

CS 147 - Voice Interaction Studio

Assignment 8: Interactive Hi-Fi Prototype

Introduction



Our Team



Grace D.



Ben H.



Karen L.



Juan David V.

Value Proposition

Spelling made magical.

Mission Statement

Our goal is to create a new, independent, and engaging way for kids to learn spelling.

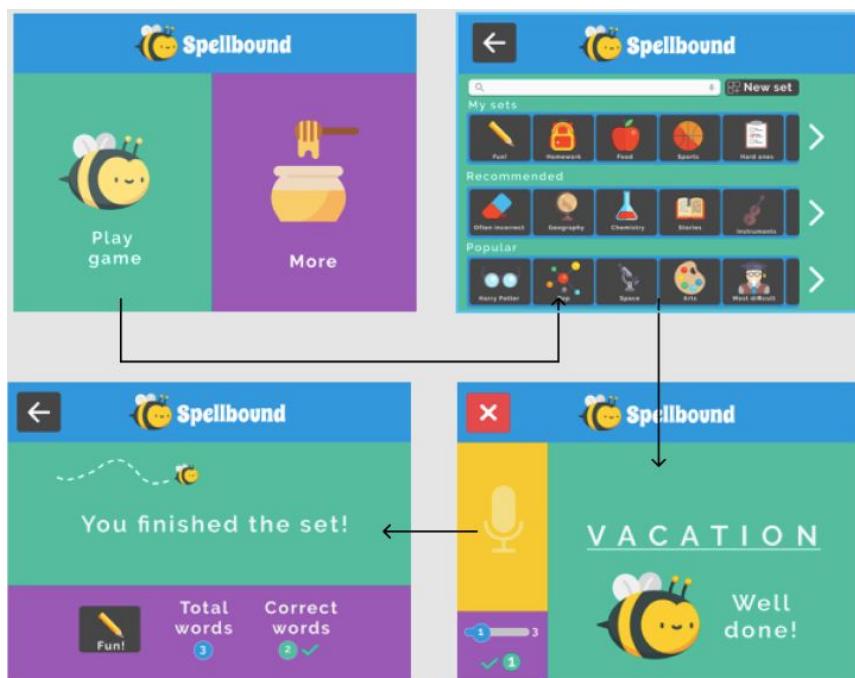
Problem/Solution

Kids are dependent on a parent/teacher to help them learn how to spell, but there's not always time for one-on-one practice. Spellbound utilizes VI to help children practice spelling and receive feedback in an engaging and independent way.

Tasks and Final Interface Scenarios

Simple - Single player Game

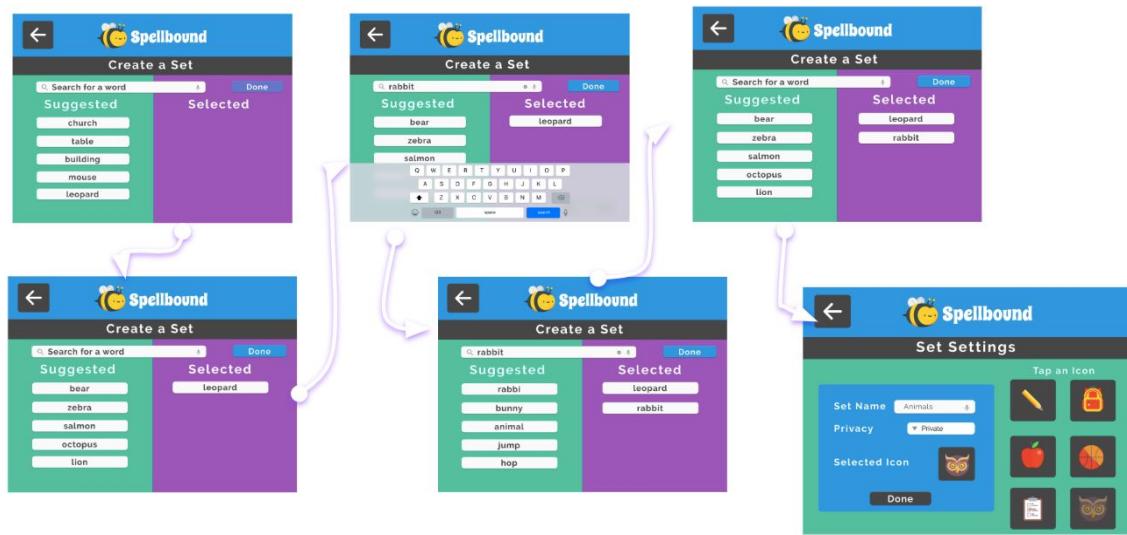
- **Reasoning:** We chose the single player game as a task because it is the core of our app and the most used function. Our purpose is to provide kids with an engaging and fun game to improve their spelling skills.
- **Storyboard Walkthrough:** To begin this task, the user clicks on “Play game” on the homepage. They are then prompted to select a word set. After, they are directed to the play page which includes repeat, define, and use in a sentence buttons and a microphone button the user must hold to trigger app listening.



