

**more amusement. more acquisition. mora.**

CS147 Autumn 2024  
Transforming Language Learning with AI  
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# Overview

## Project Name

mora

## Value Proposition

more amusement. more acquisition. mora

## The Team



**Bryant Perkins**  
Computer Science  
Mobile Developer



**Candy Tang**  
Urban Studies  
Designer



**Lulu Sullivan**  
Computer Science  
Mobile Developer



**Tommy DeBenedetti**  
Computer Science  
Designer

\*The listed title reflects each teammate's specialty, but every member contributed to each phase of the project.

## The Problem

Traditional language learning methods are tedious and use one-size-fits-all curriculum that does not engage learners in fun and immersive contexts. Furthermore, the content of traditional language learning is decontextualized and impersonal, which fails to motivate learners to whom it feels irrelevant.

## Our Solution

Mora is a companion for streaming which interrupts your watching with live language lessons and links to an app which summarizes your stats, curates review material for your favorite shows, and connects you to interest-based communities of language learners to bond and/or compete live with. Mora seeks to make language learning fun, effective, and inclusive.

# Needfinding

In order to identify the real pain-points and needs of our users, to identify those users in the first place, and to narrow the scope of our design, we interviewed participants about their language learning experience, habits, and opinions.

## Interview Participants and Procedure

Out of nine interviews, four participants were chosen randomly from cafe-goers on University Avenue in Palo Alto and five were chosen intentionally based on some unique relation to language learning — those included one linguistics professor, one rabbi, one person from a multilingual household, one American expatriate, and one tourist. Of these nine we identified several extreme users: one who identified herself as a life-long struggler with language-learning, one who has a scientific understanding of languages and is thus particularly equipped to learn them, and one who was vehemently against assistive technology in language learning. These participants have been compensated with updates about our project throughout its lifecycle.

Each interview was conducted with two researchers — one who asked the questions, and one who took notes.

Before the interviews began, participants signed a consent form giving permission for us to use their sentiments, as well as audio and video of the interview, in our project.



**Figure 1:** Tommy and Bryant conducting an interview with Anna on University Avenue.

In the interviews, we asked general questions such as “what do you do” or “where are you from.” We then collected information specific to language learning including the languages they speak — as well as where, when, how, and why they learned these languages — how the processes of learning those languages compare, and whether and why they value languages or multilingualism. We also inquired about the ways they use and think about technology and if they have ever used technology to assist with language learning or use. Throughout all of these domains, we let the conversation veer according to the interviewee, asking extraneous follow up questions as appropriate.

Additionally, with each interviewee we did a “language exchange” activity, wherein first the interviewer would teach the interviewee a couple of words or phrases in a non-English language they know, and second the interviewee would teach the interviewer a little bit of a non-English language *they* speak. This provided us a host of interesting, cross-linguistic artifacts (such as written characters and pictures) and allowed us to actually observe people learning and teaching language and make insights into those processes.

## Synthesizing Results

For each interview, we constructed an “empathy map,” in which we drew out what the user “did” and “said” in the interview as well as made insights into what they “think” and “feel.” In constructing this diagram, we paid particular attention to surprises, tensions, or contradictions that arose during the interview.

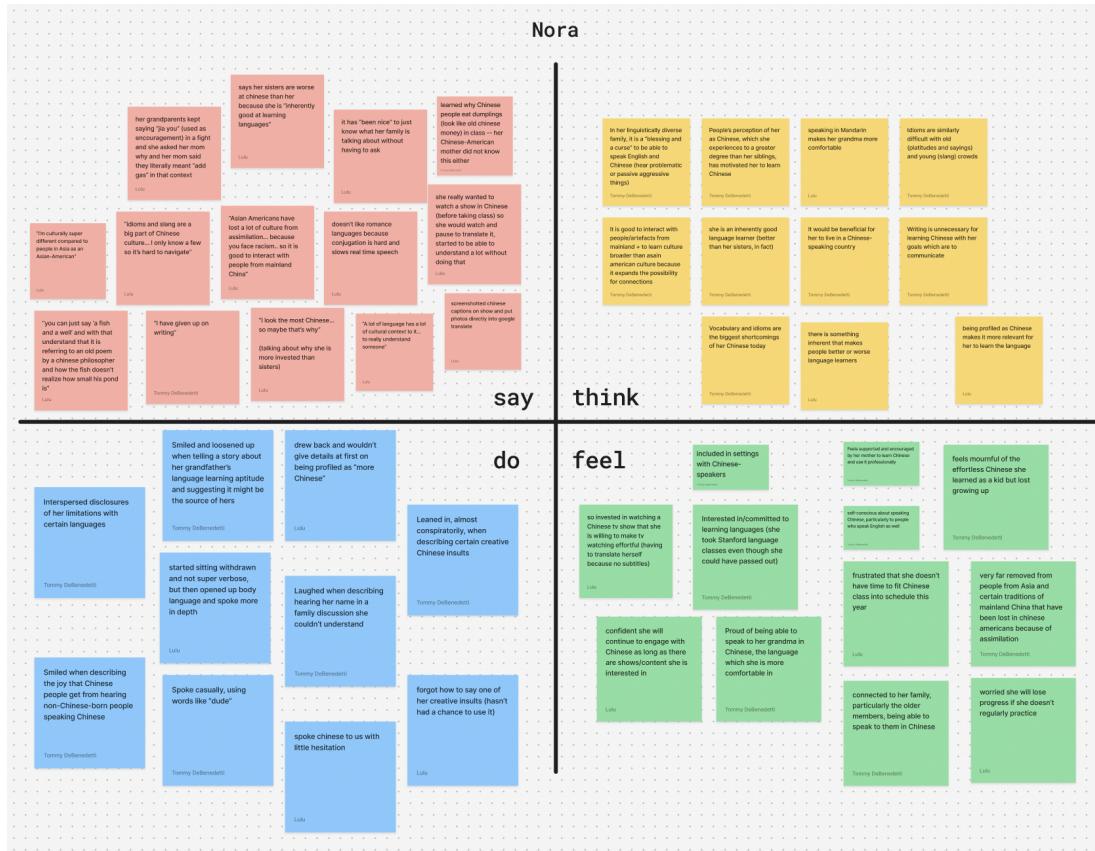


Figure 2: An example of an empathy map — Nora's.

Some key learnings from our needfinding process were as follows: people are willing to contribute a lot of effort to language learning if the foreign language content is relevant and exciting to them; people find traditional methods for language learning (in a classroom or rote memorization) to be unengaging and lacking in important context; people attribute value to language because of the connection and cultural exchange it enables and need social and cultural elements to be centered in the learning process.

## POVs & HMWs

We then moved forward with three of our most elucidating interviews. For each, we more succinctly summarized the resulting insights by writing a POV statement. Then from those POVs generated "How Might We"s, which are questions grounded in particular user needs which generate solutions. For each of three interviews, the following is the resulting POV and a handful of "HMWs" produced from it.

### Nora

We met... Nora, a biology co-term at Stanford who is Chinese-American and has frequently used pop culture to learn Mandarin.

We were surprised to notice that... before knowing Mandarin, Nora watched Chinese TV shows without English subtitles and paused to take pictures of Mandarin text and put them into Google translate, turning a restful activity into an intentional and effortful learning experience.

We wonder if this means... even tedious aspects of language learning can be made enjoyable with a personal and cultural connection to the content.

It would be game-changing to... enable Nora to learn more varied content while continuing to have fun.

The following HMWs were the top three generated from Nora's POV:

*How might we integrate various forms of entertainment into Nora's language learning?*

*How might we develop new, inspiring interests through language learning?*

*How might we make language learning feel more relevant to young people?*

### Rebecca

We met... Rebecca, a rabbi who works at a university that characterizes herself as a lifelong struggler of learning Hebrew and regularly feels inadequate as a rabbi and Jew.

We were surprised to notice that... she spoke as little Hebrew as possible during her immersion program in Israel despite her peers constantly practicing and despite her long interest in becoming a rabbi.

We wonder if this means... she felt helpless to ever achieve her lofty goal of being a rabbi.

It would be game-changing to... remove Rebecca's internal expectations from the language learning process.

The following HMWs were the top three generated from Rebecca's POV:

*How might we make language learning a form of self expression for Rebecca?*

*How might we trick users into feeling successful?*

*How might we make failure fun?*

## **Anna**

We met... Anna, a mother and feminist studies PhD student who speaks five languages and enjoys directly connecting with different cultures.

