Syll**able**

05-438 Term Project — Molly Niehaus & Shenai Chan

Language learning as an adult is hard. Particularly, learning how to pronounce new sounds and tones, as well as how to even distinguish between them, is much harder as an adult than as a child. We saw the opportunity to fill this unmet need with Syll**able**, a language learning app that focuses primarily on speaking and listening to novel sounds. Syll**able** aims to augment the traditional language learning experience by providing both a standard progression for individual usage (assuming the user is learning on their own through textbooks or other apps), as well as an interface for supporting in-classroom learning. We aim to help users gain confidence in their speaking and interpreting abilities, and we hope they can go out into the world with a deeper understanding of the sounds of their target language of choice.

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1. Unmet Need/Root Cause

Learning a language as an adult is challenging as the ability to distinguish between sounds significantly decreases with age, and accurate pronunciation suffers as a result. This is due to perceptual narrowing that occurs where as infants we are able to differentiate between all different language sounds but, even as young as 10-12 months old, we lose the ability to discriminate between sounds that are not in our native language (Elsabbagh et al., 2013). As an example, if a speaker of a non-tonal language tries to learn a tonal language, it can be quite difficult for the learner to hear the necessary contrast (Kiriloff, 1969).

Many people try to learn a new language as an adult every year. In 2022 on Duolingo alone, there were 12.5 million daily users (Duolingo Shareholder Letter). On Duolingo, users are evaluated on their pronunciation by repeating a phrase and receiving a binary success/fail result. Very frequently, there are minor yet vital pronunciation errors that Duolingo either cannot detect or chooses to ignore if the user has hit a certain threshold of accurate pronunciation. However, without feedback on the scale of individual sounds, users will not improve their pronunciation.

Minor pronunciation deviations are not inherently a problem, maybe people communicate across different accents easily every day. However, there are two areas in which pronunciation errors are important to consider: First, when distinguishing between two words that differ only by one phoneme. And second, when a speaker feels unconfident speaking due to their accent. One study found that 64.97% - or almost two thirds - of participants who were learning a foreign language experienced foreign language anxiety (Wang & Zhang, 2021). This foreign language anxiety prevents a barrier to communication for those learning a second language. Therefore, our app strives to assist with these aspects of pronunciation by focusing on what's actually useful and effective for communication and increasing the confidence of the speaker without contributing to the stigmatization of non-standardized accents.

This need for better pronunciation help has persisted for many reasons:
- Speech to IPA (International Phonetic Alphabet, a universal phonetic alphabet) is quite a difficult problem for signal analysts and machine learning engineers everywhere. However, this sort of technology, when harnessed correctly, can support remote feedback on pronunciation and provide users with targeted advice for how to produce the correct sounds in relation to the specific sounds they are presently creating.
- Focusing on the pronunciation of individual sounds can be tedious and yield low retention rates in language learning. (O'Brien, 2021)
- Developing the vocabulary to talk about the differences between sounds requires nontrivial overhead and, again, can yield low retention rates in language learning.

If someone wants to learn a language, but they aren't currently in an environment in which others speak that language, it can be incredibly useful to have a tool/app readily available through which they can practice the language. Particularly for those who do not have the time or money to access live teachers who can help correct their

pronunciation in real time, technology can be a cheap, easily accessible resource. Additionally, re-learning how to differentiate sounds that you have lost the ability to distinguish is the kind of activity that is benefited by repetitive exercises. In this way, technology supplies the high frequency reinforcement that is vital for language learning (Aroline, 2020).

2. **Competitive Analysis**

We conducted our analysis by first generating a list of language-learning apps through both our pre-existing knowledge of such resources and Google searches such as "language learning app" and "learning pronunciation app." After having a list of potential competitors to review, we went through the list and reviewed the materials of each competitor reading their website to find out what features they offer and looking at reviews of the app to see what users felt were lacking.

Duolingo

Description:
Language learning app that tries to help you learn the whole language. It teaches both vocabulary and pronunciation. You set daily goals and get reminders to hit them. There is also a friend feature which allows people to congratulate you on reaching milestones and do 'quests' to do certain amounts of work as a pair in a week.

Improvements Needed:
The pronunciation portion of Duolingo is somewhat inadequate. It sometimes does and sometimes does not approve the speaking even when no real difference seems to be there. It also does not provide much instruction on how to do pronunciation beyond just listening to the word being spoken.

Features to Borrow:
  - General idea of speaking into a device and being rated on your pronunciation
  - Friends feature might be good to include for motivation?
  - Entertaining/engaging graphics

Babbel

Description:
Language learning app that focuses on learning real-life conversations. Education grounded in real-world conversations, perspective from native speakers, and memory retention techniques.

Improvements Needed:
Seems to be much less gamified, which could be a con for people who struggle to stay motivated.

Features to Borrow:
  - More academic/rigorous than duolingo, which can have downsides, but helps people gain a deeper understanding of the language as a whole
  - Focus on conversational language, rather than Duolingo's funny phrases.
  - Audio is authentic and natural

Rosetta Stone

Description:
Language learning app that helps immerse students in real-world scenarios, interactive activities, and audio from native speakers. Offers live coaching for native speakers and a robust curriculum optimized for understanding different contexts for using your new words.

Improvements Needed:
Like many lang learning apps, it's hard to clarify if you have questions. Also, the inability to change perspectives with scenarios can make it difficult to understand different relationships in the foreign language.

Features to Borrow:
  - Robust speech recognition software with the ability to customize the level of difficulty (how close you have to get to the native pronunciation in order to pass exercises). + can view a graphic of your pronunciation and the native speaker's pronunciation side by side

Say it Right

Description:
A website which helps with pronunciation of Mandarin Chinese both the consonants/vowels and the tonal system. There are sounds available for listening to and ways of evaluating how well you have heard the pronunciation.

Improvements Needed:
Doesn't seem to have a way for students to get feedback on their own pronunciation. It only has ways for students to listen and to be told how to pronounce words but with no way of testing that.

Features to Borrow:
  - Good database of pronunciation for learning from
  - Dictation feature that involves writing out what was heard

Pinyin King: Chinese Tone Practice

Description:
Used to help learn Chinese Tones. Plays audio from real human speakers. Drills differentiation between new sounds both on simple words and in whole phrases.

Improvements Needed:
Not the most easily understood/welcoming interface. It doesn't seem to practice pronunciation at all – only identification.

Features to Borrow:
  - Drilled exercises to learn differentiation
  - Having these drills both in simple contexts (such as one syllable words) where it is easier to learn initially and more complicated ones (such as whole phrases or

sentences where it will actually be encountered in real speech)

Fluent Forever

Description:
Language learning app that focuses on 10 min daily practice. They have a four part approach: ear training, relevant stories, spaced repetition, and introducing playfulness.

Improvements Needed:
Not necessarily an improvement needed, but the service does not have a free option, and it is subscription based. We're interested in creating a more accessible experience for everyone.

