Usability Testing Review

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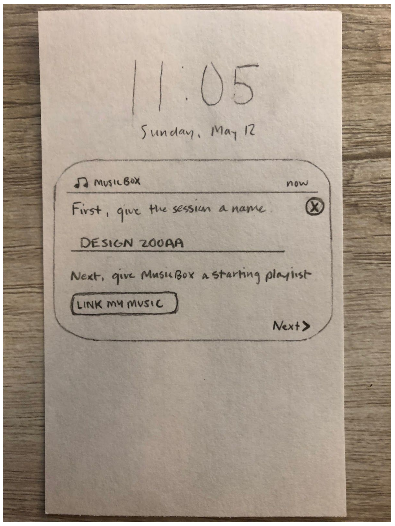
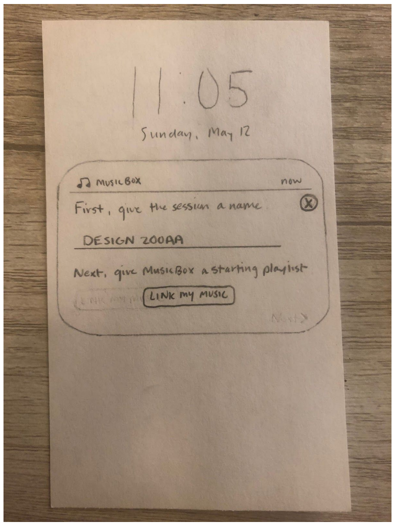
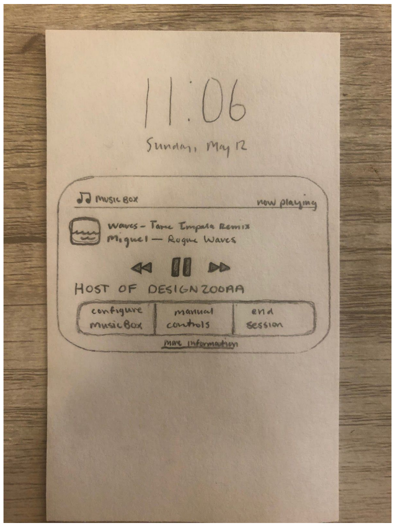
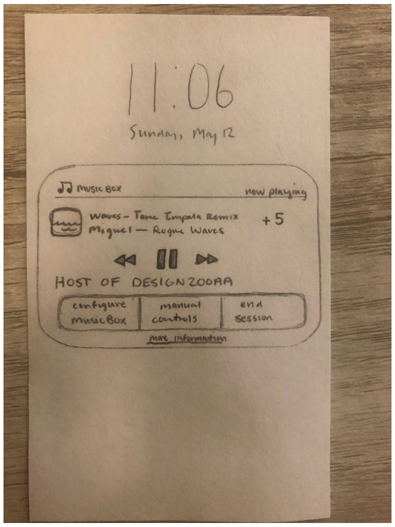
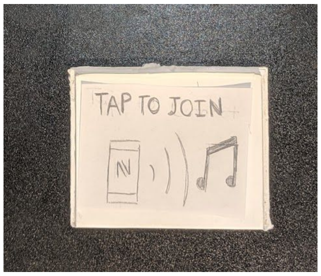
CSE440 AA

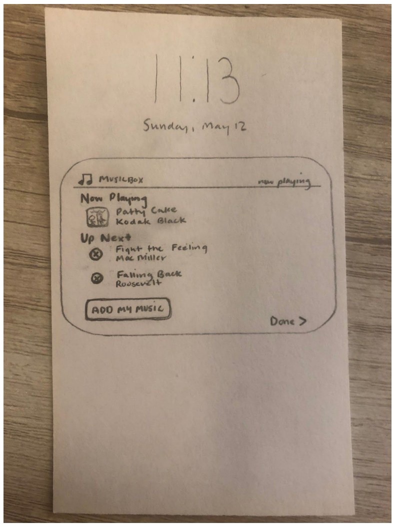
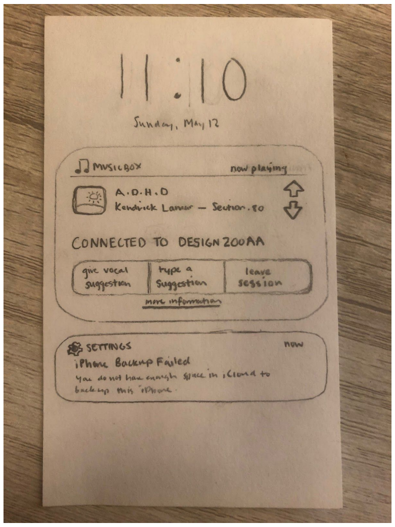
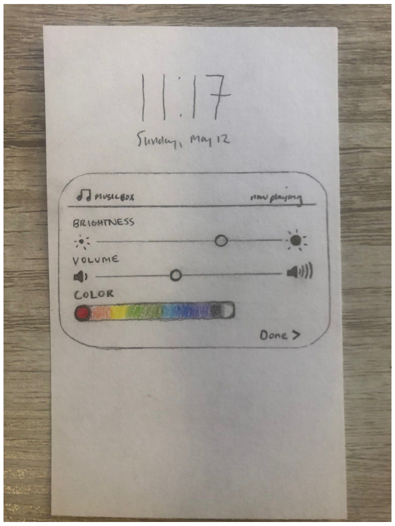
Usability Test #1:

Christina Stanfield conducted the first usability test with a Design major in an on-campus private study room. The participant is a mutual friend of Stanfield previously unfamiliar with the course project and was chosen because he belongs to our target group of users. During the first part of the test the participant played through the role of “host”, and in the second part he interacted as an “attendee”. Stanfield first explained our primary tasks (dynamically playing music & providing feedback) and then asked him to show how he might use the given screens to complete the tasks. Stanfield observed the participant organize the given screens and work through the UI flow, providing additional short clarification/confirmation only if asked. Overall, the participant walked through the screens in perfect order with little prompting and was able to successfully complete the tasks in a short amount of time. The participant had a difficult time initially understanding how the physical MusicBox device worked in regards to host onboarding—for future tests, writing a “quick start”/“set-up”/”user guide” pamphlet that would accompany the device in a real-life unboxing scenario might help and be more realistic. Stanfield also found manually writing feedback and recording the time spent on specific tasks while observing the participant was difficult and might have preferred taping the entire session.

