



# keynotes

where feedback strikes a chord

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## Team and Value Proposition

### Team

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### Value Proposition

Where feedback strikes a chord

## Problem and Solution Overview

As musicians transition to adulthood, their relationship with music evolves. Early adult musicians struggle to find reliable sources of feedback, which impacts their confidence and self-perception. Keynotes provides a platform where musicians can connect and obtain one-on-one and crowdsourced feedback.

## Needfinding Interviews

### Overview

We conducted seven need-finding interviews. Interview participants were recruited through a combination of snowball sampling, cold-calling, and finding people in-context (such as at local marketplaces and train stations). We interviewed all but one of our participants in person, and all interviews were conducted by a single team member accompanied by a note-taker. Of these seven interviews, five yielded interesting insights.

## **Participants**

### *Interview A*

A is a 20 year old cellist who works as a software engineer at a big tech company. She feels that music is a more fundamental part of her identity than her career. However, she feels guilty for wanting more opportunities to perform and grow, since she is “just an amateur.”

### *Interview B*

B is an aspiring musician in his early twenties. He moved to the Bay Area five years ago to pursue music. Although he currently works at a bakery to support himself, his dream is to make music professionally, and this makes him one of our extreme users. He feels less self-critical when he can get feedback from his bandmates and other musicians, but he has found it hard to break into existing support networks of musicians in Palo Alto.

### *Interview C*

C is a professional violist and music educator. Her experience training early adult musicians for over 20 years makes her our domain expert. She believes that sharing music, especially in contexts other than concert halls, is an excellent way to engage with one’s community. Despite years of experience and connections, she still finds it time-consuming to organize performances.



Using these empathy maps, we identified three key tensions that early adult musicians tend to grapple with:

### *Why make music in early adulthood?*

Our interviews revealed that early adult musicians tend to make music as a form of escape and self-expression. They need platforms to make and share music in ways that feel fulfilling, constructive, and engaging

### *Who gets to make music in early adulthood?*

Even musicians with years of experience shared that they sometimes feel excluded from the music-making community and struggle with self-criticism. This revealed a need to make the music-making community more inclusive to people with different levels of formal music education

### *Where can early adult musicians share their music with their community?*

Finding places to share music and arranging performances is difficult for everyone, not just for beginners! Early adult musicians, especially those removed from formal structures of music education, need easier ways to share their music, arrange performances, and find a community of musicians.

## POVs and Potential Solutions

We further synthesized our needfinding interviews into 9 POVs, which we used to generate How Might We statements. Three of these POV statements are listed below, with a sample of the HMW statements they helped generate.

### POV 1:

- We met C, a professional violist and music educator at Stanford.
- We were surprised to realize that as a classical musician with a busy schedule, she would often play in spaces such as women's prisons, nursing homes, etc., and vividly remembers the audiences from these performances
- We wonder if she feels the greater interaction between her and the audience in non-traditional performances is an important part of her identity as a musician
- It would be game-changing to make it easier for her to experience these meaningful audience-performer interactions

Sampling of HMW statements from POV 1:

- HMW connect C with people in non-traditional spaces to organize performances?
- HMW make concert hall performances more interactive and engaging for C?
- HMW make sharing and performing music more like a conversation and less like a speech?

**POV 2:**

- We met A, 26-year-old cellist working as a SWE at Big Tech
- We were surprised to realize that she said that she is “lucky”, as an “amateur”, to get the opportunities she does have - despite saying that she is frustrated with the amount and level of opportunities that she gets to perform
- We wonder if she feels guilty for wanting more opportunities to perform as a non-professional
- It would be game-changing to find a way for her to get involved with music to the degree that she wants without making her feel self-conscious
- 

## Sampling of HMW statements from POV 2:

- HMW connect A with musicians she can work with and learn from?
- HMW make A more confident in her ability and worthiness to perform?
- HMW change people’s perception of what it means to be an amateur?

**POV 3:**

- We met B, a man in his 20s who works in a bakery in Palo Alto and plays in an indie rock band
- We were surprised to realize that even though he believes that Palo Alto is a very supportive environment for musicians, he does not play much in Palo Alto because he does not have many friends in the city

- We wonder if he feels that the music community in Palo Alto is supportive but insular
- It would be game-changing to help young musicians like B break into the existing support network and music scene in places like Palo Alto

Sampling of HMW statements from POV 3:

- HMW leverage B's amateur status to create opportunities and foster new interactions?
- HMW connect B to other newcomers to the music scene in his area, to learn and grow together?
- HMW find B a mentor who can help him tap into existing support networks within the music community?

### **Top Three Solutions**

From these POVs and HMWs, we generated over 70 solution ideas, which we narrowed down to our top three using heatmap voting.

Our top three solutions are as follows:

- A platform that connects musicians with non-traditional spaces to perform
- A platform that connects people with complementary interests and skillsets so that they can learn from each other
- A platform to post your music for feedback from a network of other musicians

## Experience Prototypes

### Solution 1 Experience Prototype

Our first solution idea, a platform that connects musicians with non-traditional spaces to perform, rested on the assumption that musicians want to play in non-traditional spaces. To test this assumption, we came up with an experience prototype (EP) that asked participants to rank 6 performance venue options - auditorium, bar, university, veterans' community center, elementary music school, and rehab center - in order of how much they would prefer to perform there. Following this, we asked participants questions to explain their rankings, including: *why did you rank these venues in the way that you did?*, *what general factors go into the way you choose a venue?*, and *have you ever thought about performing in non-traditional spaces before this?* We tested this EP with three separate participants: Z.Flat, a South Korean rapper; Edmund, a violist and Santa Clara University CS major; and Joe, a guitarist at NYU.

Out of our 3 EP tests, only Edmund's test confirmed our assumption that musicians want to play in non-traditional spaces. He ranked the non-traditional venues, such as elementary music school and rehab center, higher than the traditional spaces. Additionally, we learned that he has played at retirement homes in the past and wants to expand classical music opportunities outside of affluent, white areas.

Our two other EP tests, on the other hand, did not confirm the assumption. Our other two testers, Z.Flat and Joe, expressed disinterest in spaces they viewed as non-traditional and ranked these venues lower. When asked to explain their rankings, they each explained that they thought their music did not fit audiences in non-traditional spaces.

They also noted that they thought these opportunities were not good for career advancement, which decreased their willingness to consider performing in those spaces.

From this EP, we learned that we cannot assume that all musicians are willing to play in non-traditional spaces. We gained the insight that classical musicians may feel that their music would be more appreciated in non-traditional spaces than non-classical musicians. We also noted that musicians with more support from teams, like Z.Flat, may be less inclined towards non-traditional spaces.

### **Solution 2 Experience Prototype**

Our second solution idea, a platform that connects people with complementary interests and skillsets so that they can learn from each other, rested on the assumption that musicians would be willing to reach out to someone with a complementary skillset as opposed to someone with a similar skillset. To test this assumption, we came up with an EP that asked participants to choose which musicians they would choose to interact with from a set of musicians of varying skillsets and years of experience. In this task, we laid out different cards in front of the participant. These cards differed based on whether or not the hypothetical person had a similar experience level to the participant, a complementary skillset (so similarly an expert in a different domain and wanting to learn the participant's instrument), or was a complete novice. We tested this EP with two different participants: Daniel, a percussionist and production manager; and Dylan, a classically-trained cellist.

Our EP tests provided mixed results for the confirmation of our assumption that musicians would be willing to reach out to people with complementary but dissimilar skillsets. On one hand, both Daniel and Dylan selected musicians with different levels and levels of experience than themselves, seemingly supporting our assumption. Further, they both said that they would be excited to collaborate with people playing their instrument at a similar level of experience to learn new genres and specialties and that they would be willing to mentor beginners in their instrument.

On the other hand, while both our testers expressed an interest conceptually in working with musicians with different skillsets, both were hesitant about certain aspects of actually reaching out to these musicians. Dylan did not want to teach someone a new instrument from scratch, and Daniel said that though he would like to teach someone an instrument, he did not think it would be feasible.

This EP partially confirmed our assumption that musicians would be willing to reach out to someone with a complementary skillset as opposed to someone with a similar skillset, with qualifications. While we learned that people are willing to interact with musicians who play the same instrument with similar skillsets and different styles, we observed that actively reaching out to people doesn't always come naturally to musicians. We also learned that people may be willing to function as a router/connector instead of a teacher, to help other musicians find the help they need without having to take on the responsibility of single-handedly teaching someone.

### **Solution 3 Experience Prototype**

Our third solution idea, a platform to post your music for feedback from a network of other musicians, rested on the assumption that amateur musicians would accept and feel encouraged by feedback from other amateurs that they do not already know. For our EP for this solution, we recruited two musicians who don't know each other: Ben, a violist, and Lisa, a violinist. We then brought them into the same Zoom video call and asked them each to play live or show a video clip of them playing while the other provided feedback. We then talked to each of them separately to ask about how they felt giving and receiving feedback.

Our EP test overwhelmingly supported our assumption that amateur musicians would accept and feel encouraged by feedback from other amateurs that they do not already know. Both testers seemed to build a rapport almost instantly. Ben said that giving/receiving feedback with Lisa was helpful and fun, and Lisa liked the structure of Ben's feedback and felt comfortable sharing a realistic video of her playing rather than a "perfect" clip. However, though Ben said he enjoyed sharing his playing with Lisa, he was unsure that he would trust other strangers to give feedback on his video.

From this EP, we learned that it's possible to facilitate productive and encouraging feedback given certain conditions: rapport between musicians, compatible musical backgrounds and similar experience levels, and feedback structured in a constructive way (i.e. not all negative).

## Final Solution

### Description

#### *Problem:*

Early adult musicians struggle to access reliable, affordable sources of feedback to help them along their musical journey. This adversely impacts their confidence and self-perception.

#### *Solution:*

keynotes, a platform where musicians can connect to share high-quality feedback (or keynotes) and unlock each other's full potential. On this platform, users share 'keynotes' on other musicians' tracks, which include one positive comment, one area for improvement, and answers to musicians' questions about their own music.

#### *Target Audience*

While theoretically accessible to all adult musicians, our target audience is early adult musicians, since the transition to early adulthood is also often a period where musicians' relationship with music, and proximity to structured music education, changes.

### Rationale

#### *Interviews*

From our interviews, we learnt that musicians find it difficult to break into existing support networks and that amateur musicians feel insecure about their amateur status. Another insight from our interviews was that feedback improves a musician's confidence and sense of self, but that access to reliable, constructive feedback is not easily available to

them. In fact, all but one of our interviewees explicitly mentioned that they struggle to find sources of feedback that are both trustworthy and critical enough to be beneficial.

