



HABLAS

A Portable Spanish Speaking Device

PROBLEM DESCRIPTION

Problem Statement

The problem with language learning apps of today is that users often forget to use their app and will forget what they have learned. When interviewing people on how they learn new languages today 15 out of twenty people who were unsuccessful in learning a language were unsuccessful because they did not practice regularly and would oftentimes forget that they needed to practice. A lot of the people I interviewed were using Duolingo as a way to learn another language, however they would forget to use their app and would have to start learning all over again.

Overview

My project is Hablas, which is a portable device that helps people learn Spanish in an everyday setting without having to think twice about having to practice Spanish. The Hablas device will be able to give the user Spanish lessons on the go.

A lot of immigrants who come into America need to quickly learn English or they will be behind in school or the workforce. People who come into America not knowing English face a lot of discrimination. So once, those immigrants who have children born in America they try their best to teach them English in order to not be behind, like they once were. However, the children of immigrants will then grow up not knowing their family's language. Which will then cause discrimination amongst their ethnic circle of family and friends.

I chose for my product to teach Spanish because I grew up in a Mexican American household where I did not need to know how to speak Spanish. Spanish was actually my first language, but as soon as I got into school I was behind from all my classmates because my English was not very good. So my parents tried to prioritize English in hopes that I would not fall behind like my mother did in school because she did not know English. I would like to connect back to my family's roots and learn to speak Spanish.

Elevator Pitch

The problem with learning a new language nowadays is that a person has to fully commit to learning the language every week. If that individual were to not be engaged in learning the language for two weeks then they risk forgetting what they have already learned and would need to continuously start over in their language learning endeavor. A person would need to fully commit to learning a new language on a daily basis in order to fully grasp that new language. The Hablas device will be able to teach someone Spanish in different places throughout the day. Such as in the kitchen, at work, in the car, and in their room. The Hablas device will be able to teach someone Spanish through casual settings. The device will be able to be attached to the car steering wheel, a refrigerator, a closet, and a mug. It will be activated through sensors attached to the device and will ask the users to say things in Spanish. It will then tell the user if what they said was correct or incorrect.



Competitive Analysis

Some competitive items that also teach people languages through speech include Alexa and Duolingo. These products help people learn a new language, but they also have many disadvantages to them. Which include: people forgetting, not wanting to learn the language due to their busy schedules, or too stressed to have additional learning materials to familiarize themselves with. Duolingo is an app that people are able to utilize for five minutes a day to improve upon their language skills. Alexa is a smart device that people can place in their living rooms and ask Alexa for suggestions or recommendations to different topics. One thing Alexa can do as a smart device is help people learn a different language.

Duolingo is the most popular language learning device that people today use, but it does come with its faults. As previously mentioned, there are times the people will not be using the Duolingo app for a couple days or weeks and once they come back onto the app they would have forgotten what they had previously learned. Which would cause a delay in their language learning. Because they would be trapped in a cycle of having to relearn material then stopping the language learning journey.

Alexa which is a physical smart device that people can leave in their living rooms and ask for suggestions or recommendations to different topics. Alexa can access an array of different

ways of teaching a different language to its users. In the article “Can Alexa Teach Languages? Yes, It Can-and Here’s How” ,written by Anna Maria, it describes the multiple different functionalities Alexa has to teach someone a new language. “Alexa can teach languages through the “Skills” feature. “Skills” are apps that expand Alexa’s knowledge. She has tons of Skills specifically designed to teach languages” (Maria 5). This quote explains how Alexa not only has one option, but multiple options in teaching languages. However, the downfall to this is having to manually ask Alexa to open a certain skill and start the language learning process.