Results from Usability Test #1:

Prototype	Incident	Revisions
 11:05 Sunday, May 12 MusicBox now First, give the session a name DESIGN 200AA Next, give MusicBox a starting playlist LINK MY MUSIC Next>	Negative Severity: 2 The participant was confused how “Link My Music” worked. This button opens the host’s Spotify/Apple Music/music streaming service for them to select a starting playlist or song. The participant thought the “Next” button was redundant and the widget should simply move on from this view once initial music is chosen without requiring them to press “Next”.	 11:05 Sunday, May 12 MusicBox now First, give the session a name DESIGN 200AA Next, give MusicBox a starting playlist LINK MY MUSIC The “Next” button is removed and the “Link My Music” button centered to show that it is a

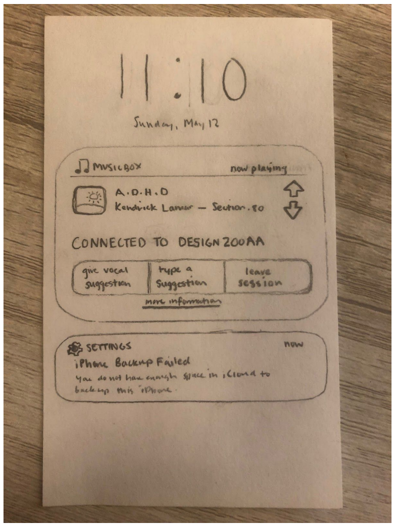
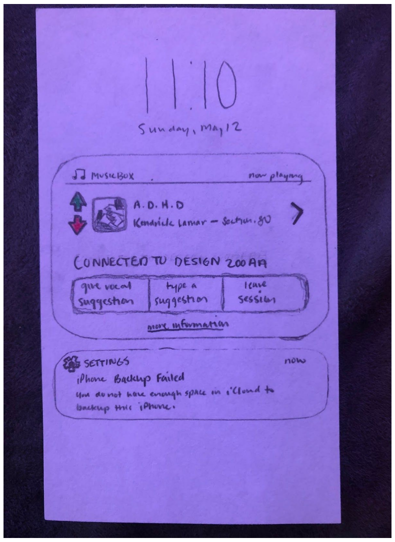
		required field.
 11:06 Sunday, May 12 Music Box now playing Waves - Tame Impala Remix Miguel — Rogue Waves HOST OF DESIGNZOOAA configure MusicBox manual controls end session more information	Negative Severity: 1 The participant thought the host should be able to clearly see the system status of upvotes and downvotes on the currently playing song. This allows the host to quickly adjust the song if needed.	 11:06 Sunday, May 12 Music Box now playing Waves - Tame Impala Remix Miguel — Rogue Waves +5 HOST OF DESIGNZOOAA configure MusicBox manual controls end session more information A simple number count, e.g. “+5” or “-3” displays next to the currently playing song in the host’s overview.
	Neutral The participant liked the idea of manually tapping an NFC reader to join, but wondered if it would be feasible/easy to accomplish in a crowded classroom setting. He wasn’t confident this would actually be a real problem—was just thinking out loud.	We will flesh this out further in additional usability tests and iterate the prototype if needed.

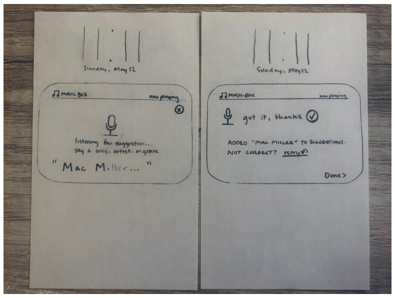
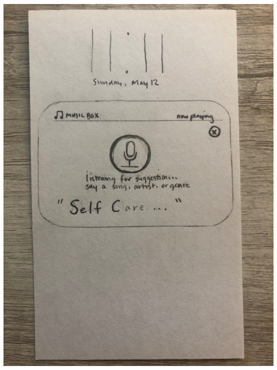
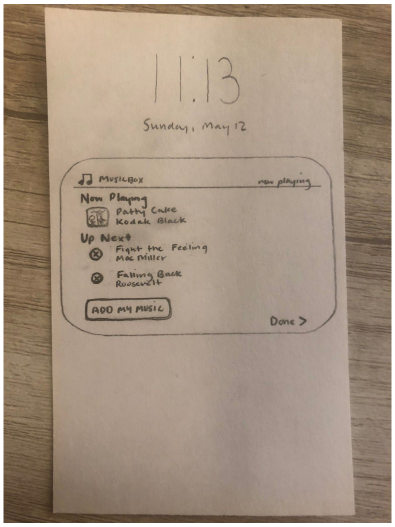
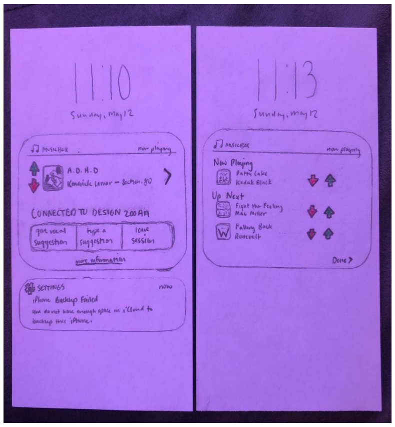
 11:13 Sunday, May 12 MUSICBOX now playing Now Playing Patty Cake Kodak Black Up Next Fight the Feeling Mac Miller Falling Back Roosevelt ADD MY MUSIC Done >	Positive The participant liked the idea of the host being able to view MusicBox's upcoming queue and optionally adjust if needed. The extra level of control gave him more freedom and comfort in knowing what was going to be played, even if it is not necessarily needed (because MusicBox already handles the task of dynamically playing music).	
 11:10 Sunday, May 12 MUSICBOX now playing A.D.H.D Kendrick Lamar – Section.80 CONNECTED TO DESIGN200AA give vocal suggestion type a suggestion leave session more information SETTINGS now iPhone Backup Failed You do not have enough space in iCloud to backup this iPhone.	Positive The participant instantly understood how to provide feedback and liked how there were multiple ways to provide it. He found the interfaces for vocal and typed suggestions easy to use, and really liked the ability to give quick feedback through the upvote/downvote system, like on Reddit.	
 11:17 Sunday, May 12 MUSICBOX now playing BRIGHTNESS VOLUME COLOR Done >	Positive The participant was excited by the ability to customize MusicBox's color and brightness and thought it would look really cool next to his existing speaker. He mentioned it would be awesome if the widget color would subtly shift to match the color of MusicBox.	We can explore the idea of matching MusicBox's color to the color of the on-screen widget, perhaps easiest to implement during the digital prototype phase.

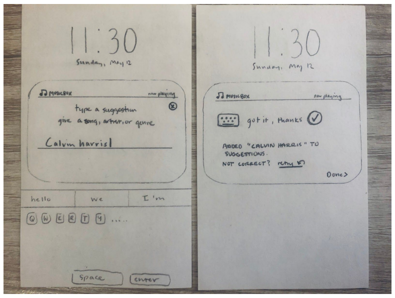
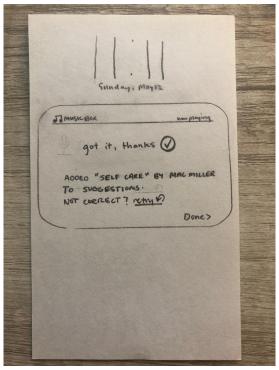
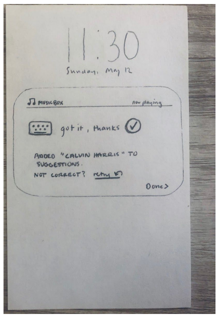
Usability Test #2:

Trevor Alexander and Christina Stanfield conducted the second usability test with an Art student. The test was conducted in an empty art classroom after normal school hours. The participant is a peer of Alexander's friend, and agreed to participate during a study break. He was unaware of the class project before the test. The location was chosen out of convenience because he was studying in the Art Building at the time, and it is a place where our target users would actually use our design. Alexander gave him a brief overview of the problem of selecting music in a group and also gave him a moment to familiarize himself with the MusicBox itself. After that, the participant was placed in a test where Alexander was the "leader" of the group and the participant was an "attendee" (Stanfield observed). If the participant got stuck, he was instructed to ask Alexander for help in the way he would ask his friend in a similar situation. The participant was quickly able to "tap into" the MusicBox and join as an attendee. From there, he had no problem navigating the suggestion screens, but did have some difficulty with a few features that he felt were not explained enough (described below). Overall, the test simulated a real situation well and the design will be made more attendee-friendly, especially for first-time attendees.