Single Player Storyboard (Figure 1)

Medium - Create a Word Set

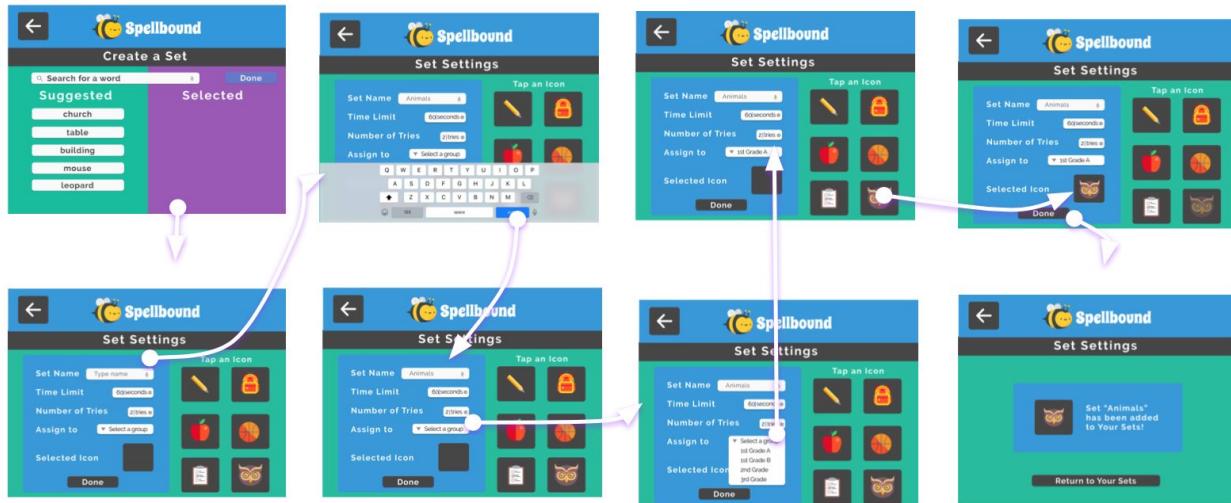
- **Reasoning:** Creating a word set is a chosen task because the ability to customize word sets allows users and teachers to personalize practice sets and lesson plans.
- **Storyboard Walkthrough:** For this task, the user clicks “More” from the home page. Then, they enter “Create a set” which is divided into “Suggested” words and “Selected” words. Under suggested, they can tap on any word or search for a specific word to add it to the set. When finished selecting, the user must name their set, choose a privacy setting (private or public), and select an icon before publishing.



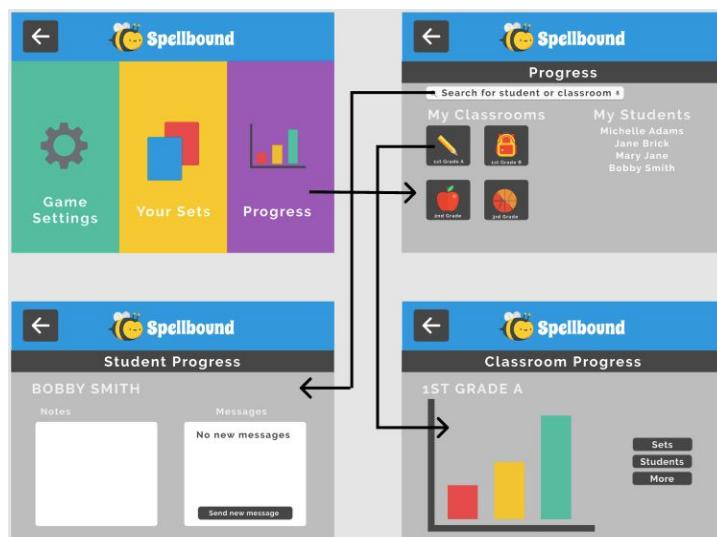
Create a Word Set (Figure 2)