Design Process

Users and Archetypes

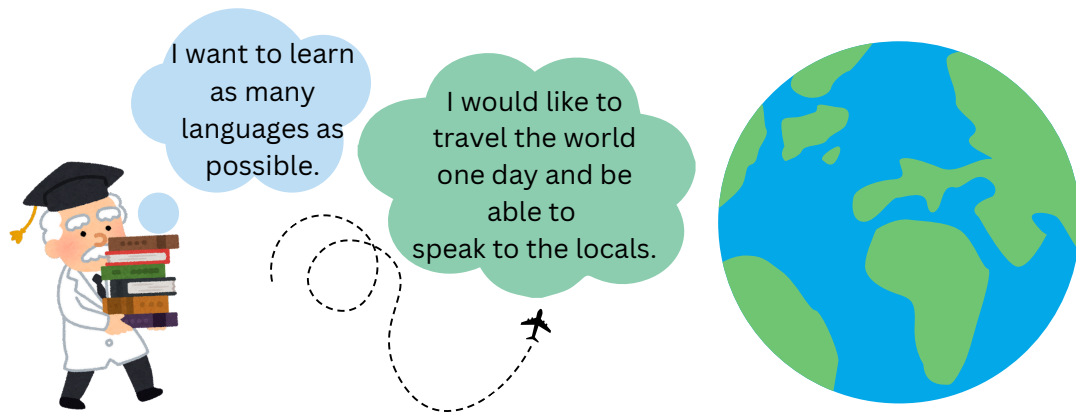
The people that will be using the Hablas device will be people who are 18-35 years old. The archetypes for this product are the reasons for why a person would like to learn a new language. The reason people have for wanting to learn a new language can influence their motivation to want to learn the language. The three archetypes are “The Family Guy” (the one that wants to connect to their roots), “The Scholar” (the one who is hungry to learn more), and “The International Student” (the one who now needs to speak a new language). These three archetypes are unique to the reasons why people choose to learn a specific language.

Firstly, “The Family Guy” is a person who grew up in a household that did not allow them to learn the language of their ancestral heritage. A lot of people living in America who are second and third generation are familiar with a couple of phrases and words of their native languages, but are unsuccessful in speaking that language. These people may have heard the language growing up. They may even understand every word spoken in the language, but do not practice speaking the language. These people want to connect back to their roots and familiarize themselves more with their cultures.



Secondly, “The Scholar” is a person who is hungry for knowledge and wants to learn as much as they can about different cultures. These people would love to travel to different places around the world. They also would like to excel at work and become a top candidate for hire

by knowing a multitude of languages. By knowing a variety of languages people do in fact open more professional doors.



Lastly, “The International Student” is a person, specifically a student, who has moved to a different country and has to suddenly adapt and learn the country’s language. This person may already know the language, but their language skills may need to be improved upon in order to properly speak to different people in the new country. They may also need to understand shortened words and slang phrases in order to have casual conversations with their peers. They also need to learn the language to attain a good paying job in the new country.



However, after carefully examining each archetype I have decided to just stick with “The Family Guy” archetype. I personally relate to this archetype myself because it is my reason for wanting to learn Spanish. Being able to be more specific to the prospective users gives me more of an advantage to market and design this product for a specific audience. The product will be aimed towards people who are of Hispanic descent and did not learn Spanish growing up. However it will still be useful to people who are not of Hispanic descent to also learn Spanish. Young adults who do not have Hispanic roots can still learn Spanish from this device.

Research Process

Info



The research process for this project included asking a variety of people questions about how they learn languages, the types of tools they were using to learn the language, and understanding the faults in those specific language learning devices. The interviewing process was the most important step in trying to figure out why learning a new language today was so hard for many. I then had to read up and use these devices myself to see the faults that a lot of people were describing when trying to learn a new language. Once I realized the faults in these language learning devices I needed to think of the best solutions to solve these problems.

Interviews

I had originally talked to twenty people before beginning on additional research as to how I can improve upon this device. Of the twenty people interviewed, 15 people were unsuccessful at learning the new language because they did not practice regularly. A lot of them had downloaded Duolingo themselves thinking it would be an easy and fast way to learn the language of their choosing.

In addition to the twenty people initially interviewed, I also interviewed six more people to ensure that I was going in the right direction with more specific questions. The questions that I asked were based on four main categories which were: getting to know the person, the main topic of how these people learn languages, a journey of them learning a language, and a more broader topic about how they learn new things and their daily habits surrounding that new thing.

Key Insights

The key insights that I have gathered from the various interviews that I have observed were exceptionally helpful in steering me into the right direction of where I needed to go for my product. During the design process of making the Hablas device I had sidetracked myself into how I was going to teach people Spanish. However, it does not matter too much how I teach people Spanish. What mattered the most was how I was going to initiate people to learn the language on a daily basis. Which was something that Duolingo and Alexa have been failing on.

The key insights from the archetype “The Family Guy”, which is the one that I will be focusing my product around, helped me understand more deeply as to why someone who has ancestry related to a specific language would love to learn to speak it. “The Family Guy” wants that connection from their heritage, and one way of achieving that would be to learn the language of their roots. They also would love to learn how people in their family express themselves fully with their native languages. Because someone may be more funny or more sarcastic than they are in a different language. These people might also want to live or visit

their country of origin and being able to speak the language of that country would be easy for them to be able to get around town and interact with the people living there.