Results from Usability Test #2:

 11:10 Sunday, May 12 MUSICBOX now playing A.D.H.D Kendrick Lamar – Section.80 CONNECTED TO DESIGN 200AA give vocal suggestion type a suggestion leave session more information SETTINGS now iPhone Backup Failed You do not have enough space in iCloud to backup this iPhone.	Negative Severity: 2 The participant was unclear on the purpose of the arrows. Once explained that they are for feedback, he was able to infer they were upvote/downvote buttons. Negative Severity: 1 Flip "now playing" and MusicBox sides.	 11:10 Sunday, May 12 MusicBox now playing A.D.H.D Kendrick Lamar – Section.80 CONNECTED TO DESIGN 200AA give vocal suggestion type a suggestion leave session more information SETTINGS now iPhone Backup Failed You do not have enough space in iCloud to backup this iPhone. The upvote arrow is now green colored and the downvote arrow red colored to more clearly signify their purpose. We chose to keep the "🎵MUSICBOX" and "now playing" header labels in their current positions because it mirrors the design of other lockscreen widgets.

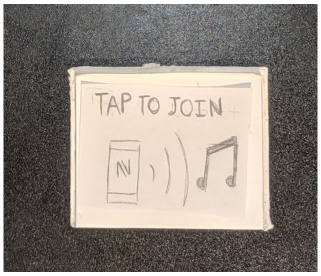
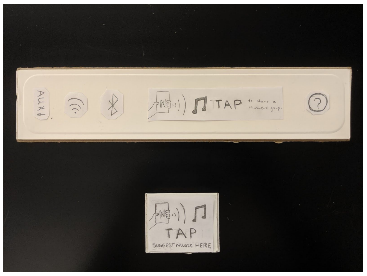
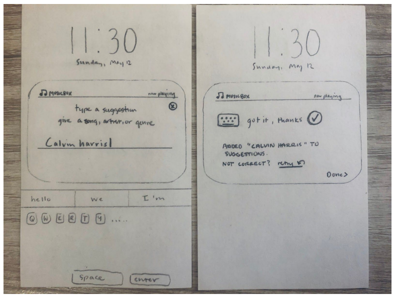
 11:11 Sunday, May 12 Music Box now playing listening for suggestion... say a song, artist, or genre " Mac Miller... " got it, thanks ADDED "MAC MILLER" TO SUGGESTIONS. NOT CORRECT? remove Done >	Negative Severity: 1 The participant was worried about unnecessary conversation that might get captured by the voice input. He also did not know how to end the input.	 11:11 Sunday, May 12 Music Box now playing listening for suggestion... say a song, artist, or genre " Self Care ... " The microphone icon is turned into a button that is held down when the user is ready to give voice input and is released when done. When released, it will transition to the second screen.
 11:13 Sunday, May 12 MusicBox now playing Now Playing Patty Cake Kodak Black Up Next Fight the Feeling Mac Miller Falling Back Roosevelt ADD MY MUSIC Done >	Negative Severity: 1 The participant wants a way of letting attendees see the queue and be able to upvote/downvote songs before they even comes on. Then, when the leader goes to manual controls, they can see the advanced feedback and have a better understanding of whether or not to cancel a song.	 11:10 Sunday, May 12 MusicBox now playing A.D.H.D Kendrick Lamar — Section.80 CONNECTED TO DESIGN 200 AH give vocal suggestion type a suggestion leave session more information SETTINGS now iPhone Backup Failed 11:13 Sunday, May 12 Now Playing Patty Cake Kodak Black Up Next Fight the Feeling Mac Miller Falling Back Roosevelt Done > We moved the voting arrows and song information around to accomodate an arrow that navigates the user to a queue with additional voting abilities. The host can view the vote counts on their queue screen.

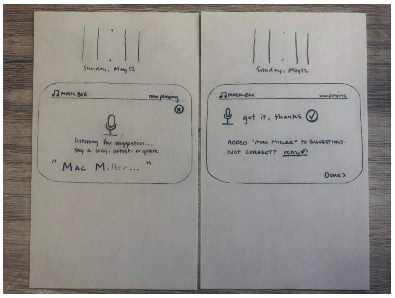
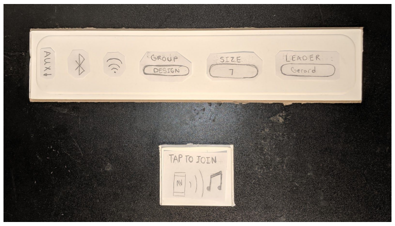
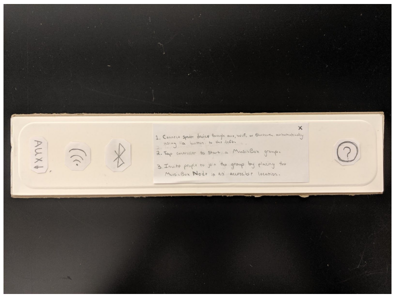
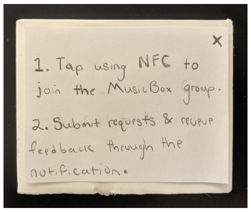
 11:30 Sunday, May 12 MUSICBOX now playing type a suggestion give a song, artist, or genre Calvin harris hello we I'm Q W E R T Y .... space enter 11:30 Sunday, May 12 MUSICBOX now playing got it, thanks ADDED "CALVIN HARRIS" TO SUGGESTIONS. NOT CORRECT? retry Done>	Negative Severity: 1 Participant thinks feedback confirmation screen does not need the icon of input type. Also, when inputting a song, clarify who it is by on the confirmation screen.	 11:11 Sunday, May 12 MUSIC BOX now playing got it, thanks ADDED "SELF CARE" BY MAC MILLER TO SUGGESTIONS. NOT CORRECT? retry Done> We removed the keyboard/microphone icons on the confirmation screen to keep the design minimal while still maintaining functionality. Following a song suggestion, we show the artist name on the confirmation screen.
 11:30 Sunday, May 12 MUSICBOX now playing got it, thanks ADDED "CALVIN HARRIS" TO SUGGESTIONS. NOT CORRECT? retry Done>	Positive Participant likes the confirmation screen after input. He thinks it is very clear about the steps to take on incorrect and correct input.	