We were surprised to notice that... despite having a good experience with a conversational language learning app, Anna is strongly opposed to using technology for language learning because she believes it is devoid of emotional intelligence and can't capture the cultural elements of language learning.

We wonder if this means... Anna is shaken by rapid innovation in technology and is clinging to what she knows.

It would be game-changing to... help Anna reap the benefits of technology while feeling comfortable and connected.

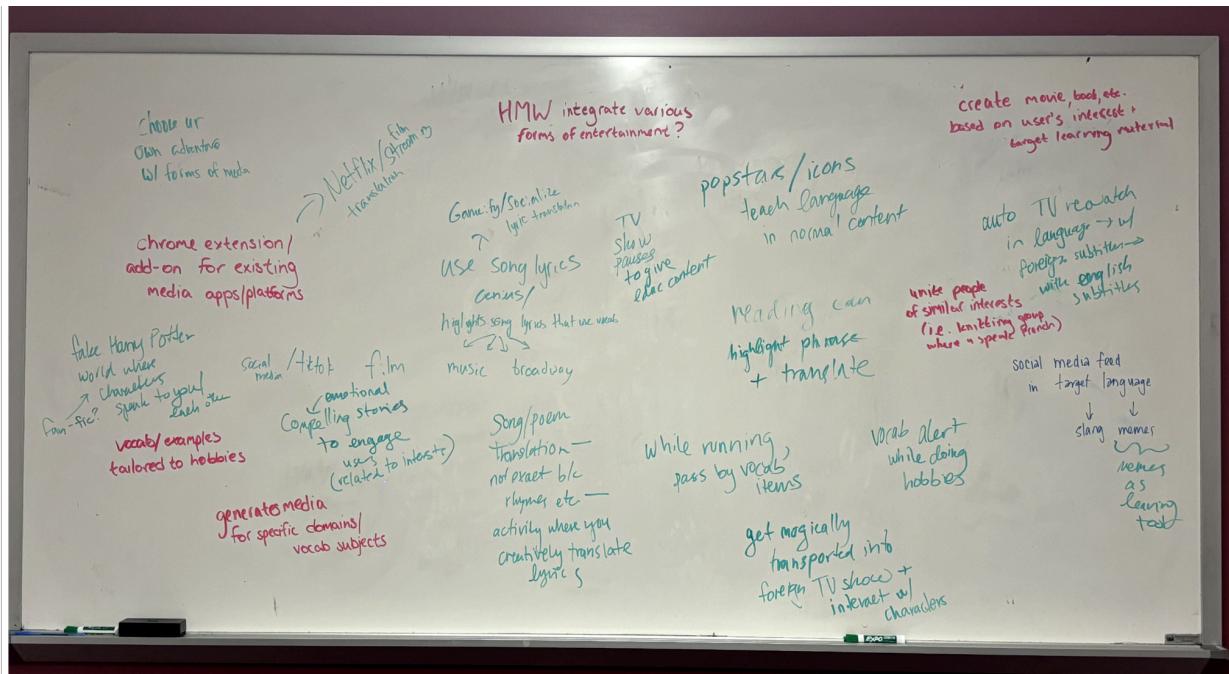
The following HMWs were the top three generated from Anna's POV:

*How might we insert Anna into the life of a native speaker?*

*How might we engage various senses/modalities in language learning?*

*How might we make a learning app feel like studying abroad?*

# Solution Brainstorming and Experience Prototypes



**Figure 3:** An example solution brainstorm for “HMW integrate various forms of entertainment?”

We narrowed all of our “HMWs” down to our favorite three, then brainstormed solutions for each of those “HMWs.” We then coalesced all of our solutions and selected our favorite three, which were the following:

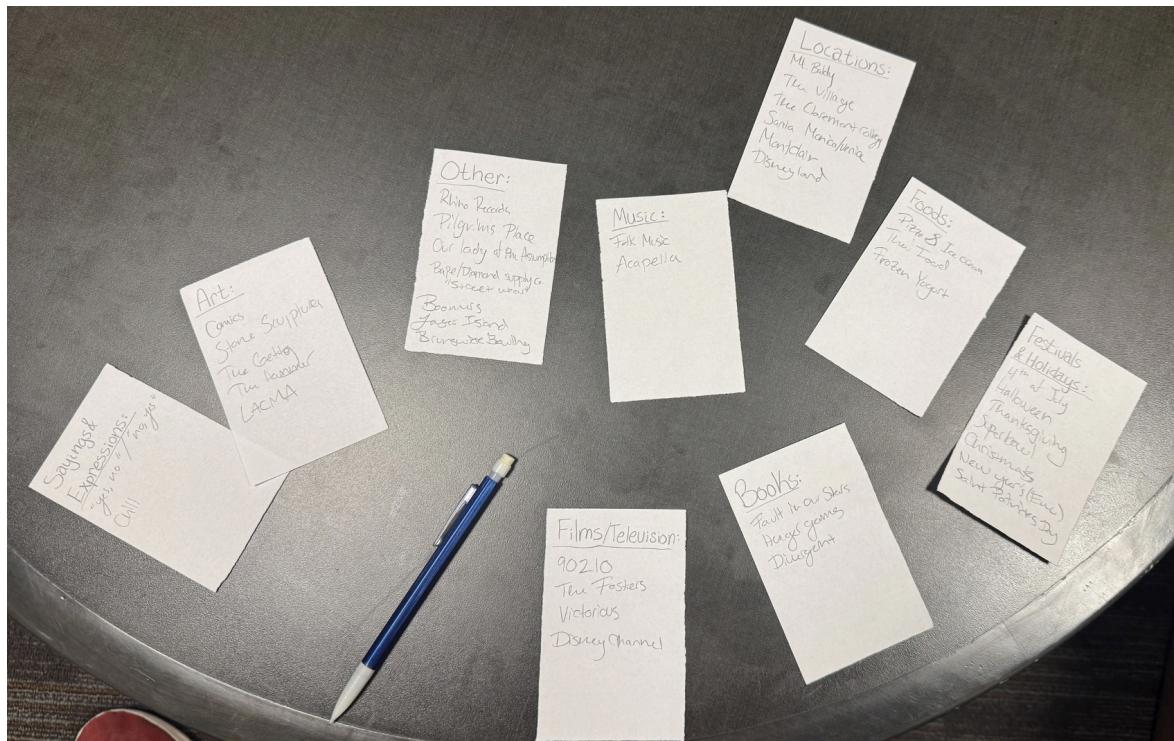
## Virtual Homestay

Concept: Users curate a digital “home,” which showcases artifacts of their culture and personal interests. Others then “homestay” in this virtual environment.

Assumption: Users are willing to curate and share an environment that’s supposed to represent them.

Experience Prototype: A team member introduces herself to the participant as an international student who knows little about American culture. The participant is then asked to brainstorm (pencil, paper) things across nine categories (including food, places, music, expressions, etc.) which represent who she is and where she comes from. The participant is then left alone for 10 minutes to think. The “international student” returns and discusses the participant’s responses

with her for 10 minutes.



**Figure 4:** The category brainstorms produced by the participant in the virtual homestay experience prototype.

**Insights:** Our assumption was correct, in that the participant was willing to be detailed and vulnerable and she had fun. However, she wanted to be able to index her cultural/personal experience with multiple media (like pictures!). Interestingly, the participant cited nostalgia as the primary emotion it evoked, which is pleasant and something we might like to consider moving forward.

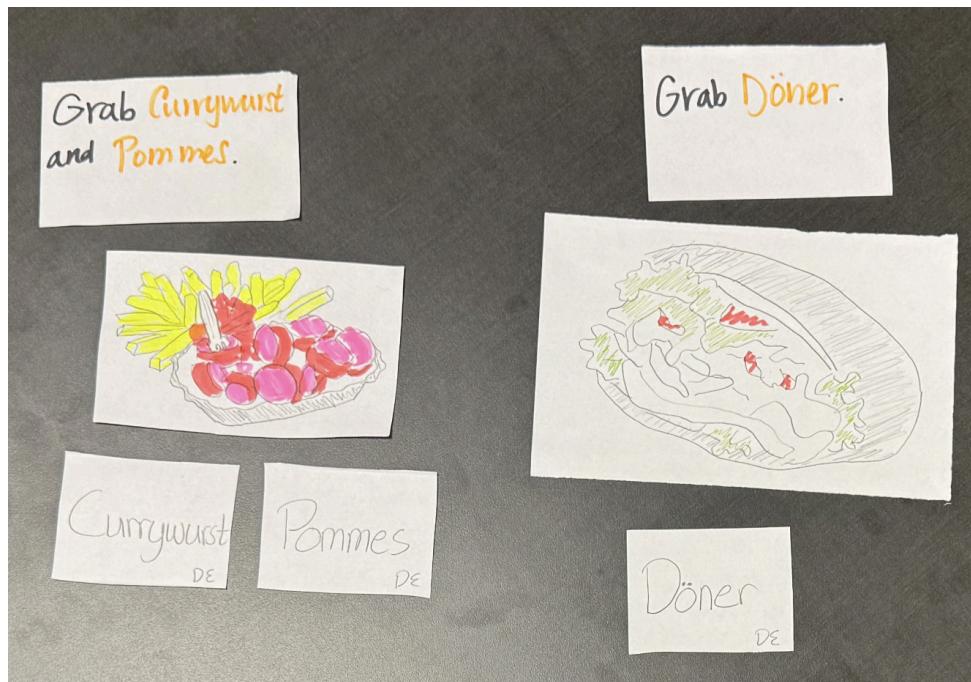
## Interactive Narratives

**Concept:** Users maneuver interactive narratives in their target language, making decisions for a character situated in a story of their choice.