Frameworks

The framework I decided to use when designing my product was the double diamond framework. I chose the double diamond framework to express my design process because I want to ensure that I come back and continue iterating upon my product even if I feel it is good enough. There may be a fault in the design process I am missing for my user base that I may want to go back and fix within the software of how the device asks people to say Spanish words or I may have to fix how the device may look. I would like for the product to want people to come back and learn more Spanish without having to think twice about needing to learn Spanish. I would also like for the users who are Hispanic to have a meaningful connection with how the device is designed.

Prototype

Prototype Iterations

The first iterations of the Hablas Prototype was just the computer asking the user to say Spanish words, which it will then tell the user whether or not they said the words correctly. By saying either “Good Job” or “I’m sorry that is incorrect, please try again”. If the user hears the phrase “Good Job” the user can then move onto saying the next Spanish word. If they were to say the word incorrectly they would then need to say the word again in order for them to move onto the next word.

The Spanish words I chose to ask the user to say were simple food related word, like apples and oranges. I chose for the user to say food related phrases because food is something that everyone meets and socializes. Spanish food words are also something that people would want to learn first in order for them to casually order something from a restaurant.

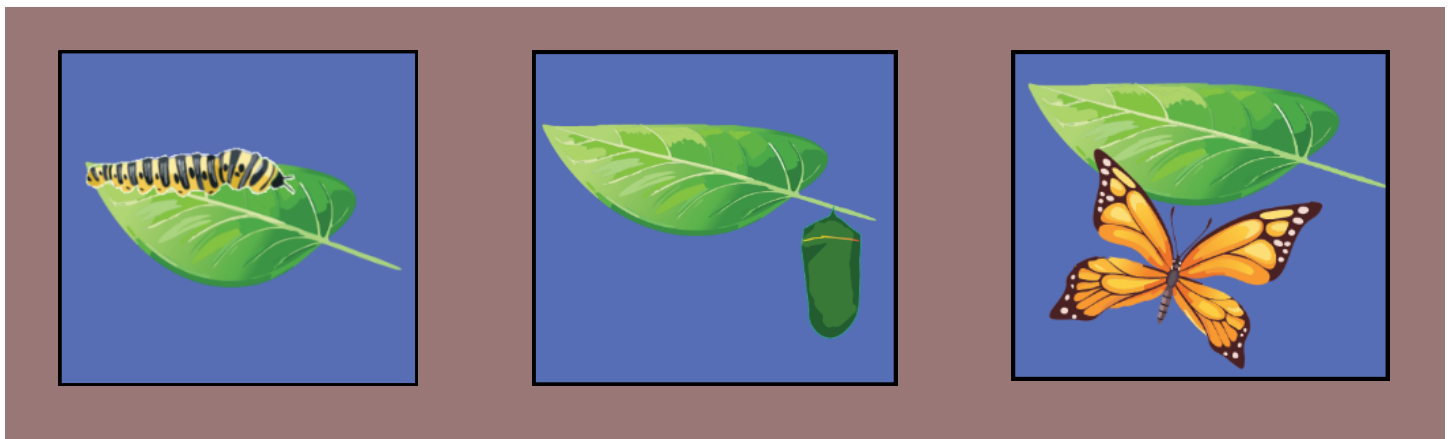


Once the user got through with saying single worded food related Spanish words, they were then prompted to the second level which was saying those same Spanish words, but now in a

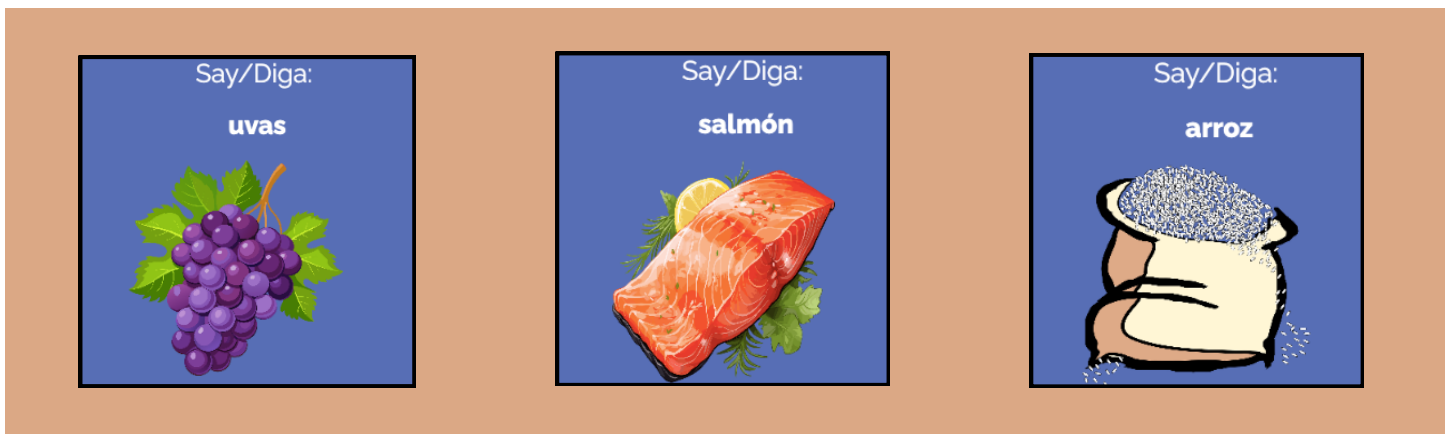
sentence. I had the users say “ I want ____”, such as: “ I want an apple”, “ I want salmon”, “ I want chocolate” and “ I want soup”. I wanted the user to get comfortable using the word they learned in an everyday setting, like when ordering food at a restaurant.