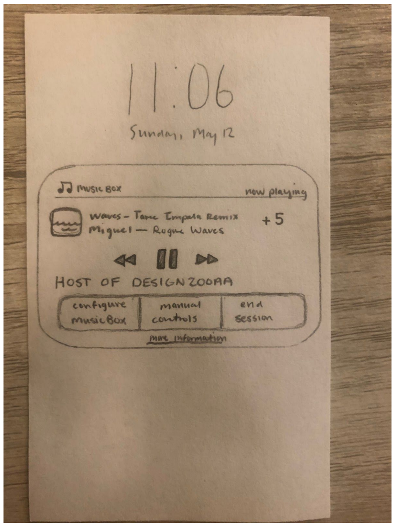
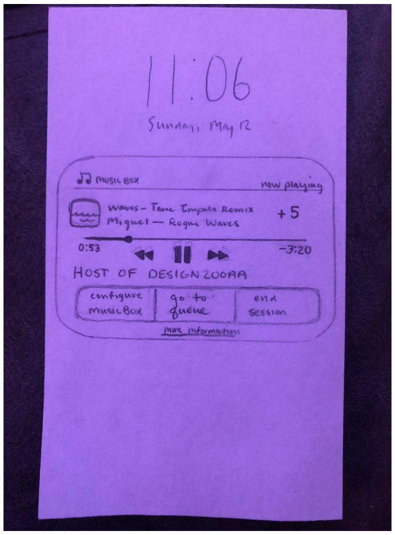
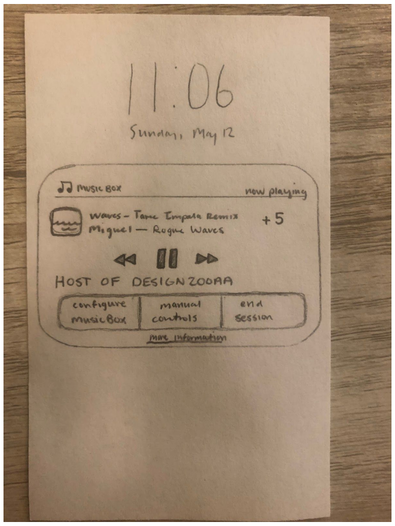
<u>Usability Test #3:</u>

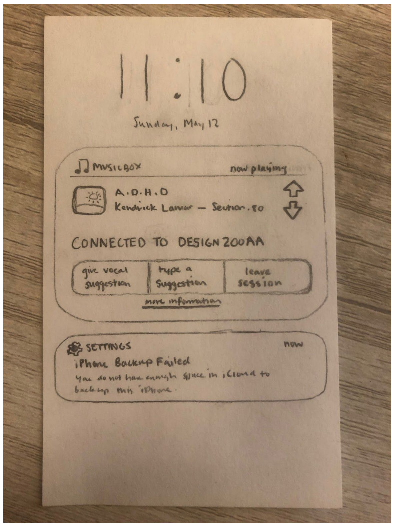
Gerard Gaimari conducted this usability test with two students, Student A being from a creative marketing background and Student B from a computer science & product management background. The test was conducted in Student B's room using his speaker system as the pseudo-audio output. Both participants were briefed on the MusicBox's background and the basic components, but were not informed on how to use them. Student B acted as the host of a MusicBox event and Student A acted as an attendee, Gerard Gaimari observed their interactions as they attempted to use the MusicBox and prompted them to achieve specific objectives if no progress was made. Student B had a very difficult time trying to set up the MusicBox's hardware interface, and was confused with some of the software interfaces as well. Student A had an easier time overall understanding how to use the hardware and navigate the software of the MusicBox, aside from a few minor critiques. Overall, the usability test exposed the crucial relationship between hardware and software of the product, demanding more congruence and recovery options in the designs from both the host and attendee perspectives.

Results from Usability Test #3:

Prototype	Incident	Revisions
NFC Node:  	Negative Severity: 3 The attendee participant was confused about what “Tap to Join” meant. From this point, they elaborated saying that people who are new to the group probably won’t understand the prompt unless they talk with other people or the host. This could be a barrier to participation the music selection process.	Controller & Node Front:  AUX N TAP to start a MusicBox group. ? N TAP SUGGEST MUSIC HERE Both the controller and node design were revised to include more explicit language and action images for connecting. A major revision to the user experience was to separate the host NFC activation point (on the controller) from the attendee (on the node) in order to directly associate the controller setup and usage with the host. See below incidents for details on the help buttons that were added to the controller and node.
Text suggestion:  11:30 Sunday, May 12 MUSICBOX now playing type a suggestion give a song, artist, or genre Calvin harris hello we I'm Q W E R T Y ..... Space enter 11:30 Sunday, May 12 MUSICBOX now playing got it, thanks ADDED "CALVIN HARRIS" TO SUGGESTIONS. NOT CORRECT? retry Done> Vocal suggestion:	Positive Attendee participant liked the vocal & text input options. They expressed that it made the system more usable in loud or quiet environments where vocal input is not ideal.	

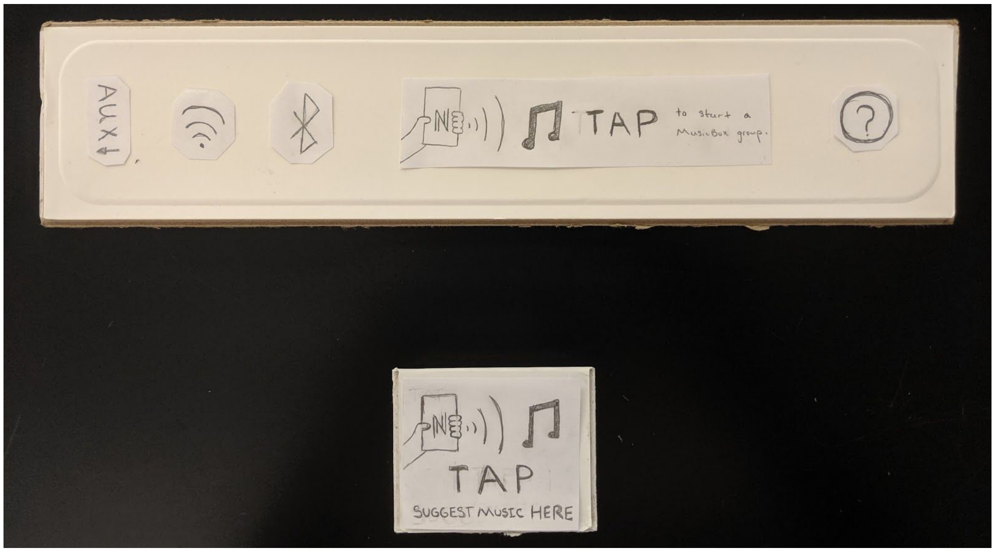
 11:11 Sunday, May 12 MUSIC BOX now playing 11:11 Sunday, May 12 MUSIC BOX now playing Done> listening for suggestion... say a song, artist, or genre " Mac Miller... " got it, thanks ADDED "MAC MILLER" TO SUGGESTIONS. NOT CORRECT? retry		
Controller & Node:  AUX GROUP DESIGN SIZE 7 LEADER Gerard TAP TO JOIN	Negative Severity: 4 The host participant was unable to setup the system without instructions. Following they said "no one reads the instruction manual" proposing that the design should be entirely self-explanatory. Specifically, the host was confused about how to become the host and the relationship between the controller and the node.	Controller Help:  1. Connect speaker device through aux, WiFi or Bluetooth automatically using the button to the left. 2. Tap controller to start a MusicBox group. 3. Invite people to join the group by placing the MusicBox Node in an accessible location. Node Back Help:  1. Tap using NFC to join the MusicBox group. 2. Submit requests & receive feedback through the notification. A highly visible help button and explicit instructions were built into to the controller and node's hardware to ensure that a user can easily access help if needed.