**Assumption:** People enjoy learning in self-insert ways.

**Experience Prototype:** An interactive semi-scripted “conversation” in English, with German words sprinkled in, is carried out between a participant and a team member. The participant is

given a script, which ends with a fill-in-the-blank. The user responds to the blank by picking between two papers with different options featuring German vocabulary. The conversation then veers based on the participant's choice. The participant also has access to a paper German word bank throughout and is shown relevant illustrated pictures.



**Figure 5:** The options (images and captions) presented to the participant in the interactive narratives experience prototype.

**Insights:** The participant explicitly said he enjoyed the “immersive nature” of this experience and succeeded in acquiring the feature vocabulary — in fact, he referenced the story to recall words’ meanings. However, he wished there was more varied sensory engagement, such as music to set the scene. It is important to note that the participant expressed having learned *cultural* details in addition to language, citing facts about Berlin that were mentioned in the story’s exposition.

## Entertainment Intervention

**Concept:** An extension/add-on for your entertainment of choice — music, TV/movies, YouTube — which intermittently interrupts with mini language lessons related to the content.

**Assumption:** People are interested in their relaxation being interrupted for learning.

Experience Prototype: The participant watched a show of his choice in a comfortable environment. Intermittently throughout, a team member would pause the show, translate a word that was just said into Mandarin, have the participant repeat it, then resume. In the meantime, we watched the show and interjected like a normal group watching experience. Halfway through and after the episode, the participant was “quizzed” on the vocab — given a Mandarin word and asked for it in English.



**Figure 6:** The set-up for the entertainment intervention experience prototype.

Insights: The participant described this experience as a little unnatural, but he clarified that it would just “take a little adjustment” and is certainly “not undesirable.” Before he knew he was going to be quizzed on his acquisition, he was not focused on the vocab and didn’t remember any of the words, so it does require active effort to be effective. However, once he was paying attention to the learning component, he succeeded in acquiring new terms; in fact, a day later he remembered a word from the experience — interestingly but perhaps not surprisingly, the one which was most personally relevant to him.

# Design Evolution

## Final Solution

We decided to proceed with the “Entertainment Intervention” solution. Our solution is a companion for streaming which interrupts your watching with live language lessons and links to an app which summarizes your stats, curates review material for your favorite shows, and connects you to interest-based communities of language learners to learn and/or compete live with.

From the original solution proposed, we narrowed the scope to just TV/movies for the sake of feasibility, as each medium would require a slightly different structure, and since our needfinding which inspired this idea specifically pointed to TV as an educational opportunity. We also added tasks involving social and asynchronous elements, which I will elaborate on further in the following tasks section, because we wanted our solution to be accessible and our needfinding revealed people crave social language learning experiences.

As for the exact form, or realization, of mora as an app which pairs to an external device this was motivated by several factors. We decided on a mobile app for the sake of accessibility since 97.6% of Americans own a smartphone,<sup>1</sup> and we decided to have the streaming be on a separate device to minimize the extent to which watching with mora harms a user’s streaming experience.

## Tasks

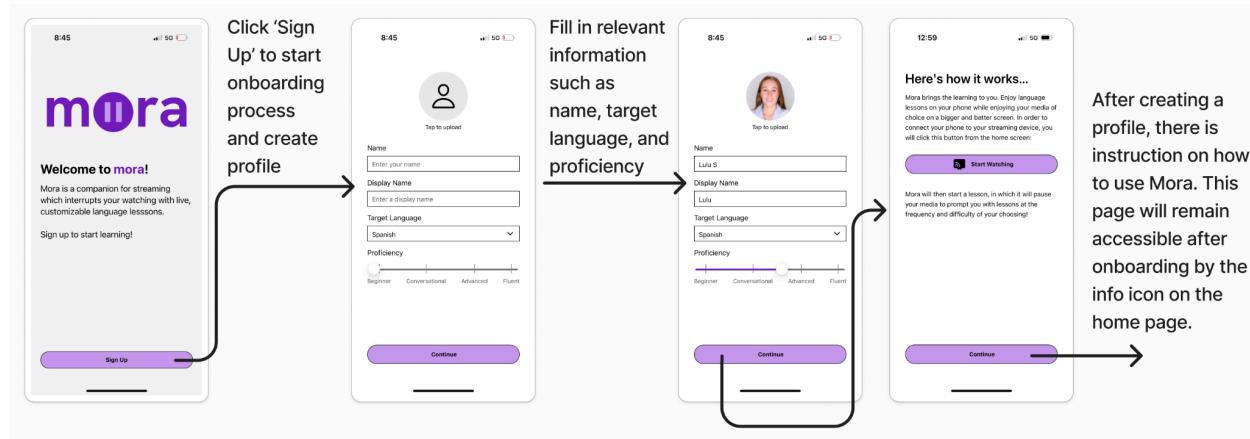
[For full hi-fi annotations, see <https://tinyurl.com/4euc7zff>.]

### Onboarding

First time users of mora get an explanation of the app’s purpose, make a profile, and receive brief instructions on the simple task.

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[1] We Are Social, & Hootsuite, & DataReportal. (February 22, 2024). Share of digital device owners in the United States in 2024 [Graph]. In Statista. Retrieved October 25, 2024, from <https://www.statista.com/statistics/1425094/digital-device-ownership-us/>



**Figure 7:** Annotated screenshots of the onboarding process in the hi-fi prototype.

### Simple Task: Engage with your entertainment of choice and learn from the interactive lesson.

Example scenario: Nora wants to work on her Mandarin but was planning on watching TV tonight, so she begins an interactive lesson to practice grammar and learn vocab while watching the show.

This task is simple because it is the most routine task that users of our product will perform. We expect every user of our product to perform this task because it is central to providing in-context, fun language learning. This brings language learning into the sphere of relaxation — instead of it being a chore. Learners can have their curriculum tailored to their interests and can learn from the comfort of their couch — both literally and figuratively.