### *Experience prototypes*

The experience prototype for this solution received the most positive user feedback and showed the highest user engagement throughout. Specifically, it showed that amateur musicians would feel encouraged by feedback from other musicians that they do not already know, given that they had compatible musical backgrounds and structured their feedback in a constructive way. Given this finding, we decided that our solution would allow users to choose which musicians could view and leave feedback on their music. We also decided that feedback would be structured to include both positive and critical feedback, with the opportunity for musicians to ask specific questions about their tracks. Further, since we found that the non-anonymous interaction and the opportunity to build rapport between musicians was appreciated by our testers. This further substantiated our hypothesis that community building and feedback could be intertwined in a way that creates a support network for musicians.

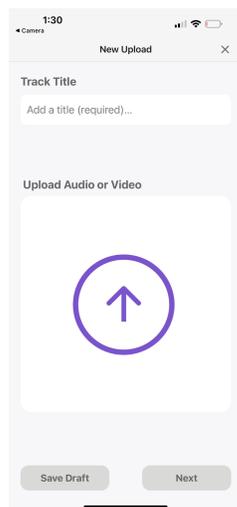
### *Market Research*

Our market research on other feedback sharing platforms revealed a few systemic reasons that musicians hesitate to use these platforms. These were distrust of anonymous reviewers, poor quality or aggressive reviews, and a lack of intrinsic motivation for reviewers to leave constructive reviews. We believed that we could mitigate these problems with a community-oriented platform and structured feedback, which further compelled us to choose this solution.

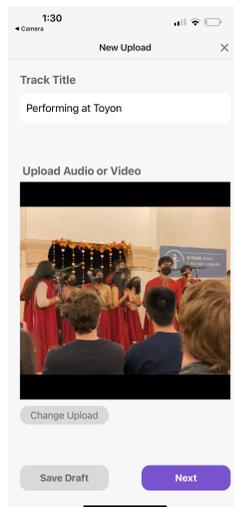
## Tasks

### Share a track to your profile

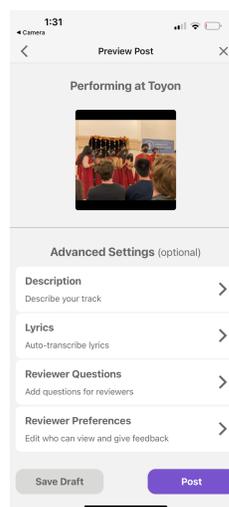
Sharing a track is a simple task because it is one of the core features of keynotes. It allows other musicians to listen to and leave feedback on a user's music. We expect that it will be a highly frequented task and so should be easy to accomplish. If the user chooses, this task can be completed by simply choosing a video or audio file, giving it a title, and clicking "post." However, there are several advanced features embedded within this track that users can choose to take advantage of: writing a description of the track, auto-transcribing lyrics, asking questions for reviewers to answer, and choosing a subset of musicians who can view this specific track.



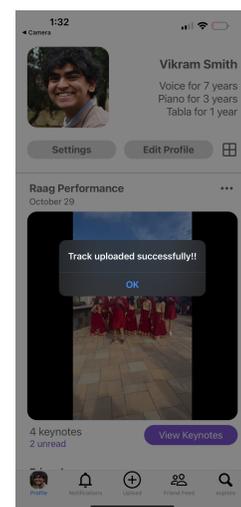
Add a title and upload a video



Confirm/change video



Click post

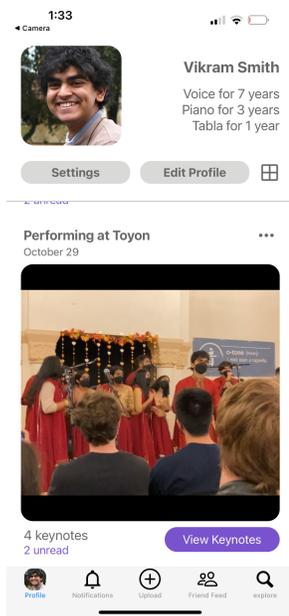


Track is added to your profile

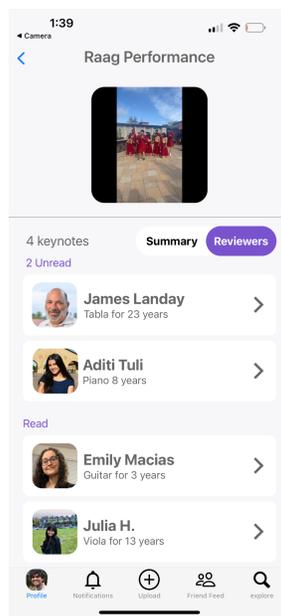
Task 1 from hi-fi prototype: Sharing a track with no advanced settings (advanced settings are implemented and shown in appendix A)

## View keynotes on a track

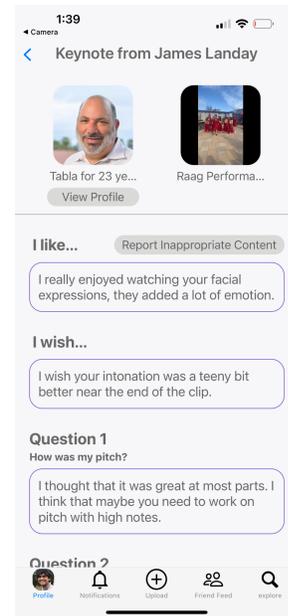
Our second simple task is viewing keynotes, or feedback, that other musicians have left on your track. This is another core, highly frequented feature of the app as it helps fulfil the primary need identified by our research: accessing high quality, constructive feedback on one's music. Users can access keynotes from their profile. Keynotes can be viewed in one of two ways: they can view an entire keynote left by an individual user, giving them another musician's wholistic perspective on their track, or they can organise feedback into positive comments, critical comments, answers to each of their questions, and audio messages.



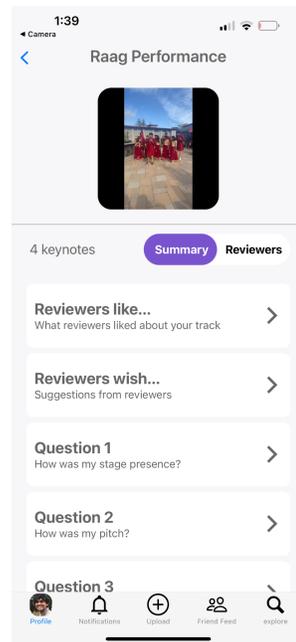
Click "view keynotes" under a track



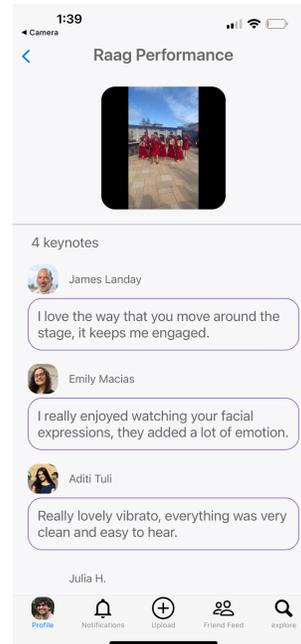
See keynotes from individual people



View one keynote in detail



Go back and choose summary view



See all positive comments in one place

Task 2 from hi-fi prototype: View keynotes (feedback) on a track you posted

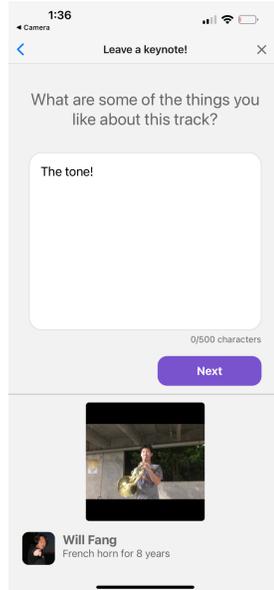
### Leave a keynote for another musician

Our moderate task involves listening to another musician's track and leaving them feedback in the form of a keynote. Users can leave keynotes for new musicians from the explore feed or for musicians they have previously added as friends on the friends feed. This task is important to our users because it fulfills another need identified in our research: a community of musicians to learn from and grow alongside. Based on our user research, we expect that musicians will be intrinsically motivated and will enjoy the process of listening to new music and leaving keynotes for other musicians. This is our moderate task because it is slightly more involved than the previous ones: it requires listening to listening to another musician's track, optionally viewing the supplementary

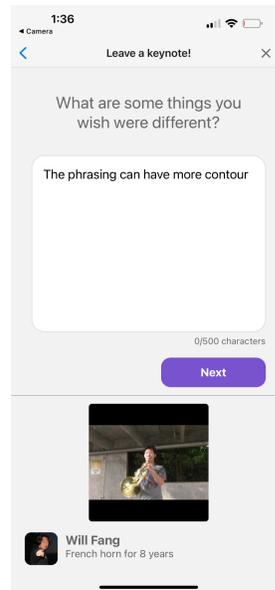
material that they uploaded, writing a positive comment, and writing a critical comment. Users may also choose to answer questions that the musician left about their track or to leave feedback in the form of an audio message.