I also chose to change the Spanish food words every couple of hours depending on the hours of Breakfast, lunch, and dinner. So if someone were to use the Hablas device in the morning they would hear Spanish words like: café, huevos, avena, and frijoles.

The second iteration of my prototype was also the computer asking the users the same Spanish words and phrases, but I also put in some images in order to gamify the experience of learning a new language. I added an image of a caterpillar in the beginning as the user progressed throughout the levels of their Spanish speaking journey they would see this caterpillar evolve into a monarch butterfly. I chose to use the Monarch butterfly because Monarch butterflies migrate to Mexico every year, and I wanted to add that cultural significance of learning a Spanish language.

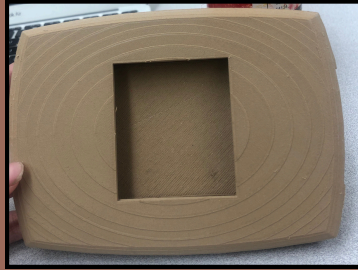


The third iteration of my prototype was also the computer asking the user to say these same phrases, with the caterpillar still in the background evolving into a butterfly at the end of the experience. But I added words on the screen for my users to see how the words were spelt and they also wanted to see a visual representation of the words they were saying, so I also added some pictures to accompany the words.



For the last prototype iteration I 3D printed a wood shell casing that would go over an Android phone to give the impression to the user that this device was a separate device that can also be carried around, like a phone. I also stamped on some flowers on the outside of the

shell encasing to also give homage the Mexican culture. since in Mexican designs they use a lot of flower designs to showcase their bright and vivid culture. I also made sure to use different bright vivid colors for the flowers. I chose red, blue, green, and orange as the colors for the flower design.



User Testings

I conducted my user testings with students on the university campus who were ages 18-35. Students are typically younger adults which made it easy for me to find people to test my product. Because I wanted to ensure that the Spanish the Hablas device was teaching to beginner level Spanish speakers, I first conducted my tests with people who were already experts in Spanish. I wanted to make sure that they were able to easily get through each level, without any hesitations. I also wanted to know if any Spanish words or phrases were being incorrectly used.

I then conducted user testing on people who knew some Spanish to see if they too were able to get through the levels, and hopefully learn a few new words that they had not already knew.

My final group of users were people who had no knowledge of the Spanish language whatsoever. It was interesting seeing this group test my product because they were eager and happy to learn something new, by a cool interactive technology.

Each time I did these user testings my users were always delighted to see cool emerging technology. Their faces lit up with excitement as they began testing my product.

Findings

Note

While conducting user testings on my first iteration of the Hablas device my users pointed out to me that they could not remember the words that they had just finished learning after completing the testing for the product.



I also found that a lot of people would start saying the Spanish words well before the speech recognition started.

The users were also confused as to why they were looking at a caterpillar on a leaf in the beginning of the testing. They were even more confused as to why this caterpillar was changing into a butterfly at the end of the testing.

The users were also confused as to why they were looking at a caterpillar on a leaf in the beginning of the testing. They were even more confused as to why this caterpillar was changing into a butterfly at the end of the testing.

Feedback Implementation

Because I had many users telling me that they could not remember the words that they had just learned from the Spanish Speaking device, I added the words that they had to say in Spanish on the screen in order to improve their memory. I also added images to signify what each word meant, so they knew exactly what the words they were saying represented.

In order to fix the problem of users saying the Spanish words well before the speech recognition recordings began, I added a beeping sound for the users to know when to start saying the Spanish words. I also added an audio prompt in the beginning to inform users that to only say the Spanish words once they heard a beeping sound.