Complex - Teacher Mode

- **Reasoning:** Teacher mode is our hardest/most complex task because it's only meant for teachers/tutors/parents and includes advanced settings. We chose this as a task because teachers can create specific word sets with specific playing parameters to share with their classes. Additionally, this task includes a way for teachers to easily track and monitor their students' progresses for each word set.
- **Storyboard Walkthrough:** The user must be logged into a teacher account. Within it, they have the same functionality as the student mode. To create a set, the teacher enters “Create a set” and then “Done” when they are finished selecting words. They can then edit the settings to customize play parameters and assign the set to a class. To track progress, teachers click “Progress,” where they can view their students’ scores either by individual or by classroom.

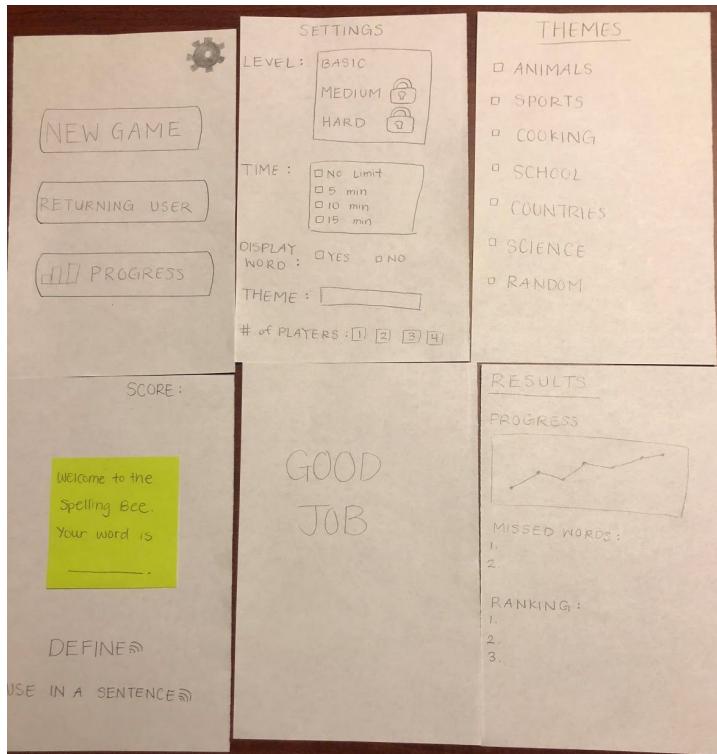


Create Set (Teacher Mode) (Figure 3)



View Progress (Teacher Mode) (Figure 4)