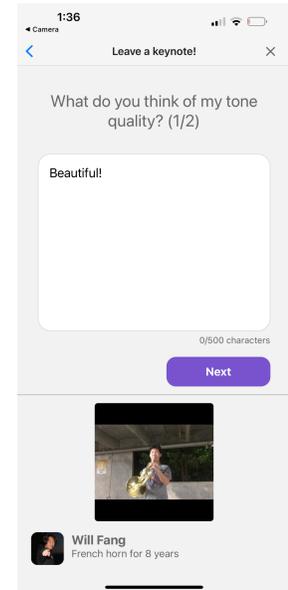
Find a new musician



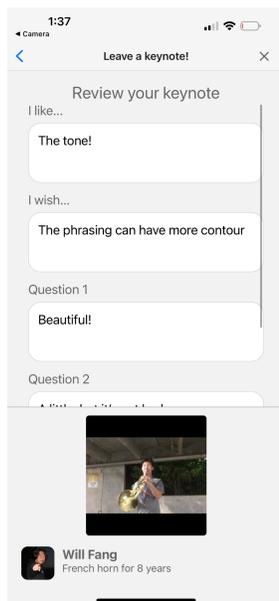
Leave a positive comment



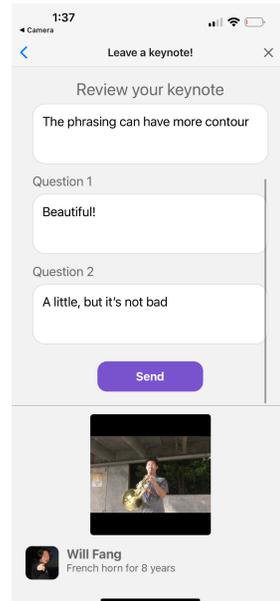
Name an area of improvement



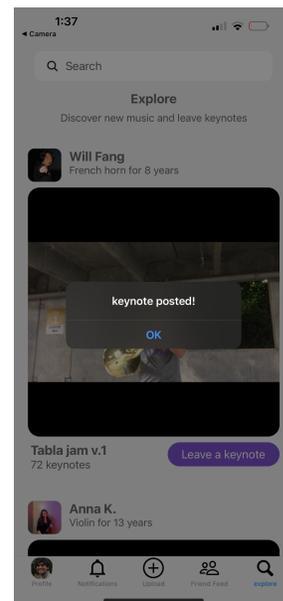
Answer their questions



Review the whole keynote



Hit send

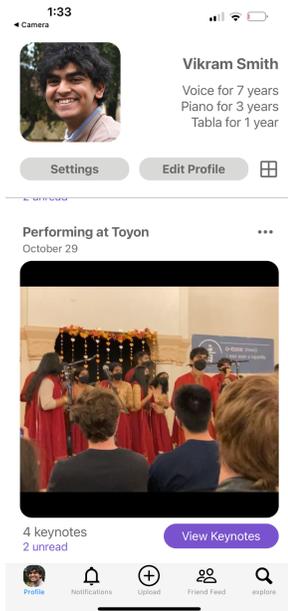


Taken back to the explore feed

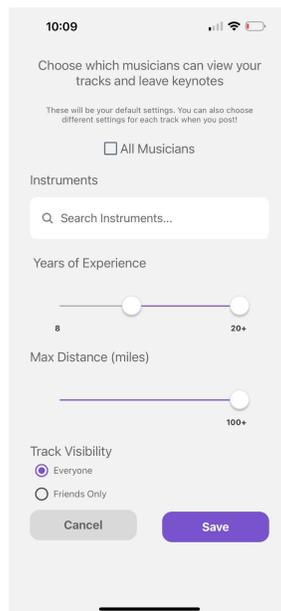
Task 3 from hi-fi prototype: Leave a keynote for another musician

## Choose which musicians can view your music and leave you keynotes

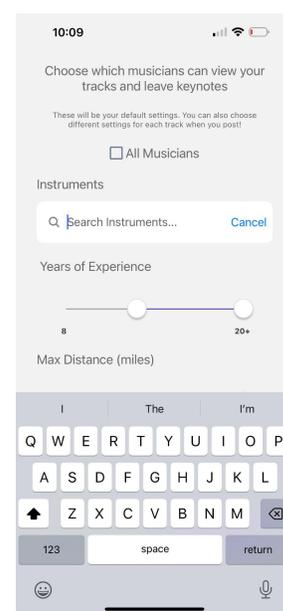
Finally, our complex task allows users to choose their default settings for which musicians can view their music and leave them keynotes. This is our complex task because we expect that users will not wish to change their default settings frequently; if they want to tweak their settings for an individual track, they may do so while uploading the track. For this task, users filter musicians based on the instruments they play, their years of experience, and their geographic location. Alternatively, users can choose “All musicians.” This task can be accessed from a user’s own profile.



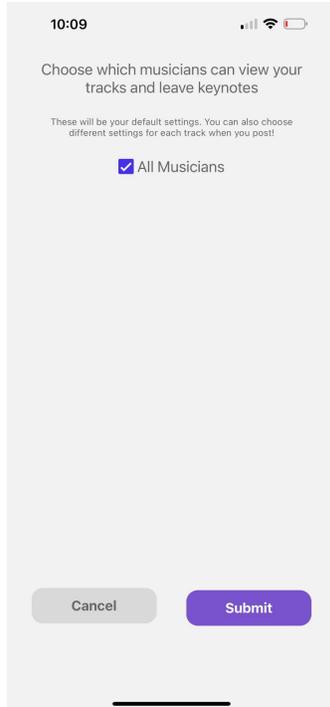
Go to settings from your profile



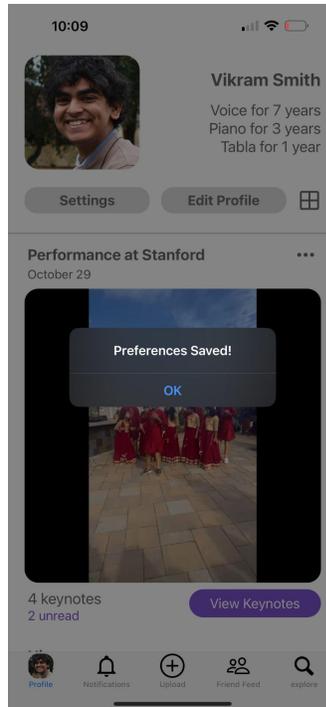
Adjust preferences for musicians



Choose specific instruments



Option to choose "all musicians"



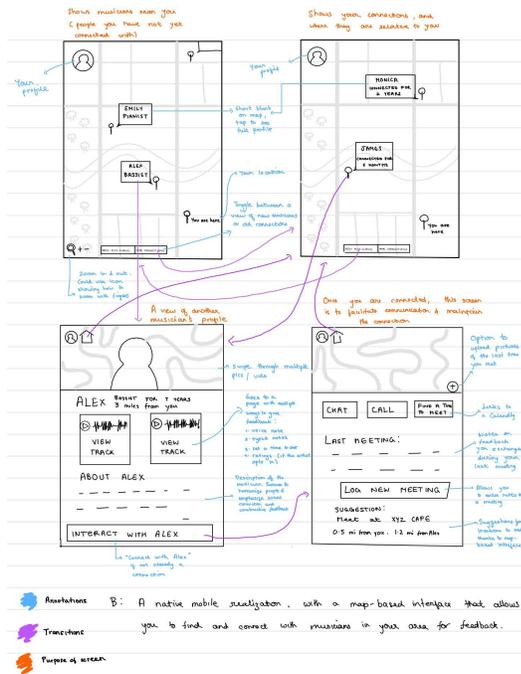
Click save to go back to profile

Task 4 from hi-fi prototype: Choose which musicians can view your music and leave you keynotes

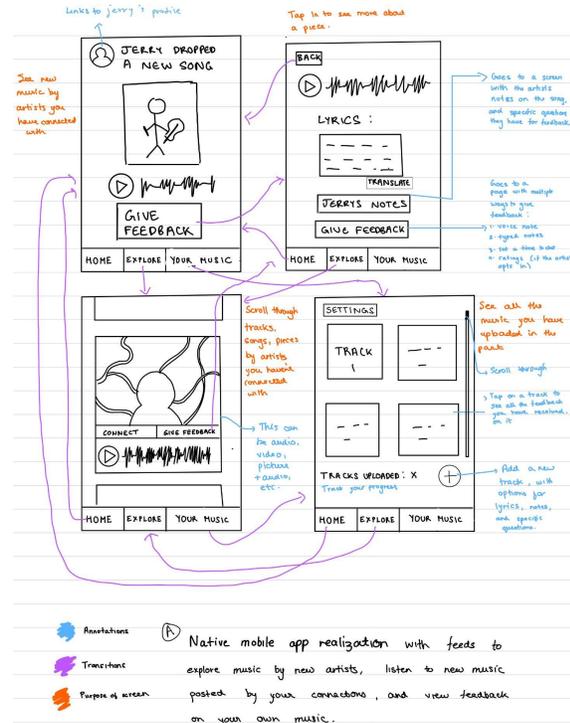
## Design evolution: Visualization(s) and rationale

### Initial Design

Guided by insights from our needfinding and ideation process thus far, we began brainstorming different realizations for our chosen solution. We explored several design directions, including AR/VR and mobile apps. Although we liked the interactivity of AR and VR, we decided that a mobile app would be both more feasible to implement and more accessible to our musician user base. We narrowed down our ideas to two options: 1) a mobile app with a map-based interface and 2) a mobile app with explore, following, and profile pages. We further sketched out each of these to evaluate which to choose.



Mobile app with a map-based interface



Mobile app with explore, following, and profile pages

We liked that option 1, the map-based interface, would encourage users to leverage connections outside of the app, promote local music scenes, and bring a more tangible sense of community with options for both in-app and in-person feedback sessions. However, we realized that the focus on interactions with nearby musicians came with a corresponding set of problems. For one, the benefit to users would completely depend on the musicians who happened to be nearby, which would put musicians who are already frustrated with the number or diversity of musicians in their local area at a disadvantage. Additionally, the focus on in-person interactions meant both that there would be more friction to share feedback (vs. more easily sharing feedback in-app) and that we would

have to consider the privacy and safety risks of users knowing each other's location and meeting in person.

Ultimately, we decided to move forward with option 2, the mobile app with explore, following, and profile pages. This realization, of course, is not without its concerns: the feedback sessions on the app could be more superficial than in-person feedback, and, as all social media platforms must, we would have to find a way to counteract harmful behavior. After comparing the two options, however, we decided that a platform with explore, following, and profile pages would allow for interactions within a wider, more diverse set of musicians and provide a low-friction way for musicians to give and receive feedback.

### **Low-Fi Prototype**

After deciding on our final realization, we created our low-fidelity prototype using poster board, tape, pencil, and highlighters. The prototype consisted of 12 iPhone 14-shaped screens, on which testers can tap "buttons", write in "text boxes", and move "toggles."



Low-fi prototype screens

For a more detailed look at our low-fi task flows, please see appendix B

## Usability Testing

With this low-fi prototype, we began usability testing. We conducted 6 usability tests in total, all in person, with a diverse set of 6 testers ranging from college students to retirees. In each test, one team member served as the “computer” who changed the “screens” based on tester interactions, and another team member served as the notetaker. Testers were asked to complete each of our three tasks using our prototype with no guidance from team members.

## Results

For each tester, we kept track of the errors made during each task and the time taken for each task. 5 out of 6 testers were able to complete all of the tasks; notably, tester 3 was unable to complete the first task, uploading a new track, and had to end the test. This

first task, uploading a new track, both had the most errors and took the most time for testers to complete, though none of our tasks were without errors.