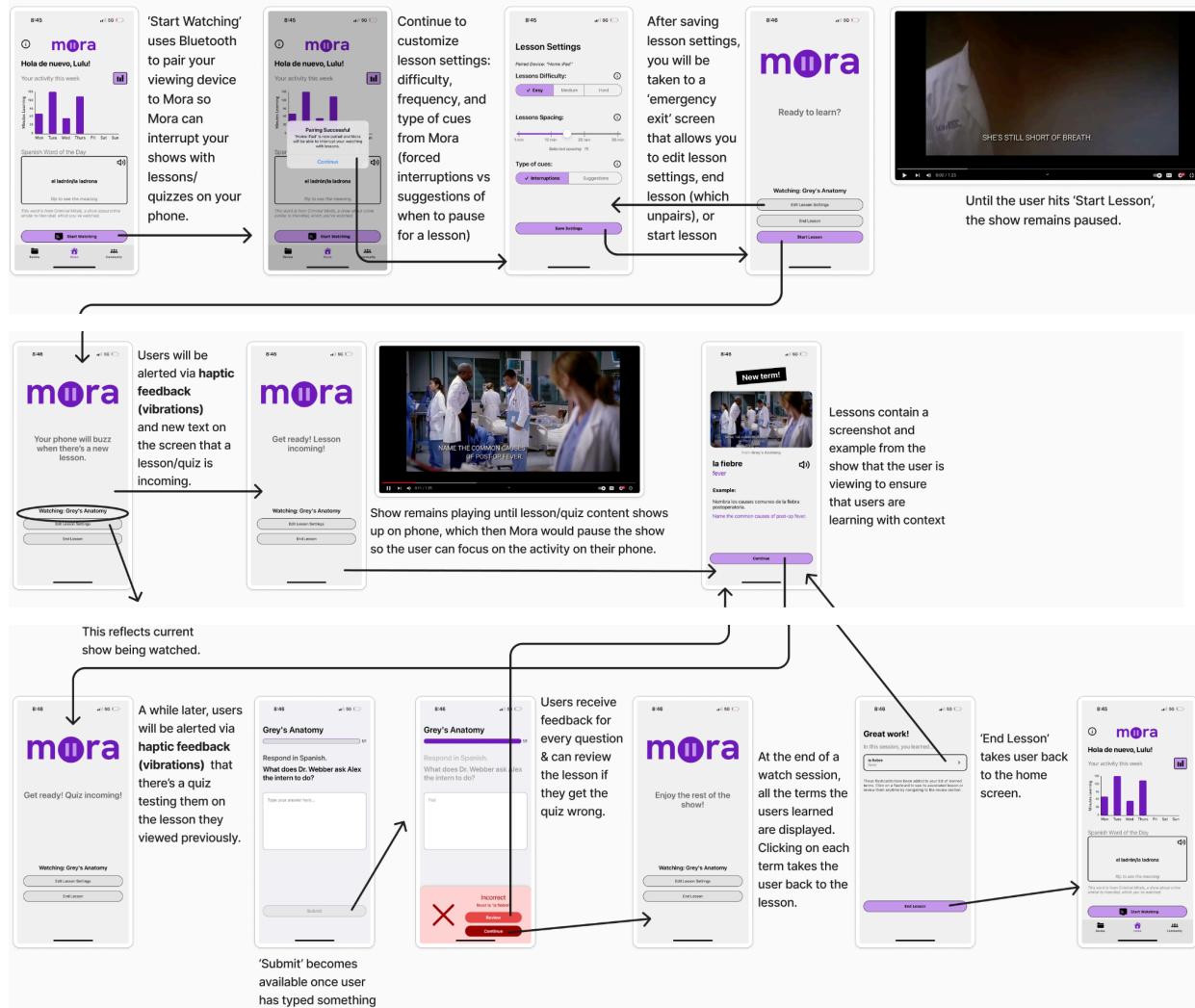


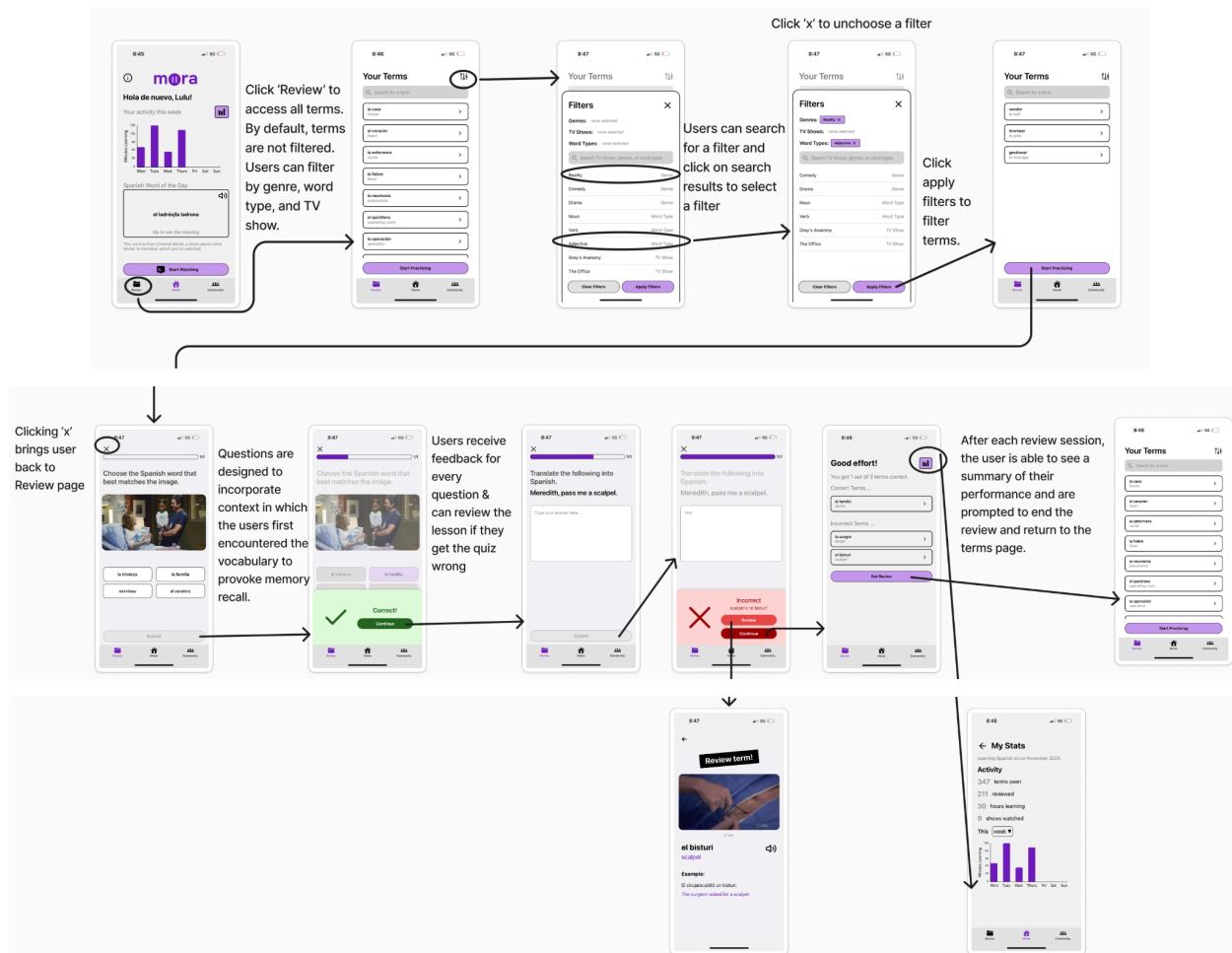
Figure 8: Annotated screenshots of the simple task flow in the hi-fi prototype.

### Moderate Task: Review previously seen material through in-app practice.

Example scenario: Rebecca has been watching *Nobody Wants This*, but she got a lot of the real-time lessons incorrect. The next day, she reviews the vocab and grammar structures in the episode she watched through curated practice material.

This task is moderate because ... it is performed, not regularly, but when prompted by specific conditions. It also requires a little more investment from the user for them to seek it out, so it is performed by fewer users. But, because of people's familiarity with this format for language content, we expect decent user engagement. Furthermore, this task is valuable to our users because repetition and recall is an important feature of language learning despite its not always being the most fun; hopefully, reviewing terms in the context of your favorite media makes it more engaging for our users. Additionally, we wanted to ensure that learners could use mora to sharpen their language skills asynchronously, without another device or on the go

— this task enables that.