Design Evolution



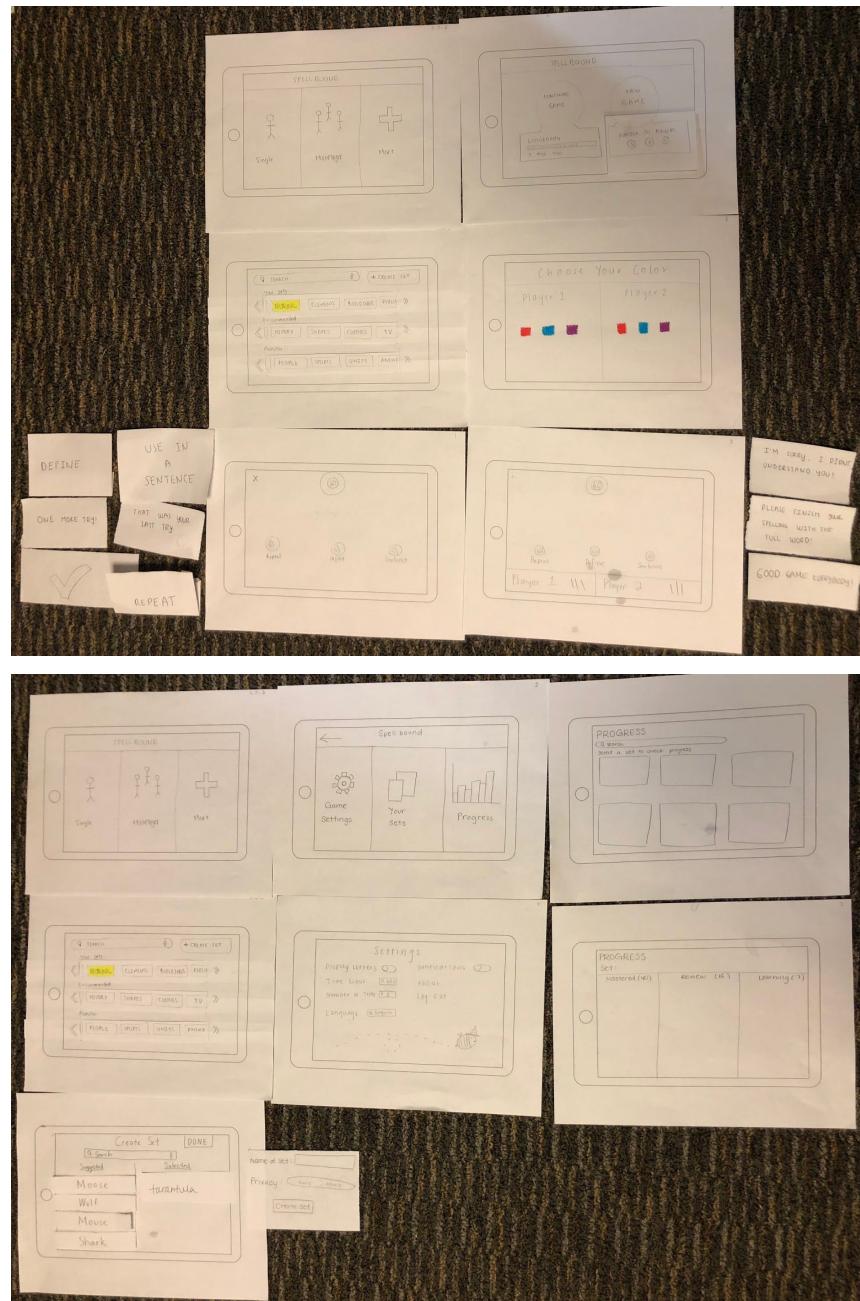
Initial Experience Prototype (Figure 5)

Initial Experience Prototype to Low-Fi Prototype Changes

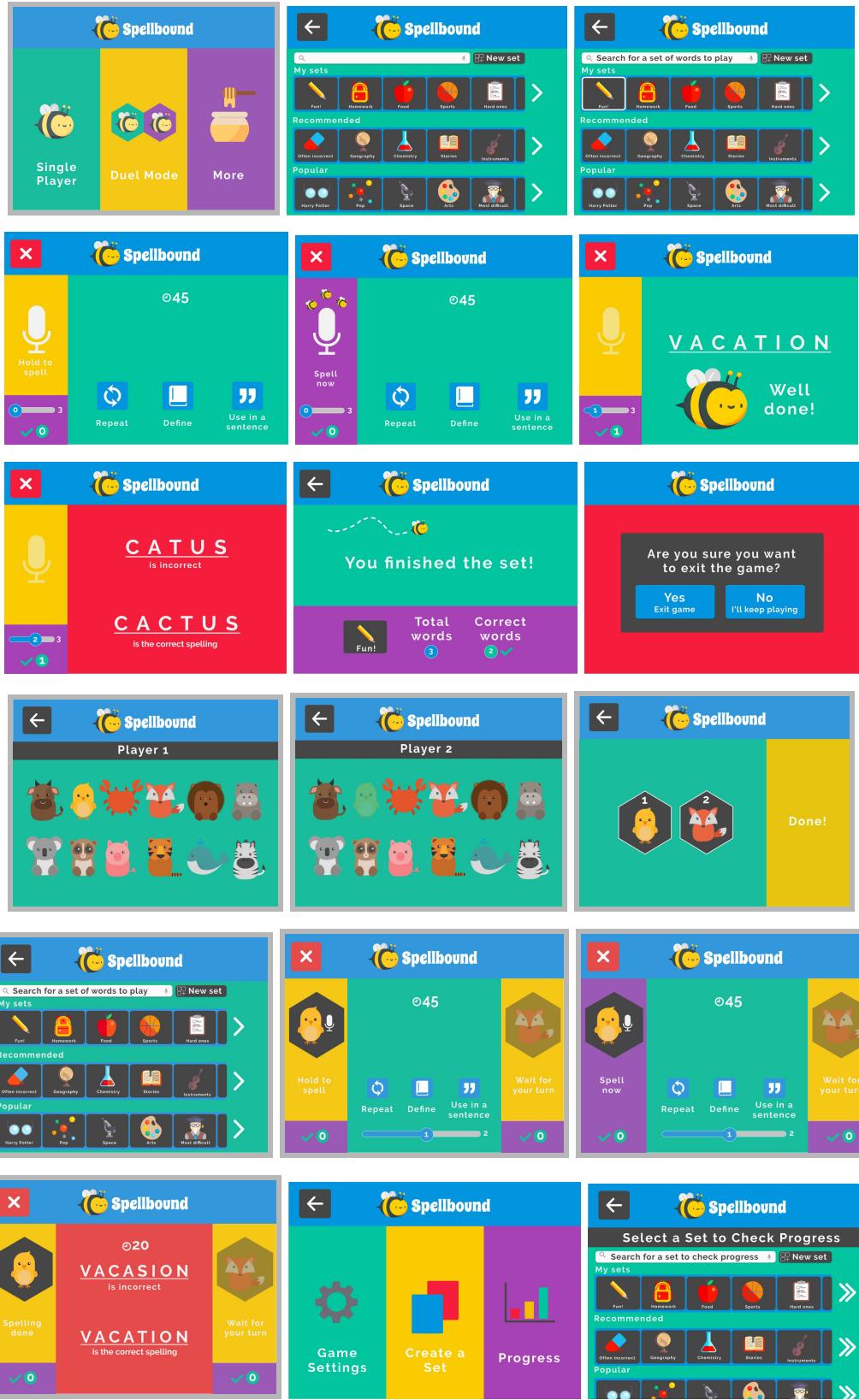
For our experience prototype (Figure 5), we imagined Spellbound as an iPhone portrait mode app that only had the ability to play a game and view progress. We tested this prototype on a mother and daughter we interviewed at Tressider. From the feedback we received, we realized a main problem with the prototype was that it used too many advanced words on the interface that a child potentially can't understand. Additionally, we realized that an iPhone wasn't the best device to design a visually-appealing and child-friendly device for due to the small screen, and that our progress section could have many more potential features.