Below are key observations from each of our testers:

- Tester 1: Thought “find new musicians” tab was to request feedback from new musicians, instead of to find music by new musicians
- Tester 2: Confused because there were two different “give feedback” buttons
- Tester 3: Could not find a way to add new music, kept oscillating between “musicians you follow” and “find new musicians” tabs
- Tester 4: Could not find the button to upload a track, confused by features of giving feedback page
- Tester 5: Said “this feels intuitive like Instagram”
- Tester 6: Said some of the navigation unintuitive, button to add track unclear

Overall, we were surprised to find that tasks that we had intended to be the most intuitive, like our simple task of uploading a track, turned out to be the tasks that testers had the most trouble completing. We noted that the majority of user confusion stemmed from two big picture issues: unclear functions, where users interpreted elements as having different functions than we intended, and complexity, where users got lost during the multiple steps it took to navigate through the app to complete a task. Correspondingly, as we moved into the medium-fidelity prototype, our main focus was on improving on these issues by clarifying the function of elements and simplifying the required steps for each task.

## Med-Fi Prototype(s)

We built our med-fi prototype on Figma. Ultimately, we ended up making two med-fi prototypes on Figma, as the changes we needed to make after the heuristic evaluation of our first med-fi prototype were so extensive as to require a new med-fi prototype to reference when building the hi-fi.

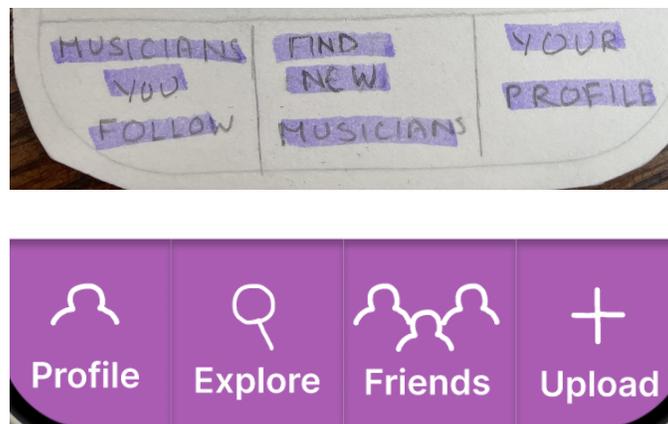
### *Design Changes: Low-Fi to Med-Fi (v.1)*

We made several design changes to our prototype between the low-fi prototype and the first version of our med-fi prototype, all within the categories of clarifying and simplifying. Below are representative examples of each category of design change.

*Clarify:* Update tabs and language of navigation bar.

Problem: Users found the navigation bar unintuitive and hard to interpret.

Solution: Clarify the description of each tab, and add icons for visual cues.

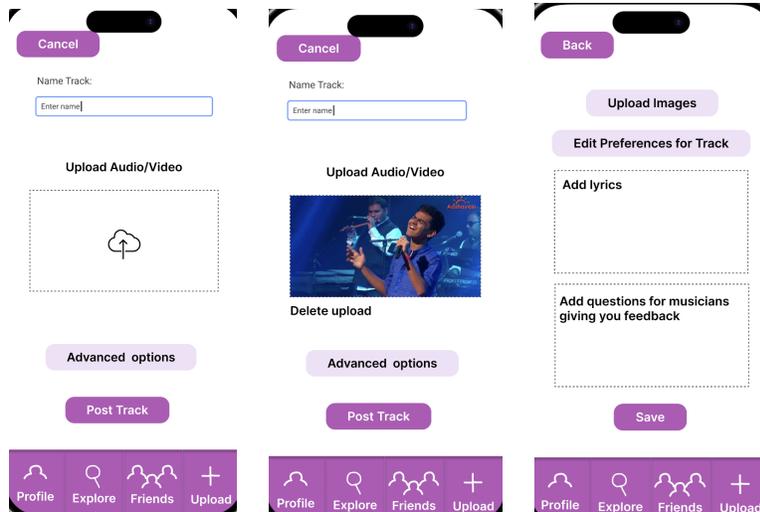
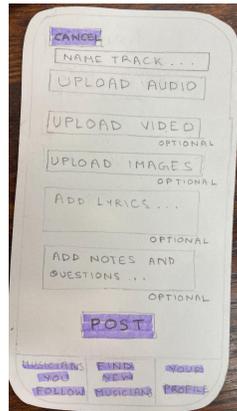


Example of clarification: Changes to navigation bar from low to med-fi v.1

*Simplify.* Upload a new track task flow

Problem: The upload track page was too busy and overwhelming for users.

Solution: Split task flow into a simplified page to add audio/video and a separate page for more complicated additions like lyrics, notes, and questions.



Example of simplification: Changes to upload track flow from low to med-fi v.1

## *Heuristic Evaluation*

Other members of our CS 147 studio outside of our team performed a heuristic evaluation on our med-fi prototype. The evaluators found a total of 93 violations, with the majority of violations being from 4 categories:

- H8: Aesthetic and Minimalist Design: The overuse of color was distracting and looked unintentional.
- H1: Visibility of System Status: There was a lack of feedback to users when they successfully completed a task (leaving feedback, uploading a track or changing their settings).
- H6: Recognition not Recall: Pages were missing reminders of key information about tracks/users necessary for multi-step task flows.
- H7: Flexibility and Efficiency of Use: There was a lot of friction created when the user wanted to view the feedback they have received on a track.

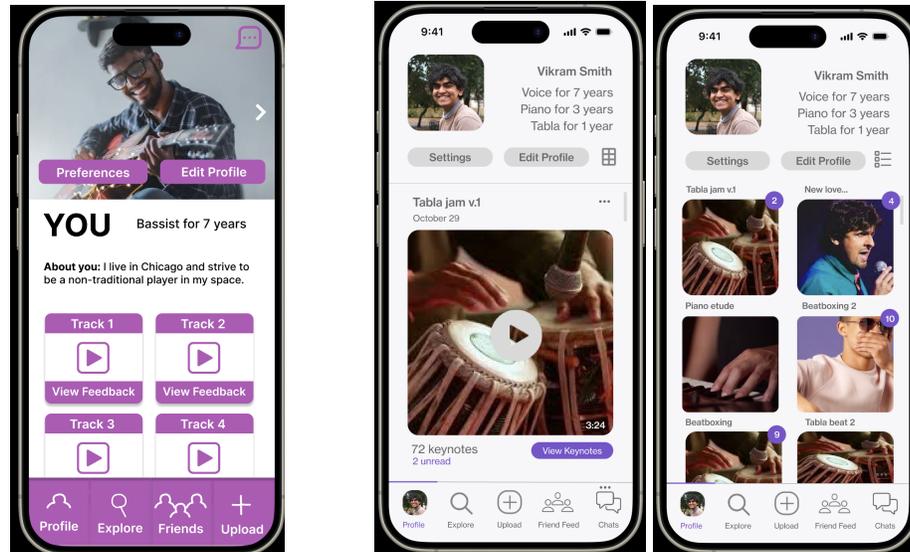
Appendix C contains a list of all severity 3 and 4 violations, separated by task flow. We addressed each of these violations when creating Med-Fi Prototype v.2.

## *Design Changes: Med-Fi Prototype (v.1) to Med-Fi Prototype (v.2)*

Given the number of violations found in our heuristic evaluation, we decided to create a second version of our med-fi prototype and undertake a complete redesign of the platform on Figma. These revisions were too comprehensive to enumerate fully, but below are examples of changes we made corresponding to the 4 most common group of serious violations: H8, H1, H6, and H7.

### *H8: Aesthetic and Minimalist Design*

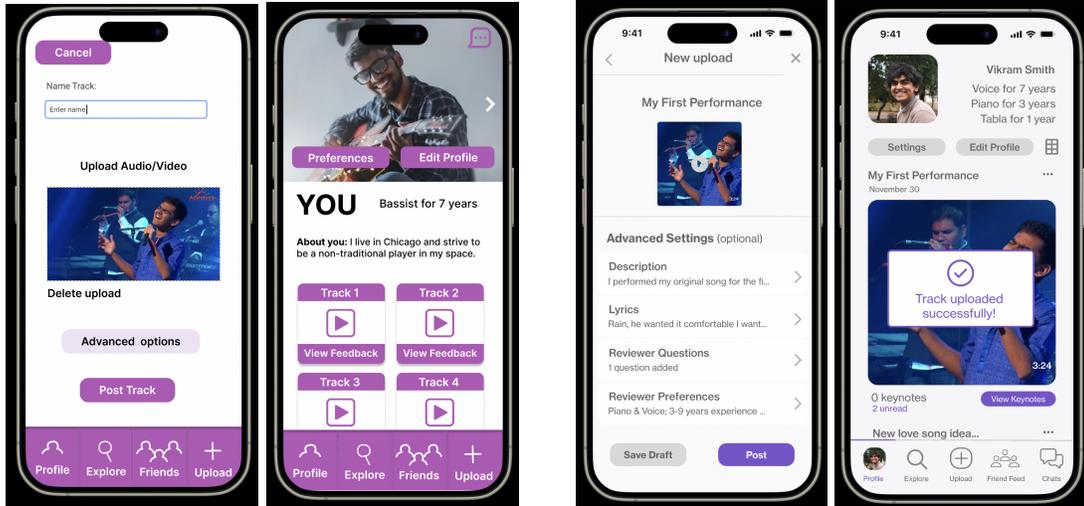
In the old med-fi, there was an overuse of bright purple and inconsistency in text color, size, and weight without meaning. In the new med-fi, purple is used sparingly and to indicate the most important elements on the screen. We also standardized the buttons, and text size and weight now indicates a hierarchy of information.



Example of changes from med-fi v.1 to v.2 that addressed H8 violations

### *H1: Visibility of System Status*

In the old med-fi, there was no feedback to the user confirming that their action of posting the track was successful. In the new med-fi, users get a notification that their action was successful.