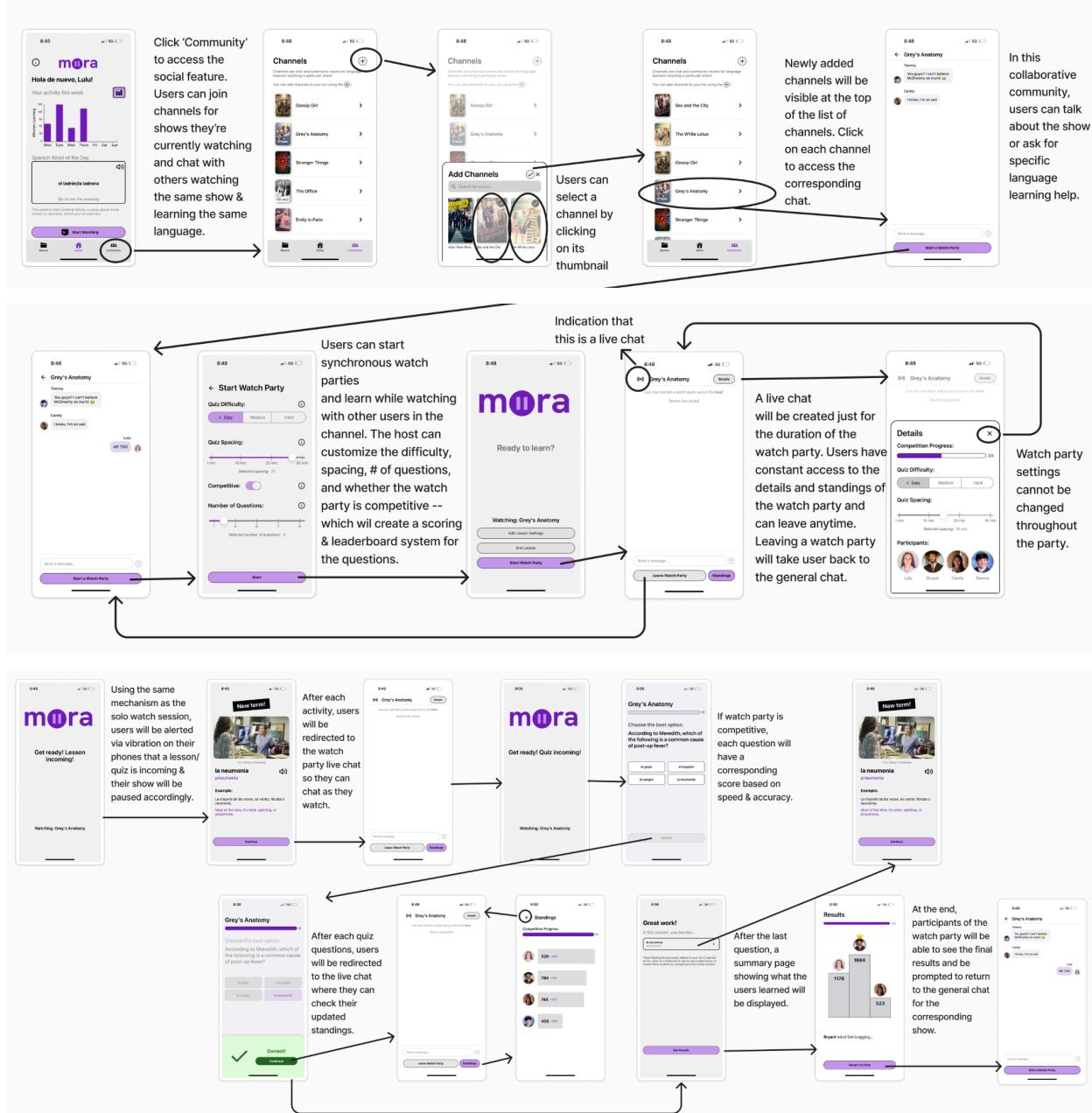
**Figure 9:** Annotated screenshots of the moderate task flow in the hi-fit prototype. (Third question in review omitted for space)

### Complex Task: Organize a synchronous, optionally competitive watch party for your media-language community.

Example scenario: Hannah has been enjoying learning German watching Glee alone, but she is craving community. So she creates a watch party to learn and chat with others in real time.

This task is complex because we can imagine only power users committed to this learning method will participate in something synchronous and/or competitive. Additionally, it requires forethought and organization. So it is both infrequent and requires complex user behavior. The task would be immensely valuable, however, to the learners from our needfinding that craved social learning experiences or expressed learning better through conversation in their target language — as this task also includes the organization of communities learning through the

same media with which users can chat. One participant even pointed specifically to competition as a big motivator for his past language learning, so users with similar motivation would benefit from this feature.



**Figure 10:** Annotated screenshots of the complex task flow in the hi-fi prototype.

# Design Evolution

## Low-Fi Prototype

Mora's first implementation was in the form of a paper prototype with very minimal design. This allowed us to test that the concept and tasks accommodated by mora were user-friendly and aligned with user needs. It also enabled us to get feedback on the high-level design of the app like the general task flows and navigation.

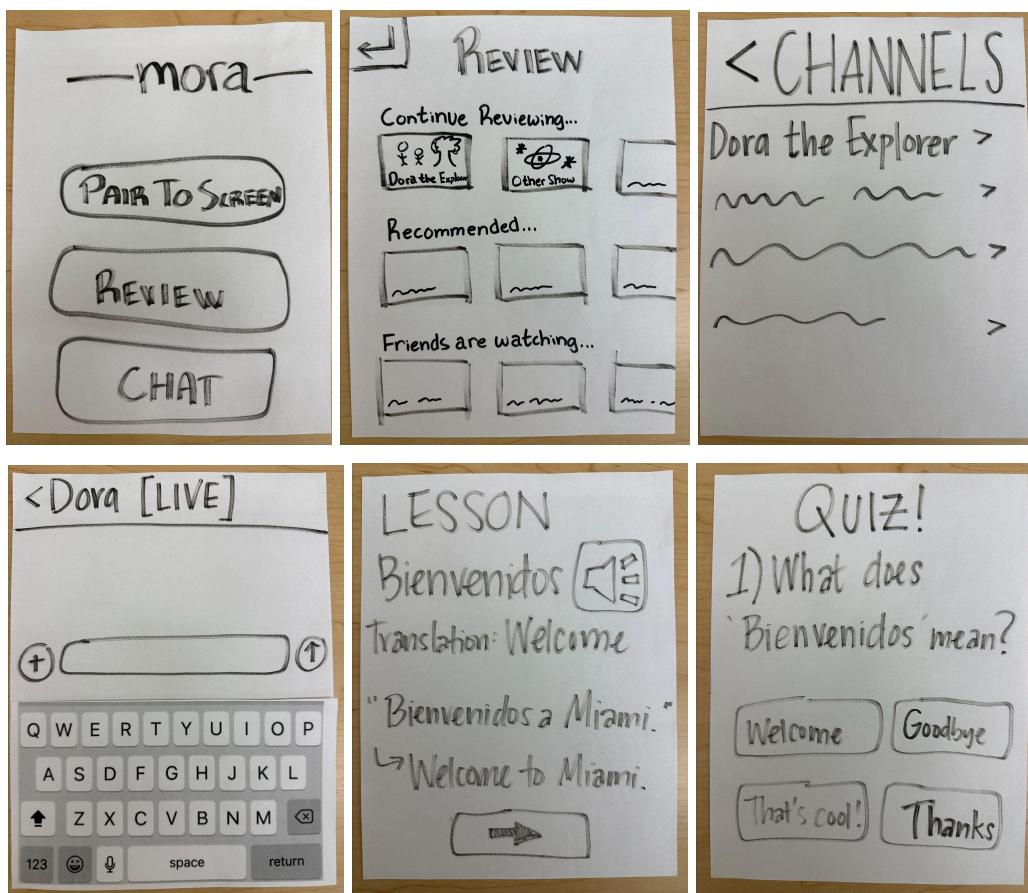


Figure 11: A few key screens of the low-fi paper prototype.

## Usability Testing

### Procedure

The tests use mora's low-fi paper prototype. Each participant was asked to use the mora app to complete the three tasks described above while watching Dora the Explorer. One team member acted as the facilitator, interacting with the participant, introducing the app, demoing the interaction, explaining the tasks, and asking for the participant's thoughts and feedback. Another team member was the notetaker, who transcribed feedback and tracked

the metrics discussed in the results section. A third team member acted as the “computer,” which meant she maneuvered as mora, replacing screens as buttons were pressed, controlling the video, and simulating haptic cues.



**Figure 12:** A picture of our usability test with Tony — Tommy facilitating, Bryant being computer, and Candy taking notes (and the picture!)

## Results

In order to evaluate the extent to which mora was demonstrating the values we wanted it to (discussed in the “Values in Design” section), we collected several “bottom-line” data. We asked each user to rate the experience on a scale from 1-5 on how fun it was compared to the average learning experience (3 meaning it was the same). We also asked each user to rate their eagerness to use the app and each of its tasks specifically on a scale from 1-5. Lastly, in order to measure how intuitive the navigation was, we counted the number of misclicks per user. The results are as follows (not shown is the eagerness by task, for which the averages were simple task: 3, moderate task: 3.5, complex task: 2.75).

	Fun	Eagerness	Misclicks
Vanessa	1	1	0
Bill	5	5	11
Tony	2	3	5
Blaine	4	4	1

Average	3	3.25	4.25
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**Figure 13:** A table showing our bottom line data for each interview and averaged.

We also collected process data by tracking and unpacking critical incidents. A few of the most impactful on our thinking are presented as follows:

Many users reflected on a show with as simple vocabulary as *Dora the Explorer* was not fun or educational. This confirmed our understanding that users needed to be able to customize their shows and the lesson difficulty. We even decided, as one participant suggested in her “exit interview,” that advanced users should be able to watch the show in their target language.

Several users reported feeling like they did not get enough language content, which implied to us that we need to give the user control over how frequent and complex lessons are.