Features to Borrow:
   - Spaced repetition for vocab and sounds
   - Focus on differentiating between sounds of native languages and the target language
   - Explanatory videos about what should go in your mouth to produce the correct sound

3. Learner Profile

Learner Background

Our app is targeted for adults since younger children can already learn pronunciation and distinguish between sounds more easily. Learners will be using Syll**able** to learn a secondary (tertiary, etc.) target language, so they will have experience with their own primary language(s) and phonemes.

Considering that we want to support people who don't have access to traditional language learning platforms (e.g. formal schooling, MOOCs), we have made the platform accessible to and considerate of a variety of socioeconomic backgrounds. We will include alt text for images and - although internet access will be required for certain features - modules are downloadable for users without reliable or consistent internet access.

Prior Experience

We expect our users will primarily be adults who already have some baseline understanding of the target language - mostly in reading and writing - but who struggle with pronunciation. For example, someone who has just immigrated to a new country and is not yet comfortable speaking the language. In this way we are targeting people who are not necessarily struggling with the grammar and word meanings of a new language as much as they are struggling with how to speak the language fluidly and feel confident doing so.

People who are learning a second language already have the experience of learning a language and so have in a mind a framework for constructing sentences and relating concepts in language. Since we are targeting people with this experience we are able to be able to describe pronunciation techniques with greater rigor and effectiveness. For example, we have included "relational" exercises and instruction to explain to users what sounds in their target language are similar to those in their native language(s).

People who learn a second language may have abiding conceptions about which phonemes are the same (e.g. for English, "t" and "d," or for Mandarin, distinguishing tones) as influenced by their native language. Our curriculum helps users to distinguish such sounds through our repertoire of exercises.

Learners' Objectives

We expect that our users will want to improve their pronunciation of their target language and in the process improve their confidence in speaking that language. Additionally, they may be hoping to gain more confidence in differentiating between sounds in the target language when other people are speaking that are not differentiated between or even present in their primary language. Syll**able** is meant to be used as a supplement to other tools for whole language learning so learners' objectives will

revolve around use of the language in spoken contexts - not in learning the meanings of words, conjugations of verbs, or other grammatical elements.

Learner's objectives will likely more specifically revolve around increasing their confidence in speaking their target language. Our app aims to empower learners who want to improve their clarity of pronunciation while avoiding linguistic prescriptivism and supporting leaner growth.

Motivation

This app is inherently for learners who already have some internal motivation to learn the topic. It is a supplement for language learning for those who want to improve their comprehension or pronunciation. This app can be used either independently as a solo language learner or as part of a classroom experience (see *Cultural Relevance and Context* subsection below). Still, even for those who are self-motivated, motivation can wane over time, so we have included several features to help keep users motivated to come back.

First and foremost, we have designed the material itself to be engaging and within the Zone of Proximal Development for the learners. If the material is either too easy or too hard, the learners would be unmotivated to return to the app. This is accomplished through a general steady progression of the materials and consistent assessment of where the students are currently at (see *Assessment* in section 6 below).

We have also harnessed the power of social connection as a large motivator. We have a community tab that includes the option of being able to 'friend' other users who can also see your progress, which will allow students to hold each other accountable. Leaderboards can also be an externally motivating factor for some people so that has been included with people receiving credits for time spent learning and for successes in their tasks.

In addition to standardized rewards every time a user finishes a module, we have included a variable reward system by setting checkpoints that appear random and giving "surprise" rewards. In this way, we have somewhat gamified the process of learning pronunciation—people can interact with the app knowing that at some point they'll hit the next secret reward, but they don't know exactly when, so they just have to keep going. Additionally, receiving these rewards and being able to see what rewards have been achieved so far will increase the users self-efficacy because they will be able to see how far they have come since they started using the app.

We also provide opportunities for users to periodically reflect on why they're still putting in the work. We have points at which they write out a few sentences about what they've accomplished and what their motivation is for continuing to do the work, in the style of LinkedIn "I got the job!" or "I never realized I could have gotten this far!" posts. In this way, their motivation can stay salient in their minds throughout the learning process.

Finally, media was identified as a strong motivating factor behind second language learning. Therefore, at the end of our modules we have included links to external pieces of media that users can enjoy as an extra motivator for including their language comprehension. This has the added benefit of increasing users' exposure to real world uses of the language which will help accustom their ear to the sounds of the target language. Especially including media with closed captions near the beginning of learning and phasing out the used of closed captions will provide the scaffolding and fading necessary for learning how to listen to the language.

Cultural Relevance and Context

There are two main contexts in which Syll**able** is built to be used: For independent language learners and as a supplement to language learning in a classroom setting.

INDEPENDENT LANGUAGE LEARNING

This is the default expected use of the app. Users who are learning independently will follow the structured progression of modules that we have designed at their own pace. This progression involves starting with learning to distinguish between different sound auditorily and then learning how to pronounce them - first as individual phonemes then in words and finally in whole sentences.

These users will have access to the community tab where they can connect with other users. This is important for providing some of that external support that is lacking in self-directed learning. We are particularly encouraging connecting two students who are learning inverse languages (e.g. one student learning Mandarin coming from English and another learning English coming from Mandarin) who can help correct each other's pronunciation in real time.

CLASSROOM SETTING

Users who are learning in a classroom setting will choose this option when they first open the app. They will then be able to use a code to access the virtual classroom. The interface is slightly different than that for an independent learner because the community tab will be replaced with a classroom tab allowing students to interact with other students in the class. In addition to viewing fellow classmates profiles, this classroom tab will allow students to participate in discussion boards and the like that the teacher sets up. Teachers can create conversation tests and practices for students within the classroom. Teachers can pair students up and have them record their conversation either in real life or virtually so that they can evaluate the students performance. All data will be linked to student profiles in the app and the recording process will occur within the app so the process is streamlined.

Teachers will have their own interface with more information about each student such as their progress. Instead of a prescribed order for completing modules, students will be given modules hand-picked by their teacher. In this way, they can most effectively

support in-class learning with our app's library of pronunciation exercises and example soundbites.

4. Deeper Problem Understanding

We conducted interviews with six people to gain a better understanding of what was needed in our app. Three of the interviewees were potential users of the app. The other three interviewees were a mix of those who had previously learned a second language to the point of fluency who were reflecting on their experience and what they found most helpful, as well as current teachers of secondary language or other areas where pronunciation is relevant.

Summary of Findings

What is most difficult in language learning/teaching of pronunciation:
- Discriminating between new sounds was quite difficult for some people, especially if they hadn't been immersed in it before.
- Production of sounds was also quite difficult, even if a student could hear the correct sound in their mind's ear.