Example of changes from med-fi v.1 to v.2 that addressed H1 violations

### H6: Recognition not Recall

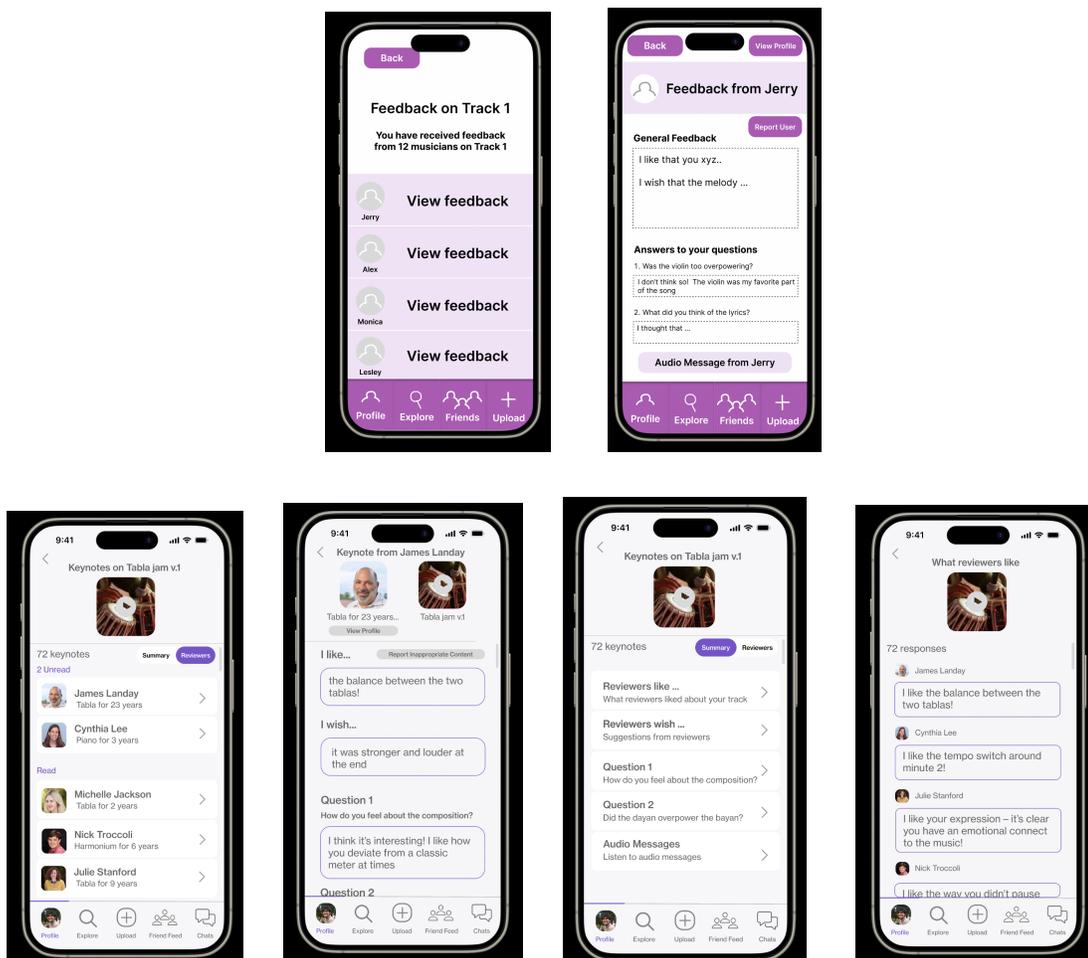
In the old med-fi, there was no ability to play the track on either of the feedback viewing screens, nor any reminder of the track for which the user is viewing feedback. In the new med-fi, users can play the track for which they are viewing feedback and see the reviewer who left feedback.



Example of changes from med-fi v.1 to v.2 that addressed H6 violations

## H7: Flexibility and Efficiency of Use

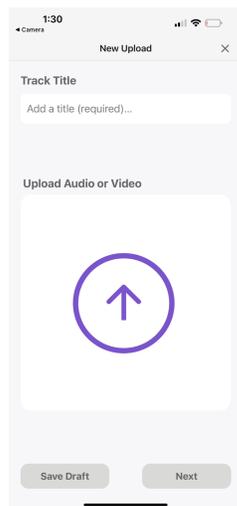
In the old med-fi, there was only a vague message about the number of feedback a track has received and no information about the users giving feedback to provide context to the user. In the new med-fi, keynotes are filtered into read and unread, with a total number of keynotes listed above. Key information about the person giving feedback is listed on both screens. Additionally, users can also view their feedback in a summary view, separated into positive comments, constructive comments, and answers to their questions.



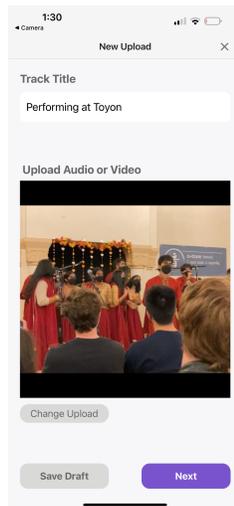
Example of changes from med-fi v.1 to v.2 that addressed H7 violations

## Hi-Fi Prototype

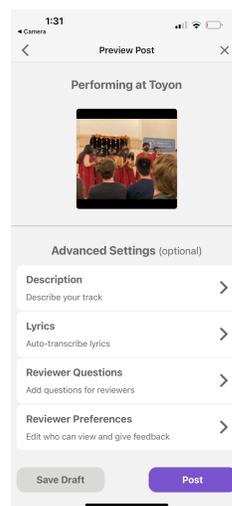
To build the hi-fi, we used React Native and Expo for mobile development. Since we chose to formalize all of the design changes after the heuristic evaluation in a second med-fi prototype on Figma (see above), our hi-fi prototype was almost indistinguishable from our final Figma task flows.



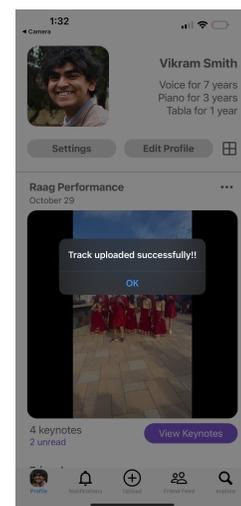
Add a title and upload a video



Confirm/change video

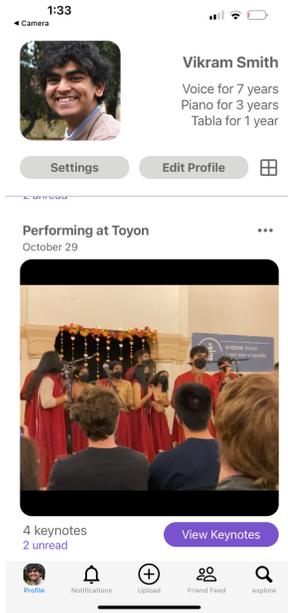


Click post

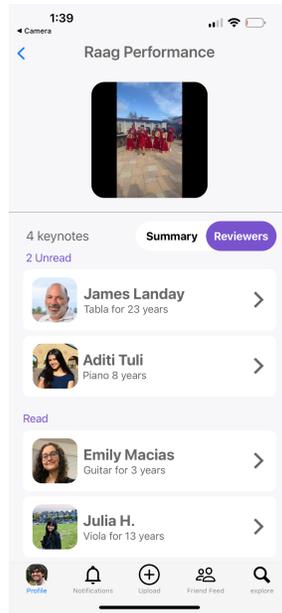


Track is added to your profile

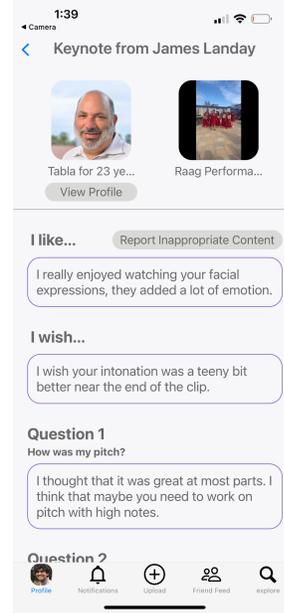
Task 1 from hi-fi prototype: Sharing a track with no advanced settings (advanced settings are implemented and shown in appendix A)



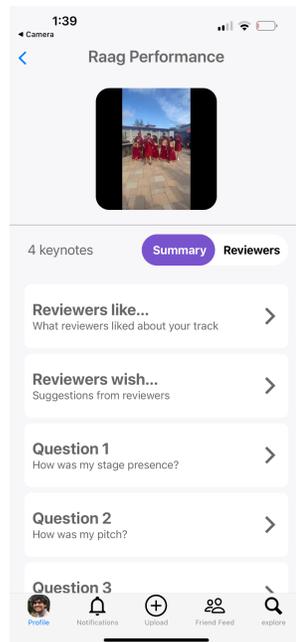
Click "view keynotes" under a track



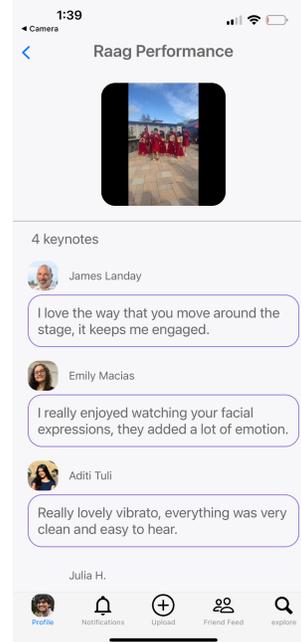
See keynotes from individual people



View one keynote in detail



Go back and choose summary view

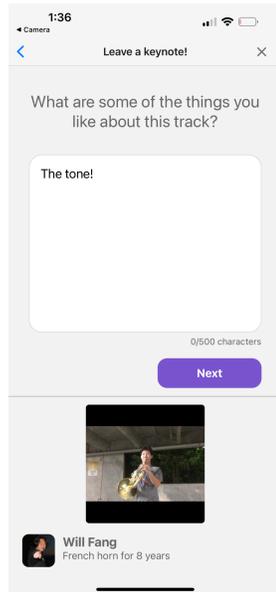


See all positive comments in one place

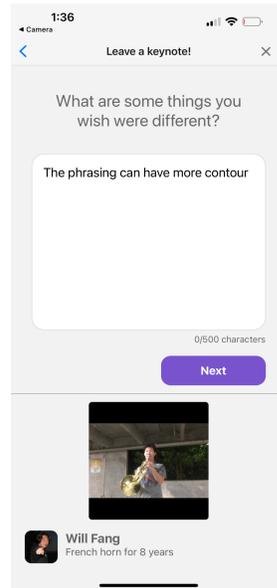
## Task 2 from hi-fi prototype: View keynotes (feedback) on a track you posted