In many interviews, the participant could not understand the meaning of certain buttons, which made us more intentional about designing descriptive and intuitive buttons in the med-fi prototype.

## Med-fi Prototype

Our next major UI iteration was a medium fidelity prototype created using Figma. The purpose of this prototype was to really hone in on the exact interface and visual design to replicate with code in the high fidelity prototype.

We chose Figma because it is an industry standard for designing phone app screens in relatively high fidelity without implementing any backend. While there is a steep learning curve to effectively use Figma, it offers a lot of capabilities like transitions and phone frames which help replicate a real app and tools like components and grids that make design easier.

While it was impossible to represent some elements of mora in this stage — like real conversation, live TV pairing, and audio/haptic elements — this prototype allowed us to start realizing mora.

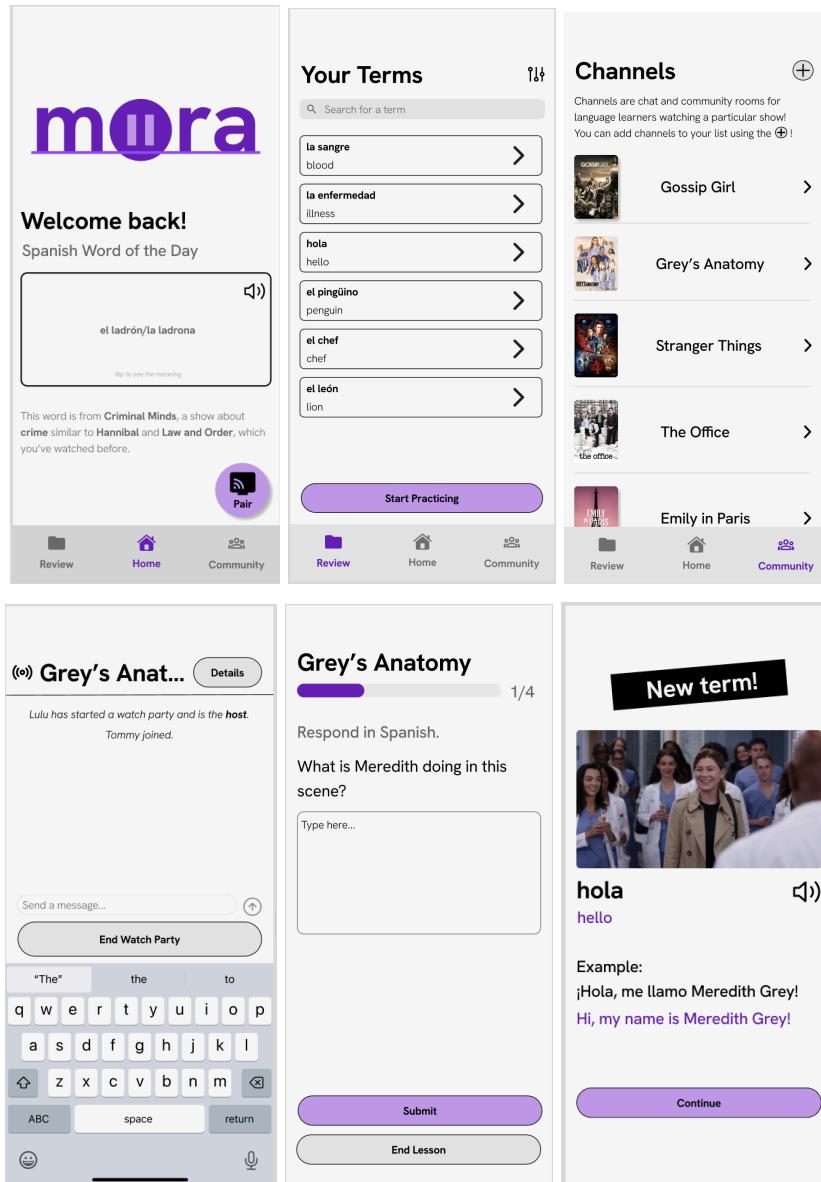


Figure 14: Select key screens from our med-fi prototype.

## Heuristic Evaluation and Revision

We exchanged med-fi prototypes with another group to perform a heuristic evaluation, then we iterated within medium fidelity. The heuristics we used were Nielsen's 10 Usability Heuristics for User Interface Design and two heuristics specific to CS 147.

We received a total of 83 violations, 22 of which were severity 3 or 4. The most common category for these violations was "Consistency and Standards" which comprised 20% of all violations. Many of the lower severity violations led to broad changes across the app including more intentional use of our action color, more contrast across our color palette,

an increase in documentation and accessibility, greater error prevention (by way of confirmations), and some added features. For the severity 3 and 4 violations, we methodically reviewed each one and fixed (or didn't fix) them as follows:

### 1. Simple Task - Error Prevention [Severity: 4]

- a. Issue: The lesson popping up without pausing the video can disrupt the viewing experience.
- b. No Fix: This is a misunderstanding of mora's functionality based on the constrained med-fi implementation. mora will automatically pause the show, making it easy for the learner.

### 2. Simple Task - Match between System & World [Severity: 4]

- a. Issue: The 'pair' button does not have a clear mapping to starting a watch session, which is more importantly what it does.
- b. Fix: Change the button label to 'Start Watching'



**Figure 15:** The changes to home page from HE (including #2).

### 3. Simple Task - Error Prevention [Severity: 4]

- a. Issue: Pairing to a device automatically starts a lesson without notification/confirmation of that.
- b. Fix: Added a confirmation screen between clicking 'Pair' (now 'Start Watching')

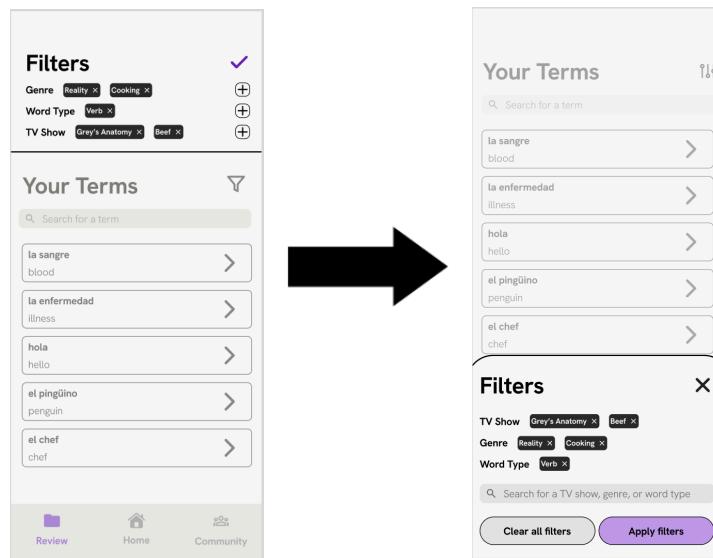
and the actual start of the session.

#### 4. Simple Task - Visibility of System Status [Severity: 3]

- a. Issue: A lesson does not provide any explanation of how long it will remain on screen or whether it will auto-close.
- b. No Fix: The expectation is that a user will have to engage with a lesson before manually clicking the clear 'Continue' button to resume the video.

#### 5. Moderate Task - Recognition not Recall [Severity: 3]

- a. Issue: The organization of your terms does not integrate context on what shows users encountered words in and makes it difficult to sort them accordingly.
- b. Fix: The filters system was entirely redesigned to be more intuitive and, regarding this particular violation, easier to find one show's terms with.



**Figure 16:** Changes to filter mechanism from HE (including emphasizing show re: #5).

#### 6. Moderate Task - Aesthetic & Minimalist Design [Severity: 3]

- a. Issue: The filter icon does not clearly indicate filtering.
- b. Fix: The icon was changed to a different commonly used filtering icon.