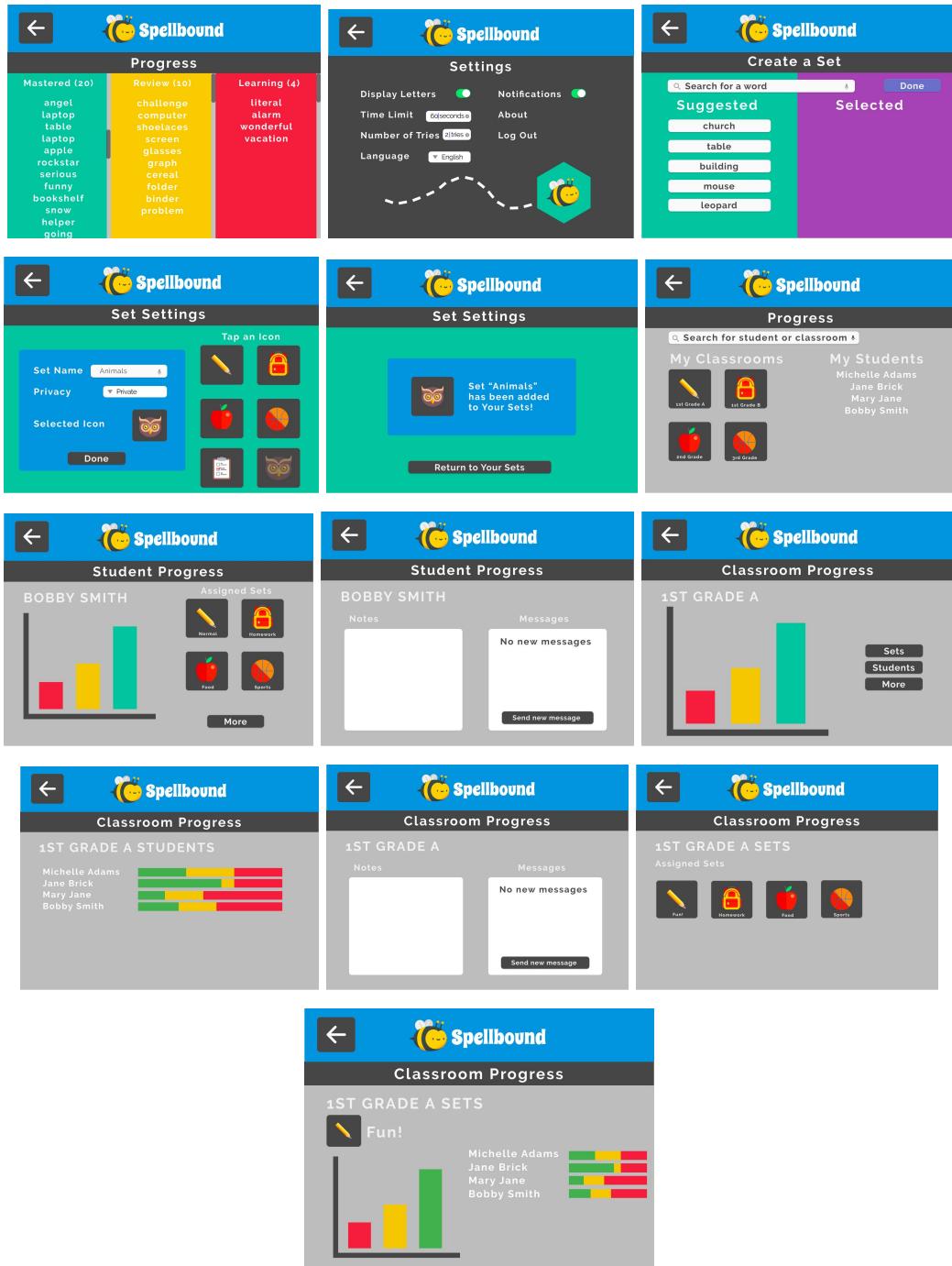
As a result, in the next design, our low-fi prototype (Figure 6), we implemented four major changes:

1. Used smaller words and a more kid-friendly user interface
2. Changed the orientation to a landscape mode for an iPad, which are easier for kids to use because of their size and are more popular amongst younger kids
3. Added a way to view progress set by set
4. Added a "dual mode" game feature



Low-Fi Prototype (Figure 6)





Medium-Fi Prototype (Figure 7)

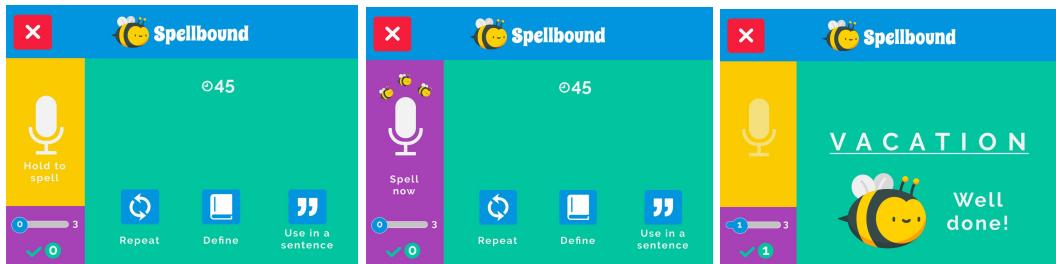
Low-Fi to Medium-Fi Prototype Changes

We tested our low-fi prototype (Figure 6) with a mother and her two children, ages 7 and 10, in a usability test in their home in Escondido Village. In our low-fi, to indicate that the player had finished spelling the word, they had to repeat the word (ie. “S-T-R-O-N-G strong”). From their feedback and our observations, we found that the

biggest issue was they forgot to repeat the word in its entirety after they were done spelling it. Furthermore, the children said they really liked the colors we included and would definitely like to see more of it. Finally, the last piece of feedback was that the sets page was too verbose and needed some visuals.

Consequently, we implemented three major changes from our low-fi to our medium-fi prototype (Figure 7):

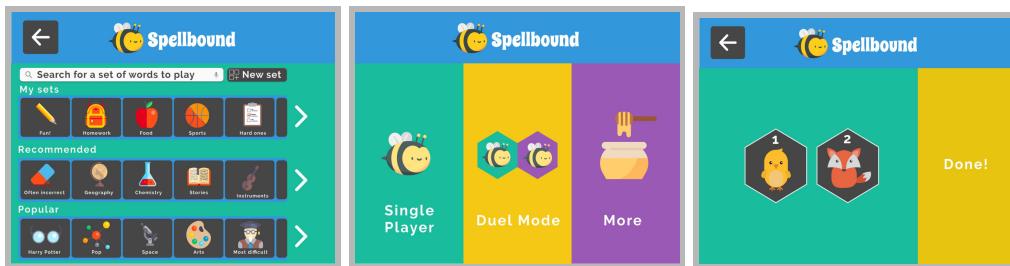
1. Instead of repeating the word to indicate that they're done spelling, we included a microphone button that they have to hold down when speaking, and then let go when they're done.