The most helpful features when learning/teaching pronunciation:
- Talking directly with other people is extremely helpful.
  - They can correct things like pronunciation or misused words.
  - Also just generally prepares the learner the best for real world application - textbooks and apps cannot capture the idiosyncrasies of actual spoken language
- Having analogies between the target language and the native language is SUPER important! People like to hear how sounds in their native language transfer to the target
- For sounds without analogy in native language
  - Detailed description of what the sound feels like with lips/tongue/teeth
  - Watch others speak the sounds and then watch self in a mirror to try and mimic what you saw
- Need a good balance of feedback and encouragement. Near-instant feedback is necessary for fixing incorrect pronunciations (while the sound is still stored in short-term memory), but encouragement is needed to keep the student from giving up or feeling like it's impossible.
  - Hearing sounds over and over again and not hearing a difference, or being able to evaluate one's one production the same way that an expert would, can be very psychologically draining
- Drilling new sounds is good for initial learning
  - Tongue twisters
  - Flash cards with audio
- Utilizing context to ground sounds and experiences in other sounds and experiences can be super useful. Whole language learning is important (our tool should be supplementary to others) as seeing a word on a vocabulary list is very different from seeing it in a sentence. Context creates meaning.
- Immersion through songs, videos, and other media can be SUPER useful for gradually, over long periods of time, gaining a sense for how the language sounds even if you don't understand it

- ○ Captions can also be useful for helping to process when listening to this media, especially early on.

Conflicting opinions:
- ● IPA
  - ○ Some found the inclusion of IPA to be useless for their language learning
    - ■ Felt like they had to go through an extra step to get to their actual target
  - ○ Others felt that the lack of IPA in their own language learning was making it harder for them to puzzle through pronunciation
  - ○ Potentially this is related to how familiar/comfortable they each were with IPA before starting this language?
- ● Anki App
  - ○ Hard to maintain motivation for use and didn't seem to lead to long term retention for one user
  - ○ Another user found their in depth video explanations to be useful for learning the mechanics of new sounds

Motivation notes:
- ● People who are highly motivated to continue learning a language have some sort of personal stake/community aspect to their drive. They want to talk to their family, social circle, or church, and gain a greater agility in connecting with the world around them.
- ● A participant noted that being able to fully understand literature from other cultures was important to them. Being able to bridge cultures feels like a strong intrinsic motivation.
- ● Maintaining motivation outside of a classroom setting (i.e. without external accountability) is hard.
  - ○ Motivation in these circumstances often seems to come from cultural interest as mentioned above, but doing the nitty gritty of language learning to get to that point is not in and of itself enjoyable for most learners.
  - ○ App can be a useful supplement in classroom type of situations for students who are particularly motivated and looking for extra opportunities.

Other things to consider in the space of language learning:
- ● The personality of the language learner may affect the parts of language learning that they find more challenging. One participant noted that being extroverted they started talking in a second language faster than their introverted husband, but that their husband was better at comprehension in listening to the same language earlier than she was.
- ● Duolingo was strangely helpful for one participant because they already knew Russian and they did the initial evaluation and it showed them how much Russian they knew -- having a gratifying expression of how much they knew (data visualization) was great
- ● There's a difference between hearing what the word should sound like in your mind and actually executing that sound with your own pronunciation

- Other fields (singing, acting, trans voice training) have useful insights into sound production
  - Understanding frameworks like vowel production and discrimination
  - Understanding different accents and attuning the ear to inflection
  - Understanding sounds in other languages to sing them properly

Interview Script

Intro: "Thank you for agreeing to talk with me about this. I'm taking a class about Technology in Education and we have a semester-long project in which we're developing and designing a piece of technology with something related to learning. My project is on learning pronunciation in a new language as an adult. So we're focusing particularly on sounds that exist in the target language you're trying to learn but not the language or languages you already speak and helping users first to differentiate those sounds while listening and then how to produce those sounds themselves."

Opening Questions:
- What's your name/age/occupation?
- What is your background in language teaching or learning?
- What have you found to be the most difficult in language teaching/learning
  - Specifically most difficult in relation to pronunciation
- Why is language learning and pronunciation important to you?

Teaching:
- What kinds of analogies have you found helpful in teaching language?
- How do you explain the pronunciation of new sounds to language learners?
- Are there any technologies that you have found useful while teaching?
- Would an app that helps people practice new sounds be useful or a hindrance?

Learning:
- What language are you currently learning?
- Why are you learning this language?
- What technologies have you used to help learn language?
- What has helped you learn pronunciation?
- Is there anything that you think would help you learn discrimination and pronunciation better that you wish there was more of?
- Is there anything that you have found particularly unhelpful/useless in learning pronunciation?

Closing question:
- Is there anything else you would like to share that you think might be relevant?

See notes from each interview in Appendix A

5. Solution Overview

Technology Platform

Syll**able** is an app for a smartphone. This was chosen because of the quick access it provides for users as well as the prevalence of smartphones over laptops across all socioeconomic groups in the U.S. (Vogels, 2021).

Downloadable modules will be available for when internet access is inconsistent for users. These modules are the same as they would be online, just downloaded in advance. Upon completing a downloaded module, users are reminded they have the option to delete it off their phone (and generally this delete button is easy to find). This is to prevent frustration with the modules taking up too much space on the user's phone. The dictionary of sounds is also accessible offline for ease of use.

Features

- Common mispronunciations and how to fix them
- Uncommon phonemes in target language
  - How to produce them
  - How to differentiate them when listening
- Speaking and correction in several forms (technological correction, self-evaluation of recordings, community correction)
- Phonics instruction
  - Written to spoken language exercises, drills, and instruction

6. Educational Goals, Instruction, and Assessment

Goals

Goal	Knowledge Dimension	Cognitive Processing Dimension
Students should be able to recall how to articulate certain sounds (e.g. point of contact between tongue and soft palate, etc.) when speaking with 80% accuracy.	Factual	Apply
Students should be able to assess what phonemes to use in new contexts when presented with an unknown word with 80% accuracy.	Procedural	Apply
Students presented with audio recordings of native speakers producing one word of a minimal pair (e.g. fan/van, mock/mop, meet/mitt) should be able to accurately determine which of the words is being produced with 80% accuracy	Factual	Remember
Students should be able to produce words from minimal pairs in the target language with accurate differentiation between the two words as judged by a spectral analysis or native speaker with 80% accuracy	Procedural	Apply
When speaking their target language, students should feel increased confidence in their ability to pronounce the phonemes correctly as judged by a self-report with at least a 10% increase in pronunciation confidence	Dispositions	Evaluate/ Create
Students should be able to detect their own errors, strengths, and weaknesses in pronunciation when having real life conversations with high frequency (self-assessed).	Metacognitive	Evaluate

Instruction formatting

BROADER LEARNING PROGRESSION

Modules will be paired in distinguishing and production pairs throughout the lesson plan with modules teaching how to distinguish between different sounds coming first and the next module teaching students how to produce those different sounds. Modules

will be broken down into lessons. A typical structure for lesson progression within the module includes the first lesson teaching the concepts with just a few exercises, the second lesson reminding the user of the concepts with more exercise, and the final lesson being similar to the second, but tracking the user's performance to evaluate whether they are ready to move on from the module.

Early modules focus on individual, isolated phonemes and tonemes. Later modules insert these sounds into words and then into sentences so that as students get more comfortable hearing and producing these different sounds they get to use these skills more in the context of real language which is of course the ultimate goal of the learning. Final reflections (as described below) will be spaced throughout to encourage self-evaluation and internal motivation.

