test/e8Gy2KeO42s3i3vfn3VM>) on your computer. Can you also share your screen? For the testing, we're interested in seeing the flow and overall experience you have. There are no right or wrong questions, please think out loud and be honest.

For navigation, you can get around by clicking parts of the screen, but note that not everything is clickable. Don't worry about clicking things that don't go anywhere!

If you press on something that isn't clickable, blue squares might show up and those squares are places you can press to navigate through.

We're going to go through three different tasks.

Task 1 (complex): Access and explore a user's page and ALTIOS under a hashtag

Today, we'll be pretending that you are a user of this app. Imagine that you open this app for the first time and want to explore a user's page. What you see on this first screen is the social feed, just like Instagram or Twitter or Facebook.

Please explore how you would do so.

GOAL: Access and explore a user's page.

Observe

- Which element did the user try to interact with first?
- How did the user find the content?
- How long did it take for them to find the correct element?
- What kind of errors did they go through before success?

Ask

- Did anything confuse you?
- What would you be interested in exploring on a user's page?

After you explored a user page, you're now interested in finding other ALTIOS that are under a hashtag. Please explore how you would do this, and feel free to walk us through your thought process.

GOAL: Get curious! Find and view some other ALTIOS under a tag.

Observe

- Which elements of the profile did the user seem interested in interacting with?
- How did the user react to the different types of content?

Demo Script

- How long did it take for them to accomplish the task?
- What kind of errors did they go through before success?

Ask

- Did anything confuse you?

Task 2 (simple): interpret an audio by drawing while listening to a song

GOAL: We'd like you to create an *alternative audio interpretation* – an "ALTiO!"

Guide:

Please go back to the home page. Now, we want you to interpret content with an ALTiO. A content can be either an audio or a video you want to share, but for this prototype we only provide audio.

Observe

- Is the UI clear enough for the user to go to the start drawing page?
- Does the user enjoy the drawing process? (observe their facial and body expressions)
- While drawing: Time how long the user spend on drawing. (As a reference for the length of ALTiOs)

Ask

- When prompted to choose between adding an audio/video. **Ask them:** Which music do you want to share for today? (Let the user choose among 3 to 5 different genres)
- Let's draw! Ask the user to open another app that they can actually draw with the music playing. Don't need to listen till the end to start drawing. They can start/stop anytime! Feel free to pause, rewind, replay while drawing.
- Do you want to keep your drawing? (see how much they value their ALTiOs)
- Ask the user to explain their drawing at the CLARIFY screen.
- After successfully posting an ALTiO - Did anything confuse you?
- Did you like the drawing process?

Task 3 (moderate): explain and clarify your ALTiO

GOAL: We'd like you to explain your ALTiO by annotating it!

Guide:

Please explore until you get to the screen to explain your ALTiO.

[Once they reach this screen:] Please explain your ALTiO here.

Observe

- Is the UI clear enough for the user to access the explanation page?
- What do their explanations center around?
- Did they name the ALTiO?

08. Appendix cont.

Demo Script

Ask

- Did anything confuse you about getting to this page?
- Was there enough guidance?
- How did you come up with your ALTIO?