2. Added color to every page in the app to make it more visually appealing and kid-friendly.



3. Included appropriate icons for every set on the sets page to make them less confusing and more visible. Also, used the bee and other icons on other pages, such as the choosing an avatar page, to make it even more kid-friendly.



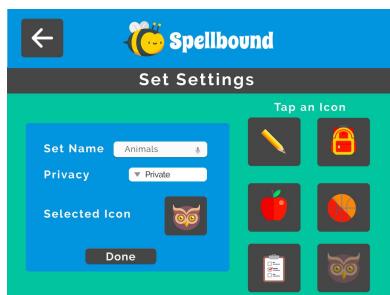
Major Usability Problems Addressed

Level 3 and 4 Usability Problems and Reasoning

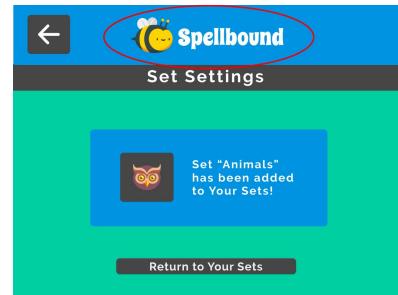
1. Holding down the button to speak

We decided to not change this aspect of the interface. In our low-fi prototype usability testing, we found that children had a difficult time remembering to say done or to repeat the word to indicate that they were finished. Additionally, they were often eager and talked over the voice assistant. As a result, we believed the microphone button was the best option because it gives a clear indication of when they must start and stop speaking, and it slows them down such that they won't begin spelling before the voice assistant is done speaking.

2. No home button



(Figure 8)



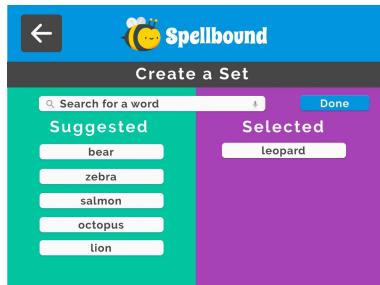
(Figure 9)

In our medium-fi prototype, one issue was that when creating a set, there was no way to get back to the landing page with one click (Figure 8), which could make people click back up to five times. We addressed this by making the logo at the top a home button (Figure 9). Since the logo is on every page, the user will be able to quickly go to home regardless of what page they're on.

3. No illustration of the word

We decided to not go with the fix to include an illustration of the word the child is supposed to spell. Our reasoning was that the goal of the app is to emulate the spelling bee format, which does not include pictures. Additionally, we wanted to focus on improving the student's audio recognition and memory rather than pictorial recognition.

4. Inability to type in word and immediately add for create a set



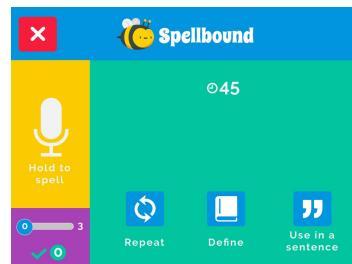
(Figure 10)



(Figure 11)

In the medium-fi, users were not able to type up any word directly and add it to their set when creating a new set (Figure 10). They could only search or add from suggested. As a result, in the hi-fi prototype, we decided to improve our “Search for a word” function. The user can now type in any word in the English lexicon and it will appear at the top of the list, where they only need to tap once to add it to their set. (Figure 11).

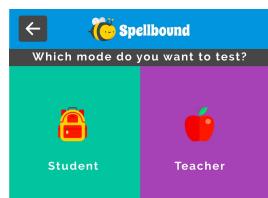
5. Definitions too difficult



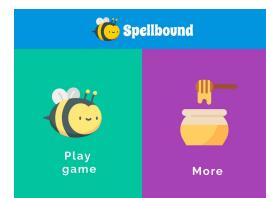
(Figure 12)

One problem with our medium-fi prototype was that the given definitions were too complicated for children. As a result, for our hi-fi, we shortened and simplified each definition for every word we coded in so they would be easier to understand. There were no visual changes, so only one visual of the relevant hi-fi page is included (Figure 12).