When learning as an individual, there will also be opportunities outside of the general module progression (on the community tab) to interact with other users of the app and get more practice using the language.

When learning as a student in a classroom, there will also be opportunities to facilitate discussions via this platform with other students in the classroom once again in order to get more practice with use of the language.

30-MINUTE LESSON DESCRIPTION

The following is a description of two lessons for a native English speaker learning Mandarin. These lessons would be very early in the learning progression as they assume little to no familiarity with the phonemes of Mandarin. The learner will first go through the sound discrimination module and learn how to distinguish between four different sounds in Mandarin (two pairs of similar sounds). This will take approximately 15 minutes. Then, they will go through the corresponding sound production module and learn how to produce these four different sounds. Outlined below is a series of instructional texts, exercises, and assessments that support this.

Discrimination
- (3 min) Introduction to the sounds
  - Learners will be presented with a screen with two buttons. Each button will be labeled with a sound (the two sounds will be closely related) and when pressed will play a native speaker producing that sound. Learners must listen to each sound at least once before advancing, but can listen to each sound as much as they like. In this case, the sounds are "zh" and "sh."
  - Upon advancing they will see a screen with two more buttons representing two more sounds ("ü" and "u"). These are the four sounds they will learn in this lesson.
  - Next they will see a similar screen only this time instead of buttons that play sound there will be two videos. This will allow learners to see the mouth of the speaker as the sound is being produced. This will repeat for the other pair of sounds once again.

- (2 min) Building connections
  - In this portion, learners will be presented with words from their native language that contain sounds similar to those they are learning in this lesson (if such analogies exist).
    - *"Some of these sounds you may already be familiar with! The Mandarin 'sh' is similar to the English 'sh' found in words like '**sh**irt' and 'ba**sh**ed.' The Mandarin 'zh' is similar to the sounds found in words like '**j**erk' and 'ba**dg**er.'"*
    - *The Mandarin sound "u" is also just like the English sounds such as 'b**oo**t' and '**you**.' ü, however, has no similar sound in English.*
- (5 min) Discrimination exercise
  - Recordings of the four different sounds will be played and learners will have to select which sound was just played. These recordings will come from multiple different native speakers so that the learners will learn how to discriminate sounds from all different kinds of speakers (instead of learning the difference between two specific recordings from one speaker).
  - There will be trials where the learner only hears audio and has to decide which sound it is. There will also be trials where there is video in addition to the audio.
  - Learners will perform many trials throughout the exercise (about 60 in order to have about 5 minutes worth of exercises).
- (3 min) Tongue Twister listening
  - To start contextualizing the sound, learners will be asked to listen to tongue twisters including the sounds they are learning. They will not yet be asked to produce these sounds both since this is the discrimination module and since they have not yet gotten to exercises dealing with sounds on the levels of words, it will just be used for getting them accustomed to hearing the sounds in use.
- (2 min) Wrap Up
  - Brief review page reminding the learners what they have learned in this lesson
    - *"In this lesson, you...*
    - *Learned about the Mandarin sounds 'sh,' 'zh,' 'u,' and 'ü.'*
    - *Practiced differentiating between the four sounds"*
  - Completion congratulations message
    - *"Congratulations on completing this module!"*
  - Media recommendations for further exposure - these do not have to be lesson-related specifically (although they should contain at least some usage of the relevant sounds), but are more general recommendations for keeping students engaged and giving them the opportunity to interact with real world usage of the language.
    - *"If you're interested in getting more practice listening to sounds, check out these awesome shows and songs...*
    - **listed recommendations for students to watch/listen to*"*

Production
- (4 min) Pronunciation explanation

- ○ This portion of the module will explain to students how to produce the sounds they just learned in the previous discrimination module. Each sound will be taken one by one.
- ○ 'sh'
  - ■ *"To produce the Mandarin 'sh' sound, first make the English 'sh' sound like that found in 'ba**sh**ed or "**sh**irt." Then curl your tongue back just a little bit further to produce the Mandarin 'sh.'"*
  - ■ **sagittal section showing the proper mouth placement for the Mandarin 'sh' and another showing the placement for the English 'sh' for comparison.**
- ○ 'zh'
  - ■ *"Producing 'zh' is very similar to producing 'sh.' It has the same mouth configuration, however, it is voiced, meaning you are producing sounds from your vocal folds at the same time. Try producing the English 'j' sound found in words like '**j**erk' or 'ba**dg**er.' Just like with 'sh,' 'zh' is very similar to those sounds, but the tongue is curled back further."*
  - ■ *Sagittal section showing the proper mouth placement for the Mandarin 'zh' and another showing the placement for the English 'j' for comparison.*
- ○ 'u'
  - ■ *"This sound is exactly like the English 'oo' sound like that found in 'l**oo**t.'"*
  - ■ **sagittal section showing tongue positioning*
- ○ 'ü'
  - ■ *"This sound doesn't have an English equivalent. Start by producing an English 'ee' sound such as that found in 'b**ee**t' or 'l**ea**n.' Keep your tongue in that position, but round your lips so that they are making an O like you did when producing the 'u' sound before. This is the 'ü' sound. The tongue is further forward in your mouth than it is for the typical 'u' sound in English."*
  - ■ **sagittal section showing tongue positioning for 'ü' and for 'u' in comparison.*
- ● (3 min) Visualization of pronunciation
  - ○ After the detailed explanation of how to pronounce the sounds, participants will watch videos of native speakers producing the sounds and then watch themselves produce the sounds.
    - ■ *"Now that you have an idea how to pronounce these sounds, let's try it out! Watch these videos of people saying the sounds and the watch yourself produce the sounds. You can use a mirror if you have one handy, or use the front facing camera on your phone! Try to make your mouth match the pronunciation of the native speakers."*
- ● (6 min) Pronunciation practice exercise
  - ○ Learners will go through trials where they are asked to produce one of the four sounds. Their performance will be assessed as they practice. Types of exercises/assessments may include

- **■** Waveform exercises: a waveform of a native speaker producing the sound will be provided. Participants will the speak into their phone and try to align their waveform with that of the native speaker.
- **■** Spectral analysis: Participants will speak into their phone and a program will compare their pronunciation with those of native speakers. It will use spectral analysis to determine the accuracy of the pronunciation.
- **■** Community: Participants will record themselves speaking and other members of the learning community (e.g. native speakers of Mandarin who are learning English) can evaluate the accuracy of the pronunciation later and even give tips on how to improve.
- **■** Self reflection: Participants will record themselves speaking and listen back to the recording and be asked to reflect on their performance and what, if anything, sounds off about their pronunciation compared to that of native speakers (native speaker recordings would be provided here for comparison).
- ● (2 min) Wrap Up
  - ○ Brief review page reminding the learners what they have learned in this lesson
    - **■** *"In this lesson, you…*
    - **■** *Learned about how to pronounce the Mandarin sounds 'sh,' 'zh,' 'u,' and 'ü.'*
    - **■** *Practiced producing all four sounds"*
  - ○ Completion congratulations message
    - **■** *"Congratulations on completing this module!"*
  - ○ More media recommendations as seen above in the discrimination module.