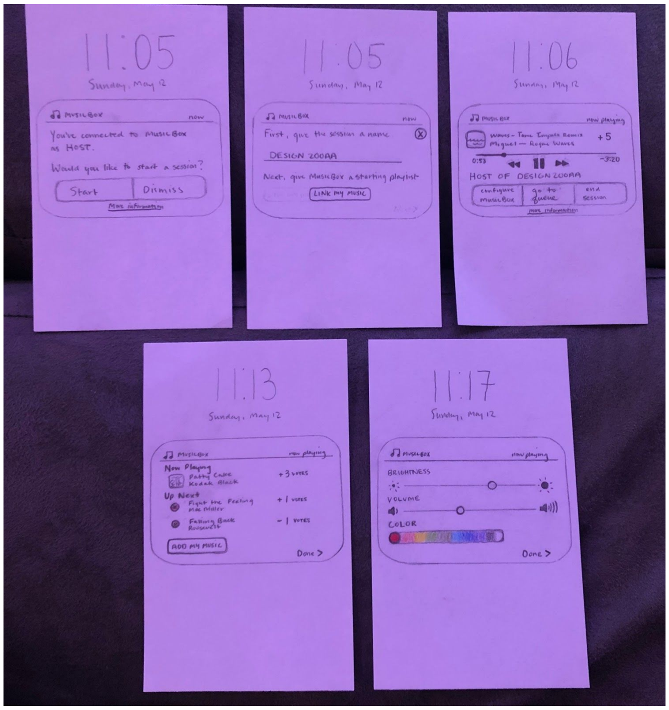
 11:06 Sunday, May 12 Music Box now playing Waves - Tame Impala Remix Miguel — Rogue Waves +5 HOST OF DESIGN ZOOAA configure MusicBox manual controls end session more information	Negative Severity: 1 The host participant was unsatisfied with the "now playing" interface from the notification. They wanted more information about the song to be immediately visible, specifically time to finish and volume. Additionally, they said that the notification should be controlled by native device buttons/commands, specifically the volume buttons on the side of most phones.	 11:06 Sunday, May 12 Music Box now playing Waves - Tame Impala Remix Miguel — Rogue Waves +5 0:53 -3:20 HOST OF DESIGN ZOOAA configure MusicBox go to queue end session more information A song scrubber with a time status is added underneath the currently playing song view. The volume can be adjusted with the volume buttons on the host's device, or by tapping "configure MusicBox".
Host View:  11:06 Sunday, May 12 Music Box now playing Waves - Tame Impala Remix Miguel — Rogue Waves +5 HOST OF DESIGN ZOOAA configure MusicBox manual controls end session more information Attendee View:	Negative Severity: 2 The host participant wanted more feedback from the app regarding attendee suggestion progress. The host should receive some sort of notification upon a request/suggestion and the attendee should receive a notification about the progress of their suggestion, such as "your request is now playing".	We have decided to not implement these suggestions. Hosts receiving notifications each time an attendee inputs a suggestion could be distracting and overwhelming to the host. Attendees already have a confirmation screen view that asserts their suggestion will be considered, and from our user research most attendees will be within hearing distance of MusicBox for the duration of the event and will be able to hear if their suggestion is currently playing.

 11:10 Sunday, May 12 MUSICBOX now playing A.D.H.D Kendrick Lamar — Section.80 CONNECTED TO DESIGN 200AA give vocal suggestion type a suggestion leave session more information SETTINGS now iPhone Backup Failed You do not have enough space in iCloud to backup this iPhone.		

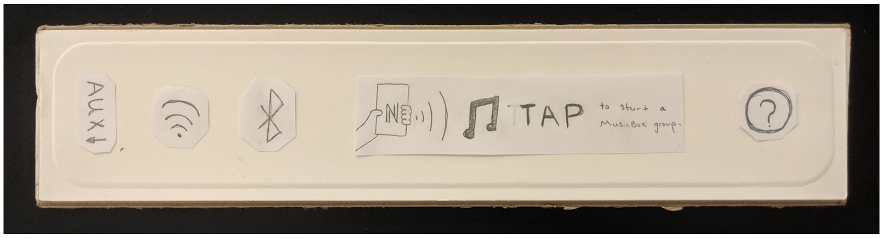
Final Paper Prototype:

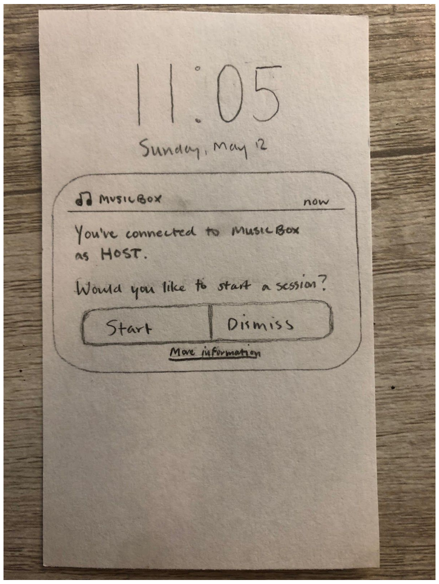
Overview of Host Interfaces:



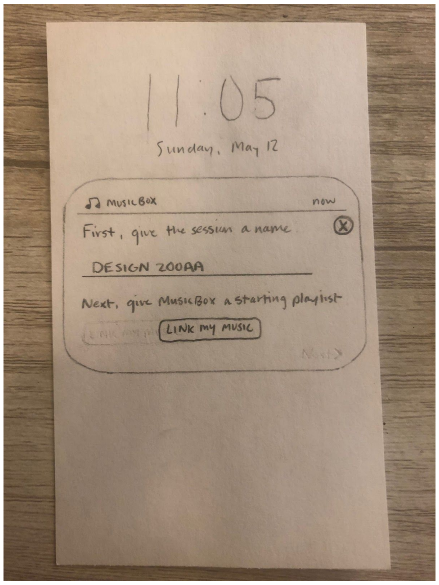


The above image is an overview of the hardware and software interfaces used to set up the MusicBox device and session from the host point of view, allowing MusicBox to dynamically curate and recommend music with minimal disruption.