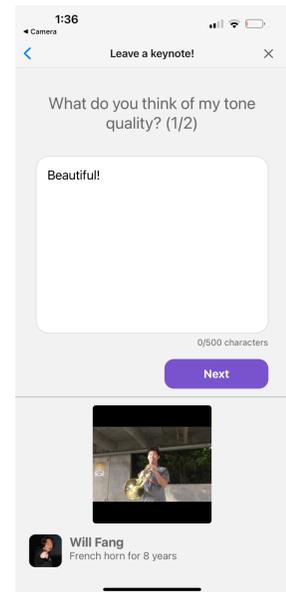
Find a new musician



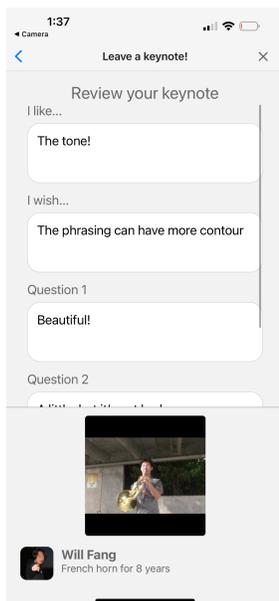
Leave a positive comment



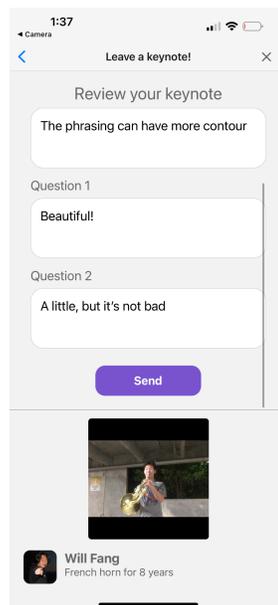
Name an area of improvement



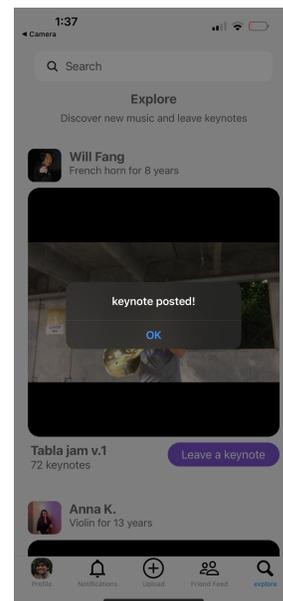
Answer their questions



Review the whole keynote

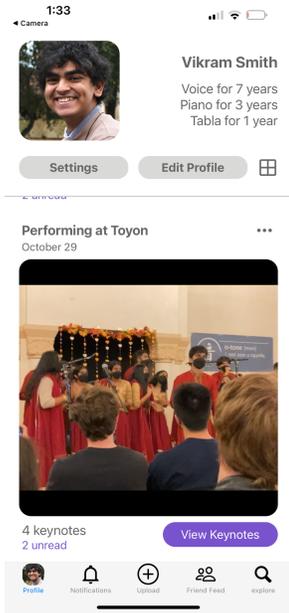


Hit send

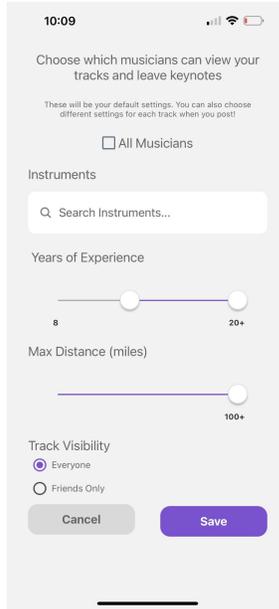


Taken back to the explore feed

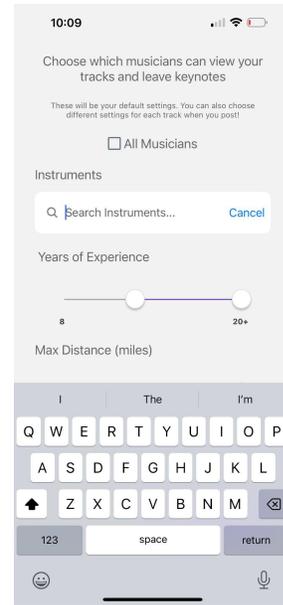
Task 3 from hi-fi prototype: Leave a keynote for another musician



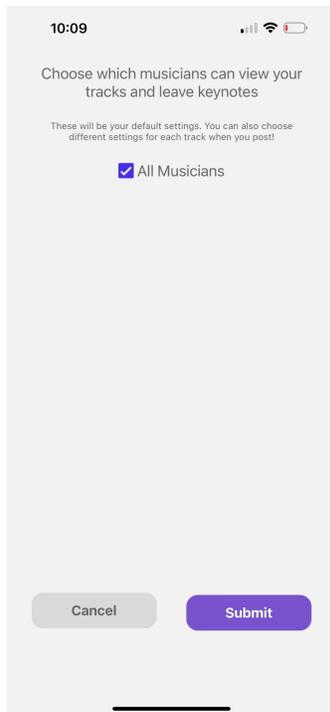
Go to settings from your profile



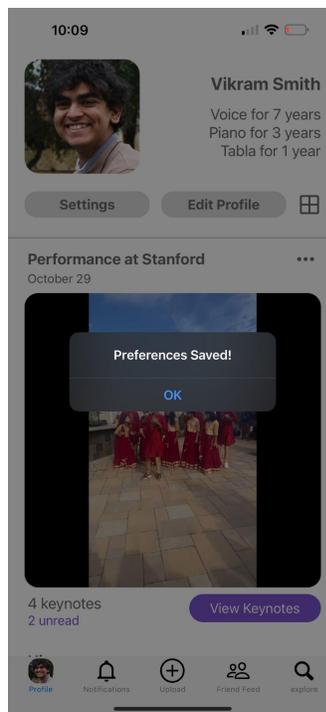
Adjust preferences for musicians



Choose specific instruments



Option to choose "all musicians"



Click save to go back to profile

Task 4 from hi-fi prototype: Choose which musicians can view your music and leave you keynotes

## Values in Design

### **Protecting marginalized or otherwise vulnerable users**

Keynotes provides musicians with a platform through which they can share feedback with other musicians. However, as with all forms of online communication, this has the potential to hurt users. Bad actors - or anyone, whether on purpose or accidentally - can misuse these channels of communication to inflict harm on other users through hurtful language, threats, and other toxic behaviors. This risk is compounded for users that belong to marginalized communities. Therefore, one value that we chose to embed in our design is protecting marginalized or otherwise vulnerable users. The need to protect users is in tension with the need to protect users' freedom of speech and expression. Some design features that we included to address this tension are structuring keynotes to include at least one positive and one critical comment, a system for users to report inappropriate content for a level of community-enforced moderation, and allowing users to choose who gets to view and leave keynotes on their tracks.

### **Inclusion and Cultural Understanding**

We also identified inclusion and cultural understanding as a value to embed in our design. We recognised that music can be highly culturally specific, and that users from non-white cultural backgrounds may feel alienated if other users don't appreciate the cultural context or language of their music. Minoritized cultures may be more harshly judged, creating a toxic or discriminatory space. At the same time, musicians may want to get feedback from as many people as possible; this creates a value tension between protecting against cultural alienation and maximising outreach. We chose to prioritize inclusion and cultural understanding in the design process by allowing users to describe

their tracks and provide cultural context that other musicians may not already have. Further, we gave users the option to filter by instrument and geographic area when choosing who can view and leave keynotes on their track. Community enforced moderation provides another layer of protection for users.

### **Outreach and Accessibility**

Another value that we prioritized is outreach and accessibility. Keynotes makes musical growth and community available to musicians who may not otherwise be able to access it, due to barriers to formal music education. Having resources such as a private teacher may create power imbalances in levels of musical knowledge, which is why we allow users to filter by years of experience. However, using keynotes still requires access to instruments and the internet. While this lack of access is a systemic issue, we see the potential for keynotes to create an information sphere, where musicians can share and learn about resources in their local communities or online.

### **Technical Implementation**

To create the keynotes app, we used React Native and Expo for mobile development. Additionally, we used Supabase for the backend features implemented in the app. For version control, we used GitHub. These tools allowed for free development and easy collaboration, however our group experienced issues when exporting the app to a public Expo QR code/link as it blocked our backend from being able to fetch data even though it was able to fetch data when the code was run on our local server.

Our simple task of uploading a track to get feedback on is implemented with a backend. This means that when a user uploads a track, their uploaded information is sent and stored in a Supabase database. If they go to their profile after posting, this information will be fetched and they can see their new post on their profile (i.e. posting and seeing your new post works!).

In terms of hardcoded features, posts on the explore page and friend page are hardcoded unlike the posts on the profile page. Additionally, the feedback, number of keynotes, reviewers, and number of read/unread reviews on each post on the user's profile is hardcoded. The notifications page is also hardcoded. In terms of Wizard of Oz techniques, the auto-generating of lyrics option that a user can select when they upload a track is simulated. Instead of lyrics actually being auto-generated with an AI tool, a fake loading screen is provided and the auto-generated lyrics are automatically set to Taylor Swift's "Midnight Rain."

## Reflections and Next Steps

### Key Learnings

Over the course of these 10 weeks, we've learned almost an inconceivable amount about the design process. Although it's difficult to narrow down, our top three takeaways can be expressed in the following key learnings:

1. User empathy

Through the process of needfinding, we learned the importance of empathizing with users. Frankly, when we were brainstorming our problem space at the very beginning of the quarter, we prematurely had an idea in mind of exactly what

problem we thought we'd hear about in our needfinding interviews - and what solution we'd create to address it. It goes without saying that from our very first interview, we realized that we were completely off base. From that moment, we made a conscious effort to check our assumptions based on our own perspectives and lived experiences and really listen to what our interviewees had to say. We learned how to sense pain and pleasure points, both explicit and implicit, in our interactions with interviewees and testers. We can say with confidence that we kept this user-centered design mindset throughout the course of the project: keynotes' key features, from the organization of the feedback to the process to upload a track, can be traced back to the insights we learned from our interviewees and testers.

## 2. Testing and evaluation

We also learned the importance of testing and evaluation throughout the design process. The most prominent example of testing and evaluation materially changing the course of our design is the heuristic evaluation, which spurred a complete redesign of our med-fi prototype. We would not have known how to proceed without the insights gleaned from this evaluation and, as shown in the sections above, our final product is much better off because of it. Beyond just the HE, the diversity of tests and evaluations we ran our prototypes through challenged and validated our assumptions throughout the design process.