Final Reflection
- ● Reflections will be included at the end of every discrimination/production pair. Learners will be asked to briefly reflect on their progress through the modules thus far. They will be asked to identify what they feel they have improved on and what they feel still needs work
- ● Occasionally, reflections will also ask students to consider why they are continuing to learn and their progress overall from the beginning of their learning. This could help students maintain their internal motivation to continue learning by reminding them of why they are learning as well as increasing their self-efficacy.

LESSON-GOAL CORRESPONDENCE

Goal	How this lesson supports the goal
Students presented with audio recordings of native speakers producing one word of	In the first module, students will be given matching exercises where they must

Goal	How this lesson supports the goal
a minimal pair (e.g. fan/van, mock/mop, meet/mitt) should be able to accurately determine which of the words is being produced with 80% accuracy	match the given words to sound bites. At the end of the module, they must pass an assessment where 80% of the matchings must be correct to proceed.
Students should be able to assess what phonemes to use in new contexts when presented with an unknown word with 80% accuracy.	Students will be given new words through the second module that have pinyin containing either "zh", "sh", "ü", or "u". They will have to identify what phoneme to use in order to begin articulating it for the assessment.
Students should be able to recall how to articulate certain sounds (e.g. point of contact between tongue and soft palate, etc.) when speaking with 80% accuracy.	Students will remember the difference between "zh" and "sh" (voiced versus unvoiced) as well as "ü" vs "u" (tongue location) through various drills across the second module.
Students should be able to produce words from minimal pairs in the target language with accurate differentiation between the two words as judged by a spectral analysis or native speaker with 80% accuracy	Finally, after assessing what sound to use and how to produce it, students will produce the four sounds and be evaluated on their performance. The three possible methods of evaluation are by machine, by fellow students/larger community, or by self reflection.
When speaking their target language, students should feel increased confidence in their ability to pronounce the phonemes correctly as judged by a self-report with at least a 10% increase in pronunciation confidence	At the end of the lesson, students will reflect on their confidence in understanding these four sounds.
Students should be able to detect their own errors, strengths, and weaknesses in pronunciation when having real life conversations with high frequency (self-assessed).	Students will be prompted at the end of the lesson to go out into the world and have conversations with a critical ear.

Assessment

Users will be tested on their ability to distinguish and pronounce these sounds within the lessons themselves through their performance on the exercises. They will have to hit a threshold of percentage of answers correct before they are able to move on to the next

module. Four potential methods of evaluation include:

- Speech analysis with AI-powered or otherwise computational tool
- The option to overlay your sound bite with another, standard sound bite and decide whether they align sufficiently
- Through the community tab with peer evaluation if the user opts into using that feature.
- With self evaluation; user will be required to reflect on their progress as well as assess their errors and successes

Confidence will be evaluated through occasional between-lesson check-ins on the learner's self-evaluation of their confidence.

7. **Design and Storyboards**

General design ideas:
- Homepage is ship/explorer-themed with a Zone of Proximal Development-esque graph structure expanding outwards.
- Data visualization of progress in pronouncing and differentiating sounds will be shareable across different users of the app.

Link to storyboards:

https://www.figma.com/file/d910S1hbQwgdxbs1vjrOnp/Story-Board?node-id=0-1&t=D15cXaLjf4TKkIZ7-0

8. Technology Prototype

Link to Technology Prototype:

https://www.figma.com/proto/nf17hsVX4ttEI2iOx9j7xX/High-Fidelity-Prototype?node-id=107-79&starting-point-node-id=107%3A79

9. Formative Assessment Notes

Our Formative Assessment was performed on a representative potential user. The user was asked to share their thoughts as they proceeded through the technology prototype and especially note anything they found confusing or any ideas they had for features.

- Title
    - How is the title meant to be pronounced? Perhaps redesign the title to fix that pronunciation better.
    - For example, the presence of the boat logo meant she thought perhaps it was supposed to be pronounced "sail-able"
    - If it's "syllable" instead of "syll-able" possible design changes include using syllable markers (`) to separate the "syll" and "able."
    - Could also make it look like "syllable" using color to draw attention to the able (<- preferred redesign option)
- Home screen
    - Make boat icon smaller/more concise
    - Icons at the bottom are easier to use than a drop down menu would be
    - Add some indication of what language is currently being learned (e.g. writing "Mandarin" at the top of the screen in the prototype)
        - This could also be used for another functionality the user suggested which is a way to easily switch between languages for users who may be learning multiple languages at once.
- Lesson
    - If you exit the lesson to the home screen and then go back into the lesson, there should be an option to either resume or start over instead of being forced to start over.
    - Screen 6: Add some sort of reassurance after saying that there is no sound in English like the Mandarin 'ü'
        - E.g. "But don't worry! We'll show you how to pronounce it in the next module!"
    - Screen 8: She thought she had to drag the play button to the letter not the other way around - this can be fixed with a rewording
    - Screens 9 and 10 - some error with the prototype feature - text isn't showing for some reason.
- Completion page
    - If getting badges, there should be one for completing your first lesson
        - This could involve a little animation for the boat - maybe badges involve getting things for your boat (a flag, a hammock, etc.)
        - This could look especially cute if the data visualization page is aesthetically presented as though you are 'inside' the boat looking at the badges you've achieved by looking at the things you've collected.
- Further practice
    - Suggestion for type of media to link: Instagram reels with voiceovers in the target language.
- Community page concept:
    - Competitive aspects in addition to cooperative ones

- Playing games (completing exercises) against other users

10.   Redesign

Based on the formative assessment and our own evaluation of the app, these are our recommendations for redesign for the next prototype of of the app:

Aesthetic changes:
- Change the Title from "Syll-Able" to "Syll**able**"
  - This change has already been implemented
- Make the user icon on the home page smaller and more concise as it is currently too complicated
- Animate the completion congratulations page
- Data visualization tab should look as though you are 'inside' the boat that you are traveling around in on the lesson map. This can give the impression that your achievements are 'treasures' that you are collecting while 'exploring' (i.e. learning).

Clarity of app changes:
- Remove the hamburger menu and leave just the icons at the bottom of the screen
- At the top of the home page, name the language that is currently being learned
  - This would be especially helpful for those users who may want to learn multiple languages at once.

Functionality changes:
- Returning to home page in the middle of the lesson should result in both a 'restart' and 'resume' button when returning to that lesson
- Community page offering the chance to play exercises 'against' other users in a friendly competitive way as a motivator.

Content changes:
- Include reassurances after stating that there is no related sound in English to make sure users don't get discouraged
- Clarify wording on dragging letter to sound exercise
  - This change has already been implemented

11. Business plan

Instead of building a business plan, we spent more time developing our lesson plan and specifying the exact layout of two lessons. Exact details can be found in the Educational Goals and Design & Storyboards sections.