6. Can't go back and forth between teacher and student mode



(Figure 13)



(Figure 14)



(Figure 15)

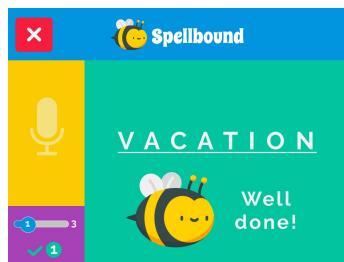
Our app is supposed to have two different modes that depend on what type of account a user is logged into, student and teacher modes. We wanted to display

both for the medium-fi, so we included them in one prototype (Figure 13). However, there was no clear way to switch back and forth between them. As a result, for the hi-fi, we made two separate apps to completely separate them and make it clear that one version is for the child/student (Figure 14) while the other is for the teacher/parent (Figure 15).

7. No instructions on teacher create a set

We did not include instructions on how to create a set in teacher mode. The reasoning is because the labels next to each function within the “Create a set” page and “Set settings” page are clear and an adult should be able to understand complete the task.

8. No auditory feedback when user has correct spelling



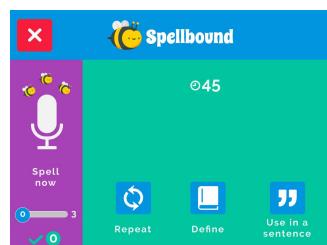
(Figure 16)

Our medium-fi only had a visual congratulations message to indicate that the spelling was correct. As a result, in our hi-fi, we included a clapping/cheering sound that played whenever the spelling was correct in addition to the message. There were no visual changes, so only one visual of the relevant hi-fi page is included (Figure 16).

9. No auditory feedback on whose turn it is

We decided to not implement the dual mode in our hi-fi prototype for reasons listed below. As a result, this heuristic point was no longer applicable.

10. Voice assistant not friendly/talks too fast



(Figure 17)

Our voice assistant in our medium-fi was too unnatural and talked too fast. As a result, in our hi-fi, we found a more personable voice assistant who spoke more slowly, so it was easier to understand. There were no visual changes, so only one visual of the relevant hi-fi page is included (Figure 17).

Additional Changes

1. Removed dual mode because we wanted to focus on creating a functional and polished single player game mode to demo.

Prototype Implementation

We built the hi-fi prototype using Swift and Xcode. One advantage that these tools provided us was that using the storyboards allowed us to conveniently organize pages and segues between pages. Additionally, we were able to easily program functional search bars, scrollable table views, and collection views, which all added an exciting level of complexity and interactivity to the app. Finally, using Swift and Xcode allowed us to implement and preserve the colorful features and buttons that were popular amongst our user testers from our medium-fi.

The major disadvantage when it came to Swift and Xcode was that it could not easily incorporate voice interaction into the application. As a result, we turned to Wizard of Oz techniques and used pre-recorded scripts to present the demo.

We had to rely on a couple of Wizard of Oz techniques in order to give presentable demos. First, since we could not get an actual voice assistant, we pre-recorded all the lines we needed and played them at the appropriate times during the demos. Additionally, since there was no voice assistant that could recognize what the user spells or automatically check whether or not they spelled it correctly, we included invisible buttons on the interface that one of our team members would press depending on whether or not the user spelled the word correctly or incorrectly.

There were also some hard coded aspects in our hi-fi prototype. One area we hard coded was the set of words that the user could play. Every set on the “Choose a set” page led to the same set because there was one functional set. Another function that we hard coded was the progress. More specifically, new games did not impact progress at all, so the progress displayed remained static through each playthrough. Lastly, users could only search for words to add in a new set within our defined lexicon, so they could not add a made up nonsense word or words outside our lexicon.

There were several features we sketched out but decided not to implement in our high-fi because they were either not necessary for a fleshed-out demo or were outside our feasibility and time constraints:

- Dual mode
- A working timer
- Tracking how many words the user has completed in a game and keeping score of how many they got correct
- Ability to message a student or take notes on a student in teacher mode

Hopefully these features can be implemented in the future.

Summary

Many kids are often dependent on a parent or teacher to help them learn how to spell, but there's not always time for one-on-one practice. We designed Spellbound to help parents and teachers connect with their children or students in a way that could accelerate education and learning. It is our hope that with our app, kids learning how to spell can easily improve their skills in a fun and independent way that does not feel like tedious homework. Throughout this class, we learned to iteratively design our app, starting with needfinding and eventually advancing through the low-fi and medium-fi prototypes and finally developing a fleshed-out high-fi prototype and demo. More importantly, we learned how to take a real-world problem and develop an engaging and effective solution for it. In the future, we will use these skills to solve problems in other human-computer interaction classes, our lives, and our careers. Thank you for a great quarter!