11:05
Sunday, May 12
MusicBox
now
You've connected to MusicBox as HOST.
Would you like to start a session?
Start
Dismiss
More information

The first person to tap the NFC controller receives this widget on the lockscreen of their phone. They can choose “Start” to setup a session, dismiss/swipe the widget away to remove the widget, or tap “More information” to open an internet webpage with additional details and help for MusicBox.

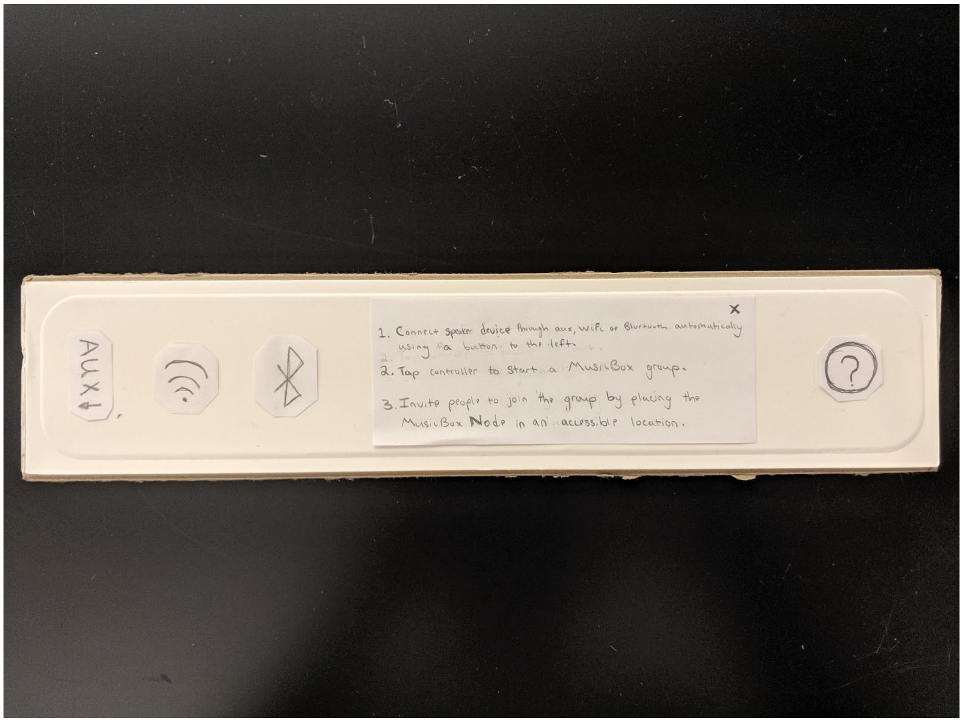


First, give the session a name

DESIGN 200AA

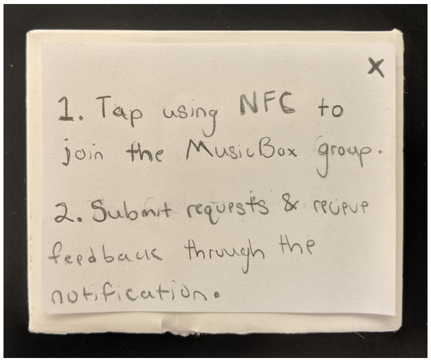
Next, give MusicBox a starting playlist

When “Start” is selected, the left image appears. The host must type a name for the MusicBox session and then press “Link My Music”, which prompts them to open a music streaming service (e.g. Spotify, Apple Music) and select a starting playlist or song. This populates MusicBox with initial recommendations necessary for it to begin playing and selecting music, thus completing the task of “dynamically playing music”. If at any point the host is unsure of the setup process regarding the interaction between hardware/software, the controller and node provide helpful instruction buttons and descriptions built-in:



1. Connect speaker device through aux, wifi or Bluetooth automatically using a button to the left.
2. Tap controller to start a MusicBox group.
3. Invite people to join the group by placing the MusicBox Node in an accessible location.

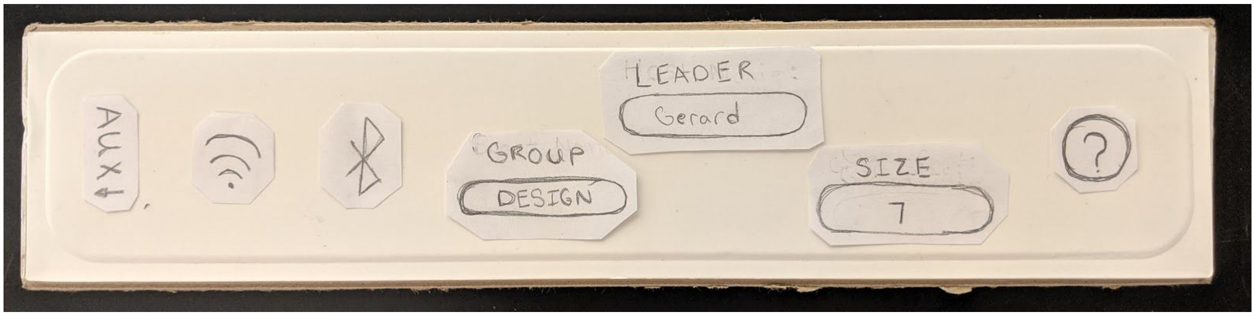
Node Back:

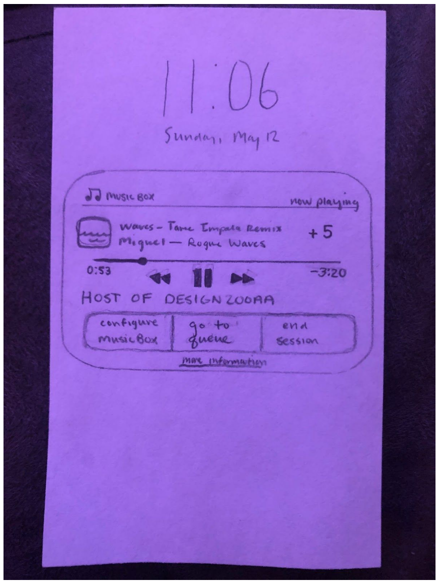


1. Tap using NFC to join the MusicBox group.

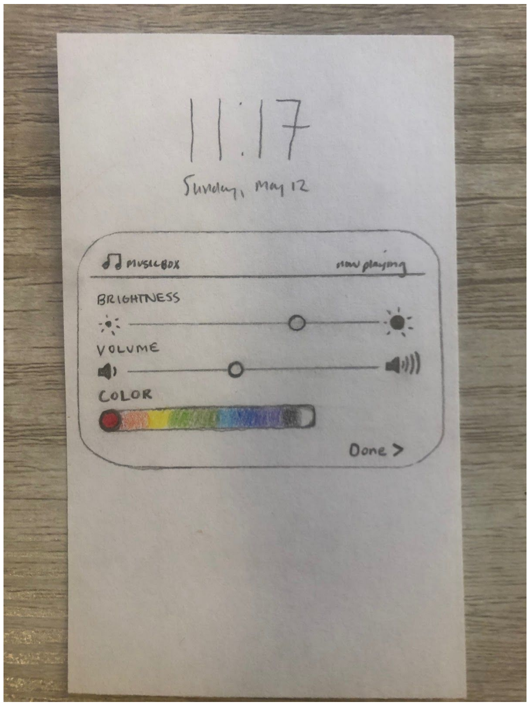
2. Submit requests & recieve feedback through the notification.