12. Case for the Solution

Adults struggle to learn new languages - particularly when it comes to hearing and speaking these languages. This is due to the perceptual narrowing that naturally happens as we leave childhood. However, it is still possible to learn these sounds once we are older with consistent practice and feedback. Syll**able** aims to provide the opportunity for that consistent practice and feedback in an easily accessible way.

From the feedback we have gotten on our project, we have found several features to be of particular importance to second language acquisition in adulthood. First and foremost is the involvement of other people. We consistently got the input that practicing with others and receiving feedback from native speakers is one of the most important parts of learning to speak in a new language. Syll**able** helps users to access other speakers through the community tab, which allows users to interact with each other directly - something that other language learning apps don't often provide.

Additionally, we gathered information on what techniques teachers use to train students on how to hear and produce new sounds and incorporated these into our lesson structure. From written explanations of mouth configurations, to including videos of native speakers producing the sounds, to playing with tongue twisters and repetitive exercises, we have brought the top tips of in-person teaching to a virtual format for language learners who do not have access to in-person resources. To increase accessibility even further, Syll**able** is available as a mobile app with downloadable modules for offline use.

In this way, Syll**able** fills a gap in the language learning market by catering specifically to learning how to converse effectively without shaming or trying to eliminate the learner's accent. It will be especially useful for those who need to learn a second language in adulthood because, for example, they have moved to a new country or are learning the language to communicate with family member's from different language backgrounds. It can also be an invaluable addition to a classroom language learning scenario by providing additional practice in distinguishing and producing phonemes.

Appendix A

ADA MARTIN

Opening Questions
- What's your name/age/occupation?
  - Ada Martin
  - 21
  - Machine Learning Master's Student at Carnegie Mellon University
- What is your background in language learning?
  - Learned JPN from textbooks (middle and high school, took one JPN class in college)
  - Took German classes in high school, has some German family members, but mostly spoke it in the context of school
    - Sometimes Grandma would have family members over from Germany who spoke German -- Ada would speak English in response
    - Though, in high school she would occasionally would speak German to relatives
- What have you found to be the most difficult in language learning, specifically most difficult in relation to pronunciation?
  - Most relevantly: German has some special vowels; the umlaut is hard (can put it about O, U or A) to make it halfway between that and an "eh" sound
  - Hard to differentiate those vowel sounds that aren't in English
- Why is language learning and pronunciation important to you?
  - When she was into language learning, pronunciation was nice to communicate with family/exchange trip to Germany
Learning:
- What languages have you learned?
  - German, Japanese
- Why are you learning these languages/why is it important to you)?
  - B/c she was bored (JPN)
  - B/c she had to take a language/for family (German)
- What technologies have you used to help learn language, if any?
  - Listening CDs (Genki) in the back of textbooks
  - Really good JPN-ENG dict https://jisho.org/
  - Online pen pal for JPN
    - Meaningful because it gave her a connection to people from other cultures, but a lot more awkward than talking to people IRL
  - Largely text based media for German
- What has helped you learn pronunciation/is there anything that you think would help you learn discrimination and pronunciation better that you wish there was more of?
  - Due to transfeminine voice training, she has a slightly better understanding about making certain vowel sounds, but she's not sure how that translates to language learning

- Is there anything that you have found particularly unhelpful/useless in learning pronunciation?
  - Writing words a bunch of times / Anki Decks (spaced repetition) https://ankiweb.net/shared/decks/ wasn't particularly helpful
    - She didn't stay motivated, didn't remember stuff long-term, but not sure how much of that was the tool's fault and how much was her's

End Thoughts
- Is there anything else you would like to share that you think might be relevant?
  - She thinks the 2-D vowel chart https://en.wikipedia.org/wiki/Vowel_diagram could be a useful vowel training tool

ARUNDHATI GHOSH

Opening Questions:
- What's your name/age/occupation?
  - Arundhati Ghosh
  - 21
  - English Undergraduate Student at the University of Texas at Austin
- What is your background in language learning?
  - Bengali (Indian Dialect) (first language)
  - Then English as a younger kid, overtook Bengali as primary language
  - Started learning Spanish in high school
  - Now learning Russian in college
- What have you found to be the most difficult in language learning, specifically most difficult in relation to pronunciation
  - In Bengali and Russian, there are letters and sounds that don't really exist in English
  - There's letters in Russian (e.g., ts) that don't exist in English
  - Processing and contextualizing sounds is difficult when learning languages
    - For example, if she hears the sound "ts", in English she would think of the word "pizza" and attach the "ts" sound to "z", but in Russian it makes a lot more sense to use the ts letter
- Why is language learning and pronunciation important to you?
  - She wants to use Russian in her studies (Russian literature)
    - Specifically learning Russian (Tolstoy and Nabokov) would be really helpful in her field of work
  - In general, being able to communicate with more people
  - Benagli -- want to be able to communicate with family back home (took Bengali lessons up until she was 14, because of this speaking and pronunciation is more natural)
  - Spanish -- used to use it the most when working in service jobs in TX, which felt useful because many people in TX speak Spanish, but lost over time

Learning:
- What technologies have you used to help learn language?
  - Duolingo supplementarily for Spanish
    - The way it was taught in high school, she didn't get a lot of outside practice, so she used Duolingo because it was really helpful to hear something in Spanish and have opportunities to practice
    - Her personal experience was learning Spanish in both a structured and personal way
    - But she thinks when learning for pleasure, self-guided structure through an app could be quite helpful
  - Not so much Duolingo for Russian (online guides to things like grammar and pronunciation, immerse self in music and videos)
- What has helped you learn pronunciation, this can be anything?
  - Analogies -- comparing to sounds already know in English

- ○ Honestly just listening to people speak in the language (Russian)
  - ■ E.g., there are stressed and unstressed syllables (tied to grammar unlike English) which are quite important to meaning
- ● Is there anything that you think would help you learn discrimination and pronunciation better that you wish there was more of?
  - ○ She wishes there was more time in class to demonstrate what dialogues should sound like
    - ■ Students get thrown into speaking tests with no prior knowledge of what a natural dialogue sounds like
- ● Is there anything that you have found particularly unhelpful/useless in learning pronunciation?
  - ○ Flashcards with no audio suck

End Thoughts
- ● Is there anything else you would like to share that you think might be relevant?
  - ○ N/A