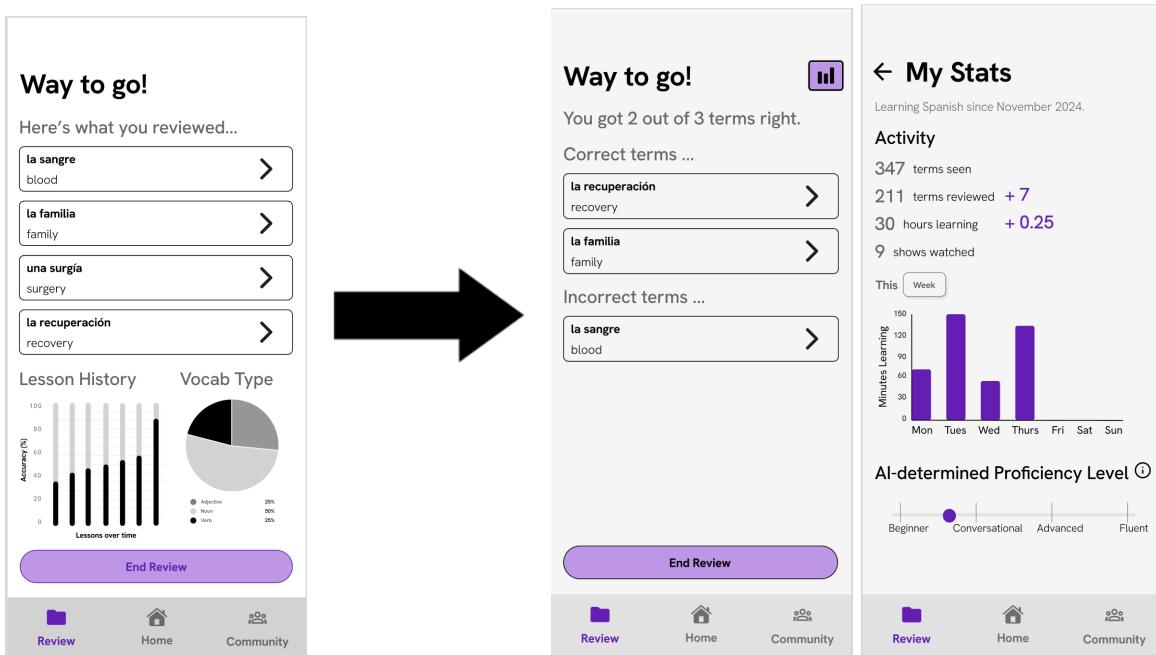
#### 7. Moderate Task - Consistency & Standards [Severity: 3]

- a. Issue: The exercises are not consistent about native language vs. target language (i.e. asks you to fill in Spanish words in English sentences).

- b. Fix: The exercise format was changed to always have an instruction in a user's native language and a question in the user's target language.

### 8. Moderate Task - Match between System & World [Severity: 3]

- a. Issue: A breakdown of the part of speech of terms practiced may not be valuable or actionable to learners.
- b. Fix: Removed this statistic.



**Figure 17:** Complete redesign of the review summary and stats from HE (including #8).

### 9. Moderate Task - Error Prevention [Severity: 3]

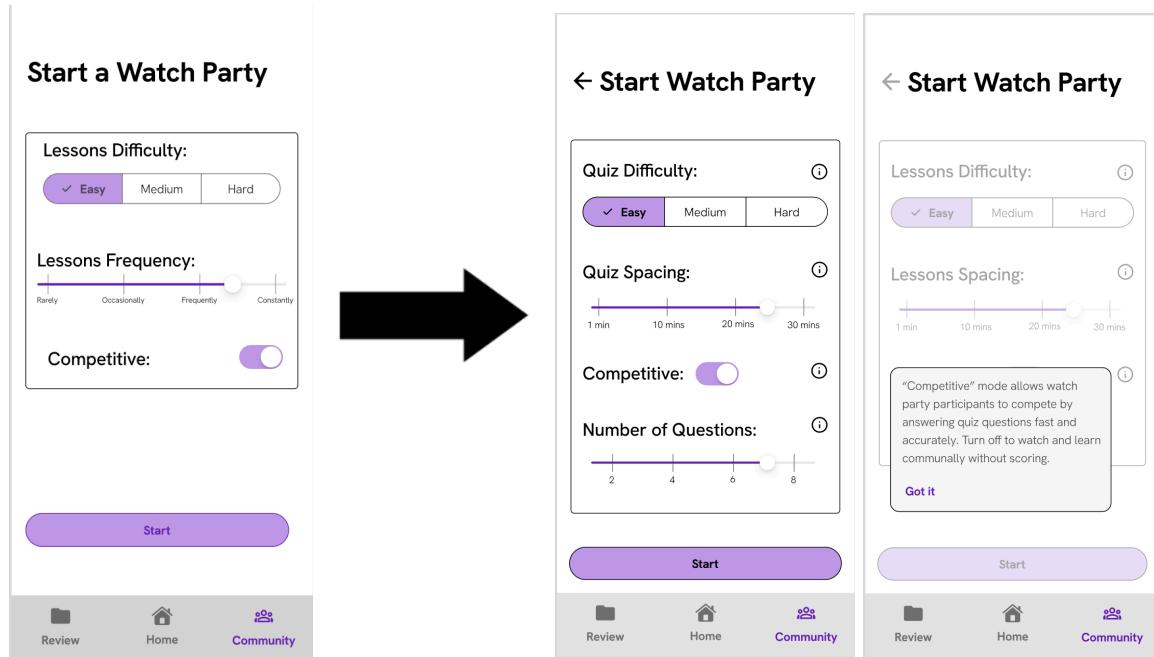
- a. Issue: Problems do not have a submit button (for a multiple choice question, for example, clicking a choice immediately responds with it).
- b. Fix: Changed to a select, then submit model.

### 10. Complex Task - User Control & Freedom [Severity: 4]

- a. Issue: Users do not have control over who joins their watch party.
- b. No Fix: All community-based features have the expectation of users engaging with the whole community. Those concerned about privacy can use the other features.

## 11. Complex Task - Help & Documentation [Severity: 4]

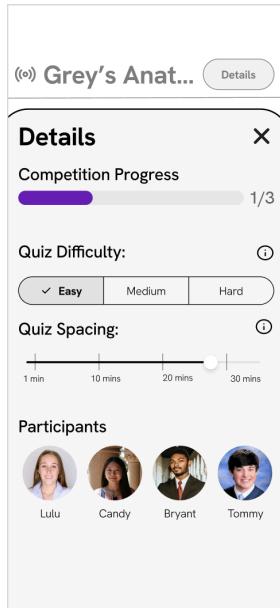
- a. Issue: There is no explanation of how users are scored for competitive watch parties.
- b. Fix: Add an info pop-up explaining the points system.



**Figure 18:** Redesign to watch party settings from HE (including #11).

## 12. Complex Task - User Control & Freedom [Severity: 3]

- a. Issue: There is no way to view watch party details or settings once it's started.
- b. Fix: Add a details button and page.



**Figure 19:** Details page added to watch party based on HE #12.

### 13. Complex Task – Visibility of System Status [Severity: 3]

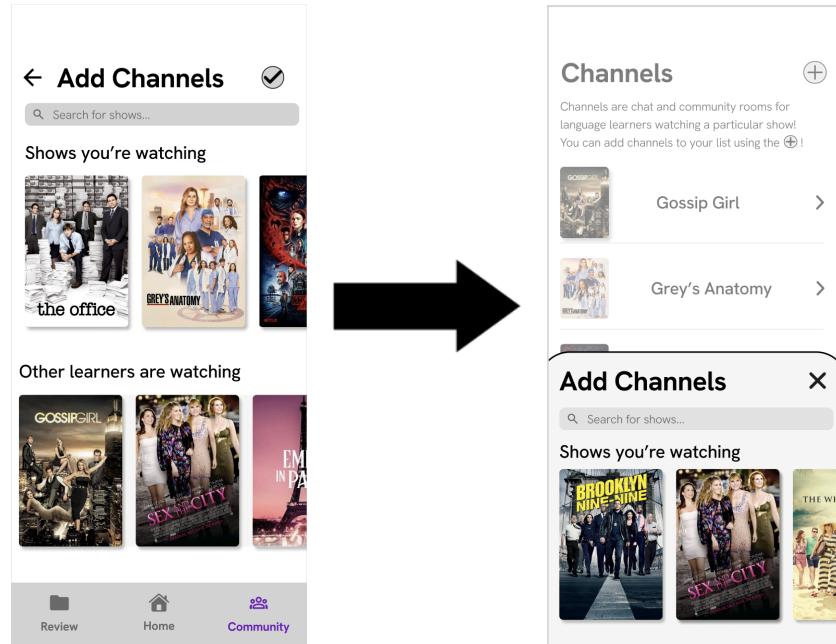
- a. Issue: 'Competition Progress' bar lacks context about how it's measuring progress.
- b. Fix: Added a fraction corresponding to the number of questions asked vs. total.

### 14. Complex Task – Help & Documentation [Severity: 3]

- a. Issue: There is no explanation of what exactly is competitive about competitive mode.
- b. Fix: Add an info pop-up explaining competitive mode.