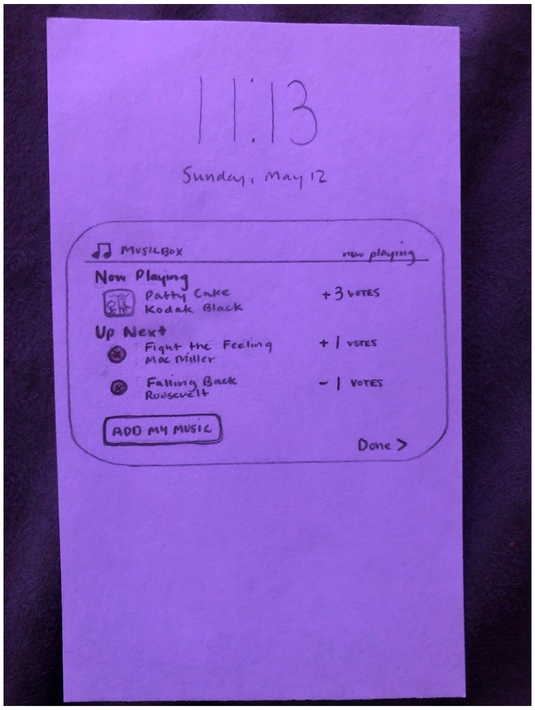
The controller indicates that setup is complete by changing its display to show the information below:





After the session is created, it is active and the image above persists on the host’s lockscreen. The host can view the current song playing, the current song’s rating as determined by attendee’s upvotes and downvotes, can restart/pause/skip the current song, and view the current time progress of the song. They also have custom host settings “configure MusicBox” and “manual controls”, and can cancel the session at any time by pressing “end session”.

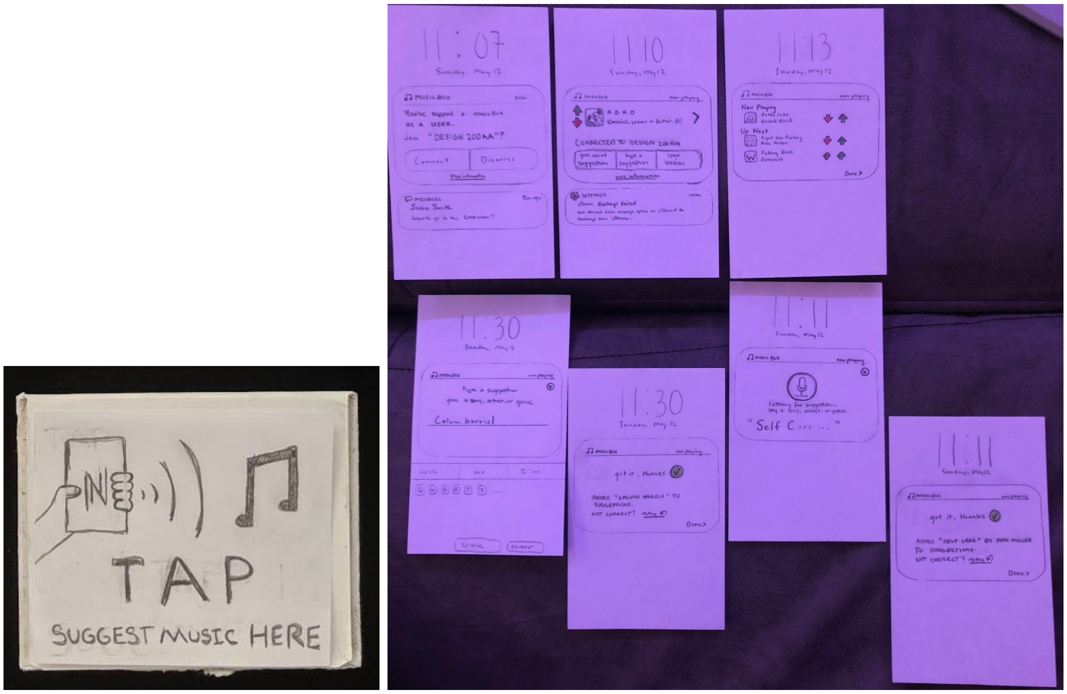




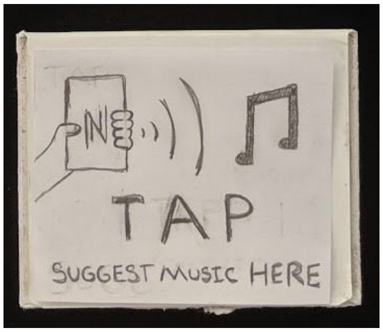
The left image is the view when “configure MusicBox” is selected from the host’s main view. The host can adjust the brightness of the LED which backlights the controller (not shown in prototype), the volume of the music playing, and the color of the LED panel. Press “Done >” to go back to the main view and save the settings.

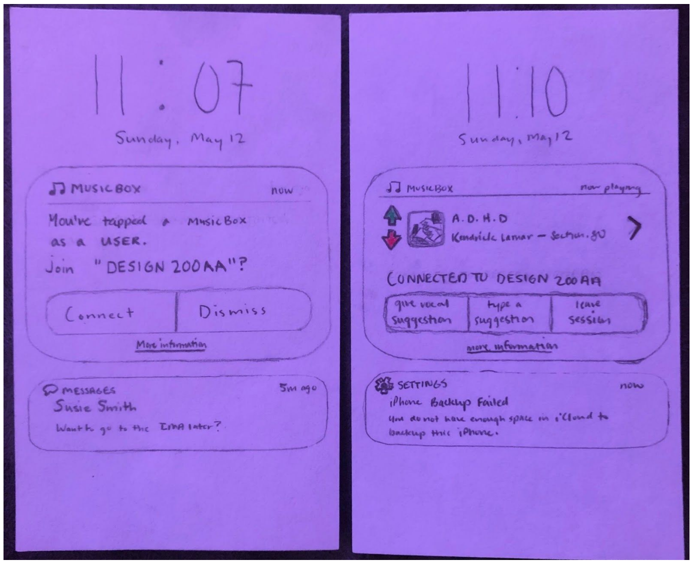
The right image is the view when “manual controls” is selected from the host’s main view. The host can see the current song playing, the next two songs in MusicBox’s queue, and the score of the current song and upcoming songs as voted upon by attendees. If necessary, the host can delete songs from the queue or optionally add their own songs from their music streaming service of choice. While MusicBox primarily fulfills the task of dynamically playing music, this screen lets the host have some optional control as well.