TIN-MAN CHAN

Opening: Questions
- What's your name/age/occupation?
  - Tin-Man Chan
  - 49
  - English tutor, history in singing and acting
- What is your background in language teaching or learning?
  - Learning: Mother tongue was Cantonese, had to learn English (age 2.5-3), then had to learn French (4th grade)
  - Teaching: Never took any TOEFL tests, mostly volunteering through church, went to HK to teach English (at 23 years old)
- What have you found to be the most difficult in language teaching/learning, specifically most difficult in relation to pronunciation?
  - Learning pronunciation:
    - She is a trained singer who had to sing in different languages
      - Learning and using a whole language is different from learning pronunciation
      - She learned songs in French, Italian, Latin, German, Russian (tricky because of the cyrillic alphabet)
      - Learned the IPA
      - For singing a lot of pronunciation learning was rote
      - As a learner you have to have a good ear and be aware of the positioning of your tongue and your teeth, and so on. You need to have good proprioception of where your tongue is in your oral cavity
      - When you sing and when you speak it sounds different (e.g., it's hard to tell someone is British when they sing in English), and this is because you have to optimize the sound production rather than default to a particular accent
  - Teaching pronunciation:
    - English tutoring to Chinese students
      - Trying to teach Beijing girls to speak involves trying to stay consistent. For example, we have the "ah" sound as in "man", "ham", and "sam", but in practice, there are a lot of diphthongs in those words in American English. However, in trying to stay consistent, you sound more British -- Australians and Americans have a lot of dipthongs.
      - Other regional accent notes: British people inflect lower as they go, American and Canadians inflect higher as you go
      - The kids know they're supposed to stick their tongue between their teeth for "th" but when they try to do it mid-sentence, it's hard for them to remember to do so. (Chinese doesn't have a "th" sound.)
      - It's helpful to know as a teacher how a student produces their native sounds (e.g., JPN doesn't have l/r distinction) and which sounds they don't have.

- Tongue twisters are helpful.
      - Cantonese v.s. Mandarin: guttural v.s. forward in the mouth
      - Tonal languages are hard for non-native speakers. Vowel sounds as well.
    - Thoughts on the pandemic:
      - a lot of pronunciation learning involves looking at other people's lips to see how they pronounce it. Because of the pandemic, kids and teachers had to wear masks, and so there was a language/speech impairment (learning loss) because kids couldn't see how adults moved their mouths.
      - We generally tell kids to look in the mirror for pronunciation, so they can emulate adults.

Teaching technologies:
- Are there any technologies that you have found useful while teaching?
    - Videos
    - Games for children or teens (useful for repeating something over and over)
    - Listening comprehension (multiple choice, asking what did that person say)
    - Going to the dictionary and clicking on a word

Learning technologies:
- What technologies have you used to help learn language?
    - Duolingo, anything you can kind of practice for fun on your own.
    - Context of the word is important, not just vocab. *Whole* language learning is important
      - In psychology -- want to tack on two or three things that a student can associate with a concept -- e.g., going to an amusement park you remember what you ate, what you wore, etc. Writing words in context is good because context provides meaning

SONYA SIMKIN

Opening Questions
- What's your name/age/occupation?
  - Sonya Simkin
  - 20
  - Computer Science Undergraduate Student at Carnegie Mellon University
- What is your background in language teaching or learning?
  - Teaching: Only whenever friends ask for words in Russian, informally in friendly contexts
  - Learning: Was tutored in Russian from a very young age until high school, professor from local community college taught her
- What have you found to be the most difficult in language teaching/learning, specifically most difficult in relation to pronunciation?
  - Teaching: trying to explain sounds that don't exist in the recipient language
    - There are soft consonants in Russian that don't exist in English
    - Students might hear something and not realize how different they are
      - Sonya (English) vs Sonya (Russian, where the n is softer)
      - *She* very much hears a difference
      - Russian stressed and unstressed syllables are vital
      - Student frustration when unable to even comprehend the difference
    - Students might not know how to produce the different sounds consistently
      - Even when students might understand the distinction between two sounds, and can hear the sound in their mind, they don't have control over their mouth in sound production, because they're used to producing an English letter as a range of sounds, but now they have to hit a certain part of that range.
  - Learning: She gets the stressed and unstressed syllables wrong
- Why is language learning and pronunciation important to you?
  - heritage speaker -- how she connects to parents and family, learning is important for talking to Russian relatives in Slavic countries
  - there's a disconnect between understanding what words to say, hearing the sound in mind, but not being able to produce it
  - pronunciation distinguishes her from rest of family

Teaching:
- What kinds of analogies have you found helpful in teaching language?
  - Explaining a letter in Russian in terms of English, "je" like the s in "pleasure"
- How do you explain the pronunciation of new sounds to language learners?
  - Take something from English, the Russian sound is just like this!
- Are there any technologies that you have found useful while teaching?
  - The internet!

- Would an app that helps people practice new sounds be useful or a hindrance?
  - it would be useful!
  - Repetition and getting people used to the sound is a good way to learn the task
  - Getting used to the way your mouth is moving

Learning:
- What technologies have you used to help learn language?
  - Briefly used Duolingo, only used to speedrun Russian and Ukrainian to see how far she'd get, mostly a feeling of encouragement
  - Listening to Russian for immersion
- What has helped you learn pronunciation?
  - Working with a tutor, practicing the language, having her parents constantly correct her for things she'd say wrong (general principle: keep on keeping on)
  - Motivation: wanting to communicate with family
    - e.g., Dad is much more comfortable speaking Russian, she wants to meet in the middle
    - She gets insecure & shuts down when she doesn't have the crutch of English words, wants to avoid that feeling
  - Having critical feedback that's not mean spirited, instantly getting feedback as soon as you say something wrong is super important because it's still in your short-term memory, hearing what you said vs what your parents said is useful to hear the distinction
- Is there anything that you think would help you learn discrimination and pronunciation better that you wish there was more of?
  - Safe environment where you're able to practice things
  - Really awkward to say things to a native speaker and receive unenthusiastic or critical feedback, makes it scary to try to practice things
  - Not being scared, and balancing getting feedback vs being encouraged/not criticized
- Is there anything that you have found particularly unhelpful/useless in learning pronunciation?
  - IPA was not super useful
  - Analogies in the language you already know are super useful (in this section, you have the sound)

End Thoughts
- Is there anything else you would like to share that you think might be relevant?
  - Fun Russian:
    - "sh" vs "sh (more closed)" are VERY similar in english but diff letters in russian
    - guttural H
    - adding certain letters to make consonants soft
    - there's a word with four consonants at the beginning

ROBIN WIETHÜCHTER

Opening Questions
- What's your name/age/occupation?
  - Robin
  - 25
  - Software Engineer & Entrepreneur
- What is your background in language learning?
  - Native language: German
  - Started learning English around age 10 or 11 (typically would've started earlier in Germany except that he was from a small town where the teacher didn't like English so they didn't start until later)
  - Started learning Chinese about 3 or 4 years ago
  - Just started Portuguese this year
- What have you found to be the most difficult in language learning? Specifically most difficult in relation to pronunciation
  - Learning language in general: He struggled the most with memorization of the words and grammar.
  - Pronunciation: Similarly, pronunciation the hardest thing is just remembering to focus on it. It's something that teachers would correct as he went, but wasn't something he specifically remembered struggles from.
- Why is language learning and pronunciation important to you?
  - It's a way to connect to a culture through its language.
  - English was important for him to learn for school (studied abroad in America for a few months) and future career.
  - Chinese, though, he started because he really enjoyed Chinese culture, and similarly Portuguese he started because of getting very involved with zouk dancing which is a Portuguese social dance.