### 15. Complex Task – Recognition not Recall [Severity: 3]

- a. Issue: The organization of the "Add Channels" page, particularly the "Shows I'm Watching" is unclear.
- b. Fix: Complete redesign of the "Add Channels" feature



**Figure 20:** Redesign to “Add Channels” page from HE (including #15).

#### 16. Complex Task – Value Alignment & Inclusion [Severity: 3]

- Issue: There is no recognition of levels of language acquisition and improvement.
- Fix: Added a stats page as well as an AI-determined proficiency level which is incorporated into designing watch session curriculum.

#### 17. Complex Task – Help & Documentation [Severity: 3]

- Issue: There is no way of seeing who is in a channel.
- No Fix: Our app doesn't mean to produce a social network so much as facilitate conversation and communal learning.

#### 18. Complex Task – User Control & Freedom [Severity: 3]

- Issue: No back button on “Lesson Settings” page after clicking “Start Watch Party.”
- Fix: Added back button.

#### 19. All Tasks – Accessible Design [Severity: 3]

- Issue: Action buttons are purple on purple, which is not contrastive.
- Fix: Made buttons purple on black to increase contrast.

#### 20. All Tasks – Visibility of System Status [Severity: 3]

- a. Issue: Target language is not shown (for users learning multiple languages).
- b. Fix: The “Welcome, back” on the home page was switched to the user's target language and a gear icon was added to edit your settings like switch between languages.

## 21. All Tasks – Consistency & Standards [Severity: 3]

- a. Issue: There is a “Shows you’re watching” section but nowhere to indicate what shows you’re watching.
- b. No Fix: Mora can collect data on what shows you’re watching through bluetooth.

## 22. Extra Violations – Help & Documentation [Severity: 3]

- a. Issue: Users have a profile in watch parties but there is no way to set up a profile.
- b. Fix: Added a profile page to onboarding and a button to revisit and edit it.

Name  
Lulu Sullivan

Display Name  
Lulu

Target Language  
Spanish

Proficiency  
Beginner   Conversational   Advanced   Fluent

Media Interests  
Search for shows or genres...  
Comedy × Crime ×

Continue

**Figure 21:** Profile page added from HE #22 (see gear icon added in Figure 15 — brings you back to this page).

## Values in Design

### Educational

As a language learning app, mora’s primary goal is to help users *learn* personally relevant and

useful language skills; therefore, the value for education is embedded in every feature of the app.

One of mora's main educational values is contextual language exposure. Our needfinding demonstrated that this was really valuable to our users, so mora provides people language lessons not only based on their favorite shows but also while they watch them. mora further reinforces the educational value of this by associating your terms in the review activities with the scene in which you encountered them.

Education is also baked into mora's community feature. Many people we spoke with in our early stages reflected on their language education as lacking social interaction in their target language, so we designed social communities — with chats and watch parties — to facilitate just that.

We also wanted mora to be educational to people of many skill levels. To ensure this value came through in every user's experience, we included a proficiency setting to tune language lessons to individuals.

### **Fun**

It was also very important that mora be *fun*. So many people we interviewed expressed the sentiment that, even though they love having learned languages, the methods for doing so can often feel like a chore due to their tedious and solitary nature. We wanted mora to be a relaxing, restorative, entertaining — *fun* — alternative.

The focus of the entire app on watching TV and movies bakes fun into its design. Whether you're watching TV and learning or reviewing your terms and recalling that really dramatic scene, TV is pretty widely considered to be fun. Additionally, users can shape their learning around their own media interests, personalizing the fun for each user.

mora also features several more game-like quiz types and a competition capability. For many users these experiences of skill and reward are really fun!

Finally, the opportunity to chat with other real people, particularly around your own interests,

is another outlet for fun that mora provides users. Users can make friends and even fandoms through mora!

### Inclusive

Our needfinding surfaced a lot of experiences of exclusion in traditional language learning — based on pace, learning style, etc. We wanted to ensure that mora was accessible to anyone interested in learning a new language.

First mora's language lessons are tailored to each user's abilities, interests, and needs, creating the right learning experience for them.

Additionally, design features like redundancy of feedback cues — red vs. green, X vs. check — and multimodal interfaces — audio for term pronunciation, haptic for incoming lesson — help make mora accessible to users with varying abilities.

A major challenge to the inclusivity of mora was that it presupposes access to a streaming service and/or device. One way of mitigating this is for mora to still offer its moderate task, media-based study sets, to those without streaming access.

### Value Tensions

While the values of fun and education are not explicitly in tension, experiences which maximize one tend to give up a little of the other. We really wanted to make sure we found the appropriate balance between the fun of watching TV and the education of the lessons. One way that mora achieves this is to let users choose how frequently they want to be interrupted with a lesson and how difficult they want those lessons to be. These settings adjust this fun-education balance, so users can identify and curate that for themselves — even differently from session to session.

We were also very aware of the issue that what might be fun for one user could be uncomfortable for others and make them feel excluded. This tension emerges, for example, in the competitive feature, in which mora resolves it by making all competition opt-in; it is an option for those who find it fun, but it is not requisite for those who find it uncomfortable.

# Final Prototype Implementation

Our final prototype, the current realization of mora, is a mobile app built with React Native and Expo. This prototype essentially replicated our post-HE med-fi in this new format.

The major pro of React Native is its cross-platform nature; we wanted people to have access to mora, even in its demo stage, regardless of what kind of device they use. Our team also had more experience with React Native than with Swift, allowing us to get started right away. The biggest con was that React Native has fewer available third-party components than native development platforms; however, we were willing to accept this considering we didn't require many.

Expo was essential for being able to rapidly prototype our prototype, so we could iterate quickly on successes and failures. Its management environment sometimes makes really low-level elements hard to have control over, but this didn't pose a problem for us.

## Wizard of Oz/Hardcoded Elements

Because streaming services do not have public APIs, many elements which involve interacting with the streaming app are controlled "Wizard of Oz" style, one of our team members controlling the flow as the computer. Additionally, because of our limited time frame some features are hardcoded for the sake of demonstrating the app's tasks and functionality. The following is a list of all such items.

1. All lesson settings (target language, difficulty, frequency of lessons, etc) are hard-coded
2. All profile information, including target language, is hard-coded
3. Pairing of devices is not real
4. All chosen pause moments and lessons are hard-coded
5. Chosen show is hard-coded to Grey's Anatomy ([link](#))
6. Must pause the streaming device manually instead of automatic interruptions/suggestions that pause automatically
7. Statistics associated with quizzes, review activities, and competitive rankings within watch parties are hard coded
8. Review content — the list of terms, filters available, the activities themselves — is hard coded.

# Reflection & Next Steps

## Reflection

Creating mora has really given us a peek behind the veil of user interaction and experience design. It has taught us how important it is to involve users before, throughout, and after the design process; to find a need rather than a product; to motivate decision decisions from your user research; to rapidly prototype and identify early and often what works and what doesn't. Building mora has exercised our understanding of design principles and the design process; creating a design from scratch illuminated the value of minimalist design, having our work scrutinized through the heuristic evaluation taught us how important consistency is, and presenting our work in various formats demonstrated the value of knowing your product and its value.

Our project experience also gave us a new perspective on language learning as a field and the role of technology, particularly AI, in it. From the very start, in our needfinding, we confirmed with user research the commonness of our own experiences: decontextualized, tedious, solitary language learning. We also gained appreciation for how hard it is to design for language learning, accommodating many languages with different structures and sometimes even different pedagogies for learning. We found that AI, working in the background, can be extremely valuable for overcoming this! We also discovered that AI might not be used in the foreground, interacting directly with learners, in this domain; people want to learn language through authentic human interaction.



**Figure 22:** Multi-award-winning team mora at the CS147 Project Expo.

Being team mora was a really special experience and an awesome learning opportunity about working in a team — a productive, communicative, successful team. It has been really helpful to identify and improve on team behaviors that are destructive and to identify and amplify practices that work well.

## Next Steps

With more time, we would try to make some of the Wizard of Oz and hardcoded features real or adaptive. While it would be difficult to get access to controls over and data from streaming services, we would want to begin that process; automatically pausing the show, the feature which gives mora its name, requires it, and actually designing a curriculum for any given show or movie relies on being able to pull information like a transcript or even the video itself and feed it to an LLM.

A more immediately available use of AI we might look into implementing is generating review material for a selected set of terms; this will keep the review activities new and exciting for repeat users.

We would also consider building up a back end. This could allow users to actually interact with each other in the community page, and it would enable the statistics to actually update based on user activity.