## 3. Intentionality in design

Finally, we learned the importance of intention at every step of the design process. Every design decision has consequences, in ways we didn't fully appreciate until we took this class. For example, we originally had interactable small purple text in

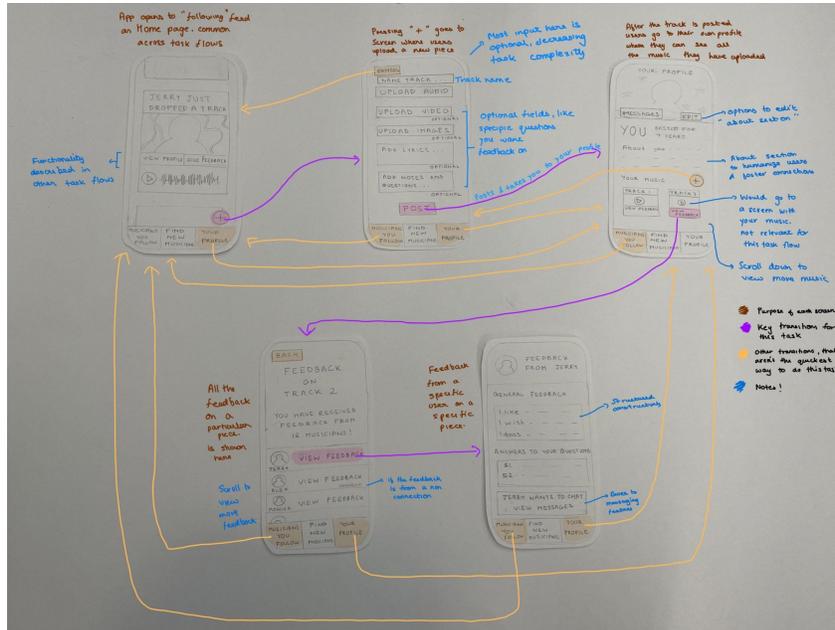
our prototype instead of buttons - until we received the feedback that blue tones and small text are more difficult to read for people with visual impairments. Throughout the course of this quarter, we have learned that inclusive design means making the conscious decision to take into consideration communities who are often left out of the conversation, from needfinding to hi-fi prototyping.

### **Possible extensions of keynotes**

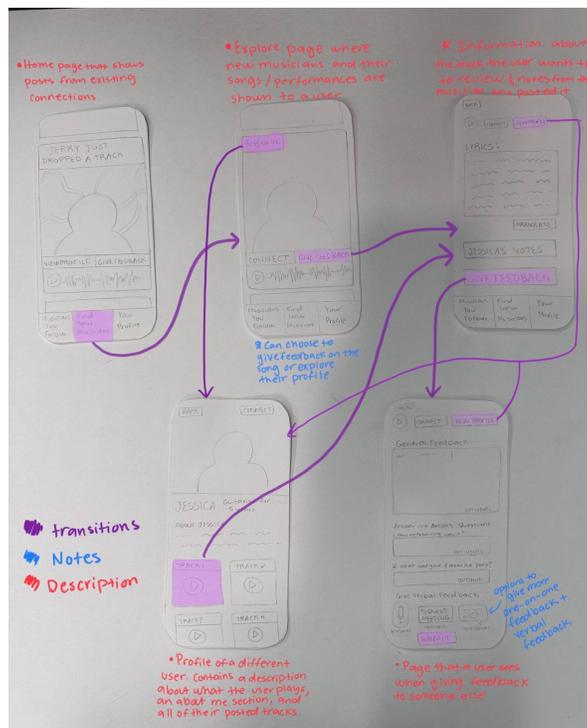
Given more time, we would further develop certain features that are not yet fully implemented in our prototype. These are the character count while typing in a description for a track, the search bar on the explore page and for specifying instrument preferences, and uploading an audio with no video. In addition to these, we have identified a few key features that we would be excited to add to keynotes if we had more time. First, we would add an option for synchronous feedback sessions, for real-time interaction and discussion between users. Another significant addition would be the ability to filter musicians by the genres of music they play, in addition to their instruments and years of experience. This would allow for a more personalized experience and, potentially, better feedback. It would also strengthen our value of inclusion and cultural understanding, as users could choose to only receive feedback from musicians who are familiar with their cultural genre. Finally, we would implement a feedback rating system. This system will recognize and reward users who consistently contribute valuable and helpful feedback, fostering a more engaging and constructive community environment.

# Appendix A

## Low-Fi Task Flows



Task 1: Upload a new track and give feedback from other musicians

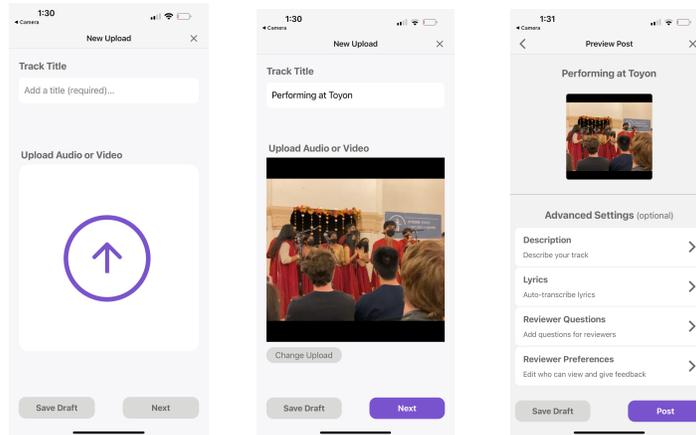


Task 2: Find a new musician on the app and give them feedback

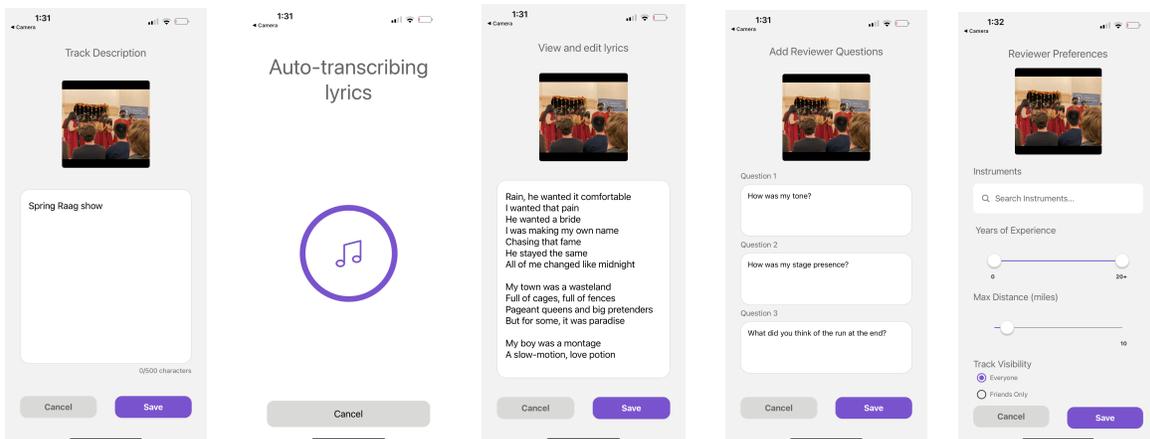


# Appendix B

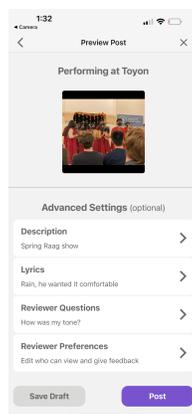
## Task Flow 1 with Advanced Settings:



Regular task flow



Advanced Settings Screens



Final page reflects changes to advanced settings

## Appendix C

### Heuristic Evaluation Violations

Below are the severity 3 and 4 violations noted for version 1 of our med-fi design. We addressed each of these violations when creating version 2 of our med-fi design.

#### Task 1: Upload a New Track

1. H11: Accessible Design / Severity: 3
  - Task: Upload a new track
  - Description: While artist can upload lyrics, the reviewer cannot access the lyrics to review
  - Rationale: If artists can upload lyrics but reviewers cannot access them, it limits the reviewer's ability to provide comprehensive feedback.
  - Fix: Allow reviewers to access and view the uploaded lyrics along with the track.
  - Fix: Introduce a reporting option to address privacy and safety concerns.
2. H7: Flexibility & Efficiency of Use / Severity: 3
  - Task: Upload a new track
  - Description: On the "Advanced options" screen, the "Upload Images" and "Edit Preferences for Track" buttons are larger than the save button.
  - Rationale: Might slow users down or make it unclear where they go to save because of multiple calls to actions. May confuse users about where to save, impacting usability.
  - Fix: Reorganize the layout for a more intuitive flow. Ensure the "Save" button is appropriately sized and positioned for user convenience.
3. H6: Recognition not Recall / Severity: 3
  - Task: Upload a new track
  - Description: Unclear what elements are required to post a track, and what are optional.
  - Rationale: Users may feel like they have to fill out all the information in advanced options to proceed. Lack of clarity may hinder users from successfully posting a track.
  - Fix: Clearly indicate required and optional fields. Use visual cues such as asterisks (\*) for required elements. Provide tooltips or help icons for additional guidance.
4. H3: User Control & Freedom / Severity: 3
  - Task: Upload a new track
  - Description: Edit preferences for track are in advanced options, but you can't see the track while you edit.
  - Rationale: Requires users to remember the track that they uploaded, slowing them down as they have to navigate back and forth. Slows users down and affects usability.
  - Fix: Implement a split-screen or pop-up preview to allow users to see the track while editing preferences.
5. H1: Visibility of System Status / Severity: 3
  - Task: Upload a new track

- Description: Track “uploads” automatically (hard coded to replace with an image).
  - Rationale: May be confused by the status of the upload. This affects the core functionality of the app and could cause confusion for users during the upload process.
  - Fix: Need feedback to the user that it has uploaded while it’s in progress to show, like a real-time progress indicator during the upload process
6. H1: Visibility of System Status / Severity: 3
- Task: Upload a new track
  - Description: Can’t play audio / video after updating it
  - Rationale: Users need to remember what they uploaded. Affects the ability to preview uploaded content, impacting user experience significantly.
  - Fix: Allow users to preview their uploaded content immediately after updating. Provide playback controls for audio and video.
7. H1: Visibility of System Status / Severity: 3
- Description: There is no notification for whether the uploading process has completed or if the file is ready for upload.
- Rationale: Users should be notified throughout the upload process and may be confused on whether they are ready to post track.
- Fix: Create a progress upload bar for a visual representation of upload status.