Learning:
- What language are you currently learning?
  - Chinese
  - Portuguese
  - About 10 minutes a day for each
- Why are you learning this language?
  - Again, interest in the culture
  - Chinese because of having been in Taiwan and wanting to go back there
  - Portuguese because he wants to go to Brazil and dance zouk there
- What technologies have you used to help learn language?
  - English was learned 'very old school' - textbooks, teachers, handwritten worksheets
  - Now using language apps to self-teach
    - Portuguese: Duolingo
    - Chinese: Hello Chinese (Like Duolingo for only Chinese); Fluent Forever (a lot of focus on pronunciation); Anki (flashcard - create his own, and use existing)
- What has helped you learn pronunciation?

- - ○ Fluent Forever is very useful for learning how to differentiate sounds
    - ○ Anki - a lot of videos that explain how the sounds work, where should your tongue be to produce the sound, etc.
    - ○ Actual people - most important. Had a language for half a year with Mandarin who every week would practice with and correct pronunciation
  - ● Is there anything that you think would help you learn discrimination and pronunciation better that you wish there was more of?
    - ○ More interacting with native speakers
  - ● Is there anything that you have found particularly unhelpful/useless in learning pronunciation?
    - ○ One thing that annoys him with Duolingo - it doesn't have (at least for Portuguese) IPA - you can only listen to it. If it's written he feels he can take it apart more easily and Portuguese is inconsistent between orthography and pronunciation so that doesn't help. Including a more standardized writing-to-pronunciation option would be nice

End Thoughts
  - ● Is there anything else you would like to share that you think might be relevant?
    - ○ Now the difference between learning English in school versus the ones he's learning on his own is really motivation. It's nice to be able to choose what works best for yourself but without the pressure of grades/teachers/etc it's hard to stay motivated

GLORIA WEISMILLER

Opening Questions
- What's your name/age/occupation?
  - Gloria
  - 51
  - High school Spanish teacher
- What is your background in language teaching?
  - Grew up in a bilingual household English/Spanish
  - Currently in sixth year of teaching high school Spanish
  - Teaching degree but not specifically in language teaching
  - Did a little Spanish teaching when teaching Montessori for about 10 years
- What have you found to be the most difficult in language teaching/learning?
  - In Spanish in particular, there are some verb tenses and moods that aren't used in English and that is really hard to teach - and grammatical gender
- Specifically most difficult in relation to pronunciation?
  - Getting the students to hear the difference in sounds that aren't familiar to them
- Why is language learning and pronunciation important to you?
  - Increasingly connected society, it's good to be able to communicate with more people of different backgrounds

Teaching:
- What kinds of analogies have you found helpful in teaching language?
  - "Butter" to explain the single 'r' in between words in Spanish (i.e. 'pero')
  - Similar analogies like that (unlike French or English - Spanish very phonetic so not a lot of change in pronunciation)
- How do you explain the pronunciation of new sounds to language learners?
  - Some sounds where just have to show the students and have them hear the difference
  - Sometimes equate sounds in spanish to similar sounds in English
  - When the sounds don't exist in the students' native language - just tell them where to put their tongue, how to move their mouth, where to put their lips
  - Sometimes by high school their tongues just don't move that way and it's just 'okay do the best you can'
- Are there any technologies that you have found useful while teaching?
  - Not for pronunciation - mentioned Duolingo has some recording of self but didn't use that in her classroom.
  - She uses regular websites that are grammar- or story-based
  - EdPuzzle
  - Textivate - more of a written sentence analysis
  - 'This is Language' "is pretty funny"
- Would an app that helps people practice new sounds be useful or a hindrance?
  - It would be good for those students who really want to get it

- - Some students who have told me literally that they only take the class because they want to get requirements done but for those that really want to learn it would be helpful
  - Some things come up where there are just small questions that come up a lot with pronunciation that could be good to correct
    - For example in Spanish the soft 'r'

End Thoughts
- Is there anything else you would like to share that you think might be relevant?
  - A lot of times when playing videos or audios, it's really useful to have captions
  - It's something that's so easily forgotten - students usually just need to be reminded

MARIELA ROSSINI

Opening Questions
- What's your name/age/occupation?
  - Mariela
  - 49
  - Language stimulation for infants (0 - 3 years old) with speech delay (low vocabularies, language comprehension, etc. - coaching families on daily routines to improve)
- What is your background in language learning?
  - Grew up in Argentina speaking Spanish.
  - Technically started learning English around 7-8 years old, once a week two hour class, upped to three times a week a little later.
  - Didn't really start learning seriously how to actually converse until she moved to America in her early 20s
- What have you found to be the most difficult in language teaching/learning
  - Understanding other people talking to her.
- Specifically most difficult in relation to pronunciation
  - English weird spelling to pronunciation meant moving from written to spoken was hard.
- Why is language learning and pronunciation important to you?
  - Moving to America it was important to be able to get around. I'm also very extroverted so I wanted to make friends so I wanted to be able to talk.

Learning:
- What language have you learned as an adult?
  - English
- Why are you learning this language?
  - Since I had moved to America it was important for just navigating around. I also had a daughter and wanted to set her up for success.
- What technologies have you used to help learn language?
  - This was the 80s in Argentina
  - Listening to cassette tapes
  - When doing three times a week - once a week was just listening (radio, news, music, etc.)
- What has helped you learn pronunciation?
  - Exposure to the language (movies, songs)
  - Motivation to learn was the songs - in teen years would listen to American music and wanted to understand so that was a lot of what I did for a while - sitting down and trying to see what they were saying.
  - Learning pronunciation trying to imitate what they were saying
  - So that was first motivation as teenager
  - What helped the most was moving to the United States.
- Is there anything that you think would help you learn discrimination and pronunciation better that you wish there was more of?

- - Wish I had friends or computer/technology to be connected with native English speakers
  - Is there anything that you have found particularly unhelpful/useless in learning pronunciation?
    - Nothing I can think of

End Thoughts
- Is there anything else you would like to share that you think might be relevant?
  - Not ready to use the second language until we are totally exposed to it. Whatever I learned in class didn't have anything to do with real life talking until I arrived here
  - I started in New York too, I had learned "I'm going to" but would hear "I'm gonna" or "I'ma" which I was not prepared for
  - Learning of languages has to do with the personality too
    - I'm very extroverted, very chatty. I was ready to talk in English much more quickly than my husband who's very introverted. I really needed to communicate.
    - My husband, however, started comprehending English much sooner than I would. He was ready for receptive language faster than me, but not speaking as much
    - For example, asking for directions, I would go up and ask for directions, but he would understand the answer when I couldn't.

Citations

Aroline E. Seibert Hanson & Christina M. Brown (2020) Enhancing L2 learning through a mobile assisted spaced-repetition tool: an effective but bitter pill?, Computer Assisted Language Learning, 33:1-2, 133-155, DOI: 10.1080/09588221.2018.1552975

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