Overview of Attendee Widget Views



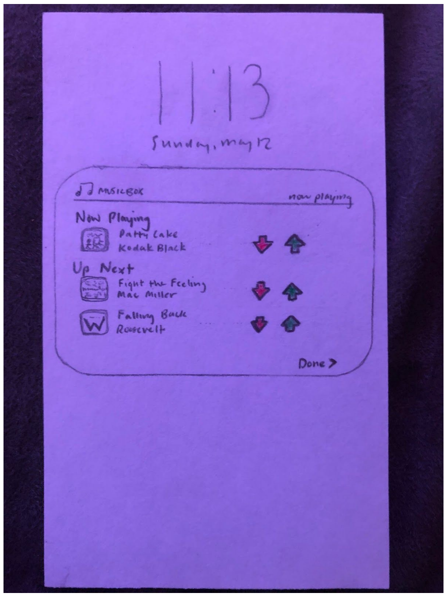
The above image is an overview of the hardware and software interfaces used to communicate feedback and user preferences to the MusicBox as an attendee. We decided on a widget that appears on a phone's home screen since it will not require listeners to go through the process of downloading an app.



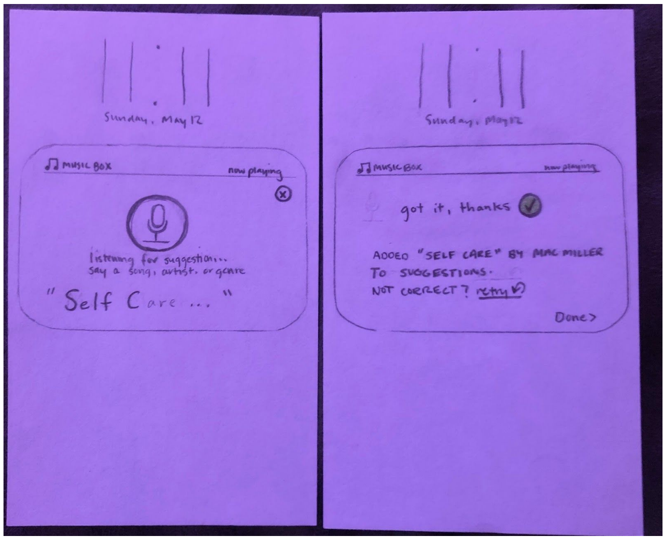


In the left panel, we see the initial widget that appears on the home screen triggered to appear when the attendee physically taps the NFC node (shown above). From here, the user can press “Connect” to join the session, “Dismiss” (or physically swipe away) to remove the widget, or “More information” to open a link in their browser with specific information about the device and usage.

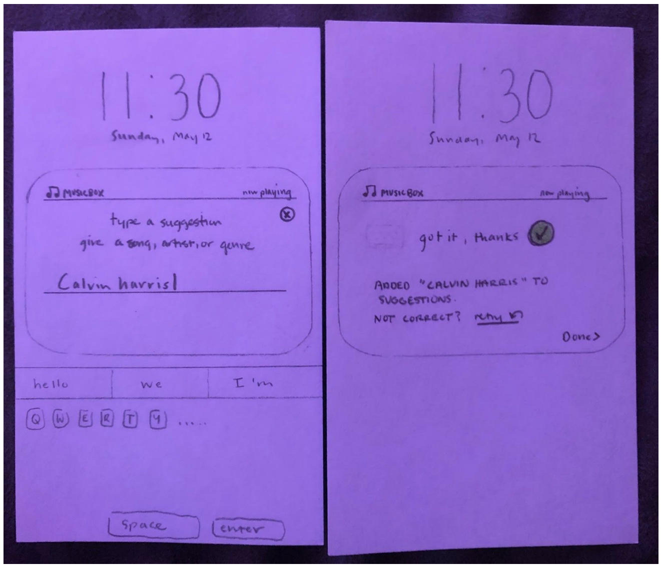
The right panel is the main view displayed when the user is actively connected to a MusicBox session. There is information about the current song playing, including the album cover, song name, artist, and album name. Next to the song information is a simple upvote and downvote mechanism: the user can tap on an arrow to indicate they like or dislike the current selection, and the feedback will be automatically sent to MusicBox to refine future recommendations. The right-pointing arrow when tapped will lead into the queue view. There are also options to provide more specific feedback by tapping “give vocal suggestion” or “type a suggestion”. If desired, the user can quit the session and remove the widget by tapping “leave session”, or tap “More information” which leads them to the same webpage as described above.



When the right-pointing arrow on the main view is tapped, this queue view appears. Attendees can see the currently playing song and the next two upcoming songs, similar to the host view. They are able to upvote and downvote the selections to provide proactive feedback.



The left panel is triggered when the user taps “give vocal suggestion” from the main view. When the microphone button is pressed, the user’s microphone will turn on and listen for words, showing its interpretation in quotes underneath the prompt until the user presses the button again to turn the microphone off. The user can quit and go back to the main view by pressing the “x” in the upper right corner. When the user is done speaking, the right panel will display to confirm the vocal input until the user presses “done” to go back to the main view. If the interpretation was incorrect, there is a chance for the user to try again by pressing “retry” which takes them back to the left panel view.



Similar to vocal suggestions, when the user taps "type a suggestion" from the main view the left panel view appears. The user can quit and go back to the main view by pressing the "x" in the upper right corner. It pulls up the phone's keyboard where the user can enter any suggestion and press "enter" on the keyboard when finished. The right panel view will appear, where it confirms the typed input until the user presses "done" to go back to the main view. If incorrect, the user has a chance to press "retry" to re-do the suggestion.

Most Important Revisions/Modifications:

1. Attendee queue w/ upvotes and downvotes:

An improvement to the feedback system's visibility was called for in all three usability tests based on attendee experience. This revision is crucial to functionality since it associates attendee feedback with the music selection in a highly visible and immediate way. Using the upvote and downvote system provides attendees with a more concrete, quick and discrete way to influence the dynamic music selection compared to open ended suggestions.

2. Clarify upvote/downvote and allow leader to see the sum of votes:

Similar to revision #1, requests to improve the feedback interface from the host's experience were common across tests. Considering that the host has the ultimate say in any event's music selection, they must understand feedback clearly. Voting clarification and additional host control ensures our design can actually support the task of receiving feedback in an effective way.

3. Moving all screens to a lockscreen widget (versus an app):

Accessibility and ease of use are crucial to the success of our design from a software and hardware standpoint. In order to eliminate any barriers to entry we didn't want to require a download to use our design, most use cases are temporary and simple. Using a notification system also reminds users that they are participating in event feedback and allows non-disruptive control to focus on the real-world context of the event.

4. Changing hardware to provide more explicit usage instructions and congruence with application:

Hardware is one of the most interactive points of our design and according to the tests one of the most confusing. We changed the relationship between the user, hardware and software by ensuring that help was available at any point when using the hardware and providing feedback in congruence to software usage. Additionally, hardware icons, wording and layout were adjusted to provide more clarity on first glance for faster setup and usage.

Contribution Statement:
Christina Stanfield: test #1 & #2, overview, software design revisions.
Trevor Alexander: test #2, writing revision, initial document creation.
Gerard Gaimari: test #3, hardware design revisions, most important revisions.