## Task 2: View feedback on a track

1. H6: Recognition not Recall / Severity: 3
- Task: View feedback on your track
  - Description: General feedback is a lot to read, with inconsistent sizes of text boxes
  - Rationale: Inconsistent text box sizes and a large amount of information requested from the user for general feedback can be overwhelming.
  - Fix: Streamline the feedback process, possibly by breaking down the information into smaller sections.
2. H5: Error Prevention / Severity: 3
- Task: View feedback on your track
  - Description: Not sure why the report user is a prominent option - colored in a primary color while the audio message is colored in a lighter color
  - Rationale: The prominence of the "report user" option in a primary color, compared to the audio message option in a lighter color, creates a confusing hierarchy.
  - Fix: Adjust the visual hierarchy to appropriately emphasize the audio message option.
3. H3: User Control & Freedom / Severity: 3
- Task: View feedback on your track
  - Description: Can’t play audio message from Jerry
  - Rationale: Requiring users to go into a separate screen to listen to an audio message from Jerry can disrupt the user experience.
  - Fix: Implement an inline audio player within the main interface.

4. H1: Visibility of System Status / Severity: 3
  - Task: View feedback on your track
  - Description: From the feedback screen, unclear who Jerry is unless I view their profile
  - Rationale: Lack of clarity about Jerry's identity without viewing their profile can cause confusion.
  - Fix: Provide essential information about Jerry on the feedback screen without requiring users to take additional actions.
5. H1: Visibility of System Status / Severity: 3
  - Description: After clicking on view feedback for a track, the notification at the top of the screen that says "received feedback from 12 musicians" does not indicate whether the feedback is new or if it's just a list of feedback.
  - Rationale: Users may be confused by whether that line determines that they have received new feedback in their inbox, represents the total number of feedback, or unread feedback, potentially making feedback selection harder.  
Fix: Clarify the notification text by using words that highlight whether the feedback is new, unread, or is the total number of feedback.
6. H7: Flexibility & Efficiency of Use / Severity: 3
  - Description: All feedback is titled as "View feedback" and users cannot see all feedback responses unless they click through each individual feedback page separately.
    - Rationale: If users want to view a specific piece of feedback again, they are unable to quickly scroll through and find it. Additionally, each piece of feedback is just labeled as "View feedback" which may be frustrating to click through to find a particular one.  
Fix: Integrate sections of each user's feedback into the main feedback page or allow for a scrollable option to easily scroll through snippets of all feedback at once, with an additional "View all" option per user to read the full feedback. Or, add a "next" button at the top of each individual feedback screen to directly access the next one.
7. H7: Flexibility & Efficiency of Use / Severity: 3
  - Description: Users cannot organize feedback when searching for specific answers to questions.
    - Rationale: It is inefficient for a user that is working to fix a particular problem in their music when they are unable to search through a categorized list of feedback to find answers to their questions.  
Fix: Add a notification section to view new notifications of feedback. Categorize feedback and let users see if their question has been answered.
8. H7: Flexibility & Efficiency of Use / Severity: 3
  - Description: No option for users to delete or archive feedback that has already been viewed.
    - Rationale: Once users start receiving more feedback, there may be potential overflow and disarray as large inboxes are hard to organize, leading to some frustration.  
Fix: Add an archive and manage feedback option to organize and store feedback entries.
9. H7: Flexibility & Efficiency of Use / Severity 3 / Found By: D

- Page: Profile Page
- Description: As a user of this app, the most important thing to me is the feedback on my tracks. It looks like the only way to view this info is from my own profile page, which shows me information about myself before it shows me my tracks.
- Rationale: I rarely need to look at my own profile information, but I will frequently need to look at the feedback on my tracks.
- Fix: Perhaps add some sort of “Tracks” page that is distinct from the profile page. This

Task 3: Find a new musician and give feedback

1. H8: Aesthetic & Minimalist Design / Severity: 3

- Task: Find a new musician on the app and give them feedback
- Description: View profile and add buttons are really small
- Rationale: Hard for users to tap.
- Fix: Enlarge the view profile and add buttons for better touch accessibility.

2. H4: Consistency & Standards / Severity: 3

- Task: Find a new musician on the app and give them feedback
- Description: Give verbal feedback has multiple buttons (chat, microphone, request meeting)
- Rationale: The presence of multiple buttons (chat, microphone, request meeting) for verbal feedback can create confusion about their respective functions.
- Fix: Streamline verbal feedback options into a single, clearly labeled button or menu, or a multi-step flow.

3. H4: Consistency & Standards / Severity: 3

- Task: Find a new musician on the app and give them feedback
- Description: Buttons on the top (back, view profile, add friend) all have the same size and hierarchy with different text sizes
- Rationale: Back button is equally emphasized as the view profile and add friend buttons. Uniform button sizes and hierarchy for top buttons, especially when dealing with different actions like going back, viewing a profile, and adding a friend, can create confusion.
- Fix: Differentiate button sizes and hierarchy based on their importance and function.

4. H3: User control and Freedom / Severity: 3 / Found by: B

Description: When clicking on “Post Feedback”, the user is automatically taken back to the profile screen of who they gave feedback to.

- Rationale: The navigation may not be intuitive to a user who is scrolling through the explore page to listen to multiple tracks in a row. There was also no expectation by the user to be brought to the profile of the person they are giving feedback to.
- Fix: Add a “back” button to take the user back to the explore page.

5. H6: Recognition not Recall / Severity: 3 / Found by: B

Description: Users do not have access to the track they are commenting on once they click on give feedback.

- Rationale: Users have to actively recall the track or go back to the “Explore” page to relisten, which can be frustrating when giving feedback.
- Fix: Provide the track at the top of the “give feedback” page to make the

feedback giving process more efficient.

6. H8: Aesthetic & Minimalist Design / Severity: 3  
Description: The navigation bar with “Profile, Explore, Friends, Upload” is still visible on the give feedback screen despite it not being used for that task.
  - Rationale: The give feedback screen is cluttered because of the navigation bar, making it overwhelming for the user when they are attempting their task of giving feedback.
  - Fix: Remove the navigation bar on the give feedback screen.
7. H8: Aesthetic & Minimalist Design / Severity: 3  
Description: Viewing another user’s profile shows a “Message” and “Add Friend” button in the place of the “Preferences” and “Edit profile” button in the user’s personal profile page.
  - Rationale: The user may be confused by the similar buttons, which are in the same location and have the same design, when going between their page and another users’.
  - Fix: Differentiate the buttons by changing the “Add Friend” and “Message” icon to something more intuitive, such as a chat icon or an icon of a silhouette and a plus sign.
8. H1 Visibility of System Status / Severity: 3
  - Task: Find a new musician and give feedback
  - Description: Can’t tell which tab I am on in the navigation panel.
  - Rationale: Users may get confused as to where they are in the app.
  - Fix: Update UI to switch tab color based on where you are
9. H12: Value Alignment & Inclusion / Severity: 3 / Found by B
  - Task: Find a new musician on the app and give them feedback
  - Description: No option to report the user, while reporting option is given in other places
  - Rationale: The absence of an option to report the user is a privacy and safety concern. Including a reporting option ensures a mechanism for addressing inappropriate content or behavior.
10. H3: User Control & Freedom / Severity: 3
  - Task: Find a new musician on the app and give them feedback
  - Description: Audio waveform doesn’t let me adjust controls of how much I want to listen to or replay
  - Rationale: Lack of controls for adjusting the audio playback may frustrate users who want to fine-tune their listening experience.
  - Fix: Introduce audio control options such as volume, playback speed, and a seek bar to give users more control over their listening experience.
11. H6: Recognition not Recall / Severity 3 / Found By: D
  - Page: Explore Page
  - Description: I am unclear on what content is being shown to be on this page. My initial assumption was that it was showing me potential friends that I can add. But the more time I spend on it, I feel like it’s actually showing me specific tracks that I can give feedback on (?)
  - Rationale: The explore page appears to be a core page in your app, so when your user navigates to this page, it should be very clear what content they are looking at.

- Fix: If this page is in fact meant to show the user tracks, I would update the top of each track card to include the name of the track. E.g. "Springtime Symphony by Jessica H." or "Track 1 by Jessica H."
12. H7: Flexibility & Efficiency of Use / Severity 3 / Found By: D
- Page: Give Feedback Page
  - Description: There's no way to easily replay the track that I'm giving feedback on as I'm entering in the feedback. I either have to go back to the explore page to play it again or just remember what my feedback was.
  - Rationale: If I'm trying to give critical feedback on a piece, I may want to play parts of it multiple times.
  - Fix: Add some UI at the top of this page that allows the user to replay the track they're giving feedback on.

#### Task 4: Change your preferences for which musicians can give you feedback

1. H4: Consistency & Standards / Severity: 3
- Description: The term "Preferences" has been used on both the individual personal profile and when uploading a track, with little differentiation between the two.
  - Rationale: "Preferences" isn't intuitive when used for both of these cases since it can be interpreted as preferences for the explore page or preferences for the feedback the user wants to receive on their track. The user may also think that both buttons lead to the same page, causing potential confusion.  
Fix: Reword the preferences buttons to make them more intuitive for the user or change the design to indicate different functionalities. If the functionalities are the H4 Consistency and standards / Severity: 3
  - Task: Change your preferences for which musicians can give you feedback
  - Description: "Preferences" and "Edit profile" sound similar and it may be hard to tell at first glance which does what
  - Rationale: Users may not know which one to press to find settings
  - Fix: Adjust wording for preferences
2. H12: Value Alignment & Inclusion / Severity 3 / Found By: D
- Page: Feedback Preferences Page
  - Description: It appears that there isn't an option to only allow people who you are friends with to give you feedback.
    - i. If it is your intention that only friends can give each other feedback, then I'm not 100% sure what this page is for.
    - ii. If it is your intention that anyone who meets the criteria in your preferences can give you feedback (regardless of whether or not they are a friend), then this is where I see a potential value alignment issue (see rationale below).
  - Rationale: Some users may be too sensitive to open themselves up to getting feedback by people who they have not explicitly added as a friend.
  - Fix: Allow users to select that they only want to receive feedback from friends.

## All tasks / Extra Violations

### 1. H4: Consistency & Standards / Severity: 3

- Description: On the profiles of the users in the “Explore” page, there is an option to view profile next to their name. However, in the “Friends” page, that option is gone and you are unable to click on view profile unless you click on “Give feedback” for the friend.
- Rationale: This may have just been a Figma or design error as there was an “Add Friend” option once you click on “Give feedback” for your friend, but it can be confusing due to the inconsistency with profiles.  
Fix: Make profiles consistent and easy access to viewing full profiles of your friends.

### 2. H3 User control and freedom

- Severity: 4
- Description: When on friend’s page and giving feedback, there is no back button.
- Rationale: Users may click “give feedback” on accident and not have a way back
- Fix: Add back button