I also made sure to add audio in the beginning to inform the users that as they progress throughout the levels the caterpillar evolves into a majestic butterfly once they had completed all levels. Which gave the users something to look forward to at the end.

Impact for Target Audience

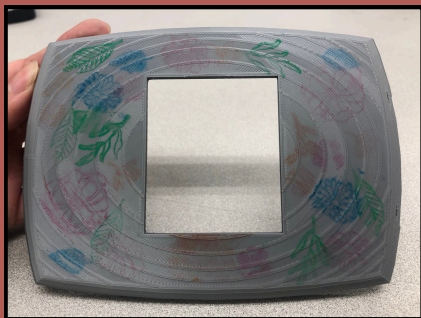
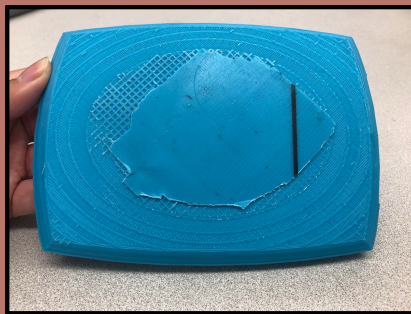
Success



After implementing all the changes that my users would appreciate after they pointed out to me the many flaws to my product, the product became a very engaging, interactive product that brought smiles and delight to all users who tested. They all loved seeing the images that were added and also learned how to spell the words that they had just learned. Their faces lit up with excitement when they saw a word that they had seen previously on either ads, restaurant signs, newspapers, websites, and much more that they had previously not known what the Spanish word meant. They were also wholeheartedly surprised when they saw that they had been pronouncing the Spanish word that they had seen in their everyday lives wrong. They were happy to realize and know how to pronounce the word correctly though.

Before and After Images & quotes

Images:





Quotes from users:

Have you tried learning a new language? If so how did you do it?

“ Not very good. Downloaded Duolingo a couple of times but ended up not interacting with it cause find no motivation

”

What did you learn?

“ Learned more about the product and specific pronunciation ”

“ what the Spanish words of english words mean ”

“ I learned how to add a verb to a sentence in Spanish ”

If you could change one thing about the device what would it be?

“ I’d like a screen showing the words I should say ”

“ Incorporating levels to different terminology pertaining to Spanish sentences ”

Technology

Tech Used

The coding software I used for this product was javascript and HTML for the code. I used the javascript libraries: P5.js (for artistic web development), P5.speech.js (for speech recognition), P5.sound.min.js (for the audio). I wrote this code on the Visual Studio Code IDE.

I used Pixabay for the stock image representations of the food people were saying in Spanish.

I also used Adobe Illustrator for the images of the caterpillar, leaf, cocoon, and butterfly. I first drew an outline of how I wanted these images to look like, I then used the Adobe Illustrator AI function to color in the images.

For the shell casing I used a 3D printer with wood filament. I used TinkerCad to design the shell. I put in a hole inside this circular rectangle for the phone to fit inside. I printed out each half at a time. I then stuck them both together. For the finishing touches I stamped the shell with colorful flowers to mimic the colorful flower designs that Mexico is famous for displaying all over their art.

Tech Critique



P5.speech.js

The tech critique I have for P5.js was that P5.speech.js (for speech recognition) was not compatible with the iPhone. Because it was not compatible with iPhones, I had to borrow an Android for the prototype to work successfully.



Github

I also used Github to deploy the project. However Github did not like accents such as: é, ó, and á. So I had to remove the accents from my code. to run properly.



3D Printer

The 3D printer had some trouble as well. 3D printers are not perfect, and often times do run into lots of trouble if they are not being watched over. The filament ran out a couple times and the filament also would get tangled up while printing which delayed my prototype from being completed.

Other Ways Tech is Used

Speech recognition functions are used today in everyday household items. Such as a phones, light switches, and watches. We often ask our smartphones for things all the time using speech recognition, like “Hey Siri, hows the weather outside”, “Hey Google how many miles to the nearest Wendy’s”, or “Hey Siri, how many planets are in the galaxy”. Our phones recognize our voices and once they hear the prompt for asking a question they will be ready to answer your questions. The same goes for our watches. Our watches now have cameras, texting abilities, and are able to count how many steps a person has done. Our watches are like a miniature smart phone on our wrist.

Alexa is another household item that people use to control their shopping lives, cooking, playing games, household appliances, information, news, and much much more. If you need Alexa to do anything all you have to do is start the prompt by saying “Alexa...”.

What I Learned from Testing

Note



While testing users who did not know Spanish or knew very little Spanish, I realized that if they did not say the Spanish word correctly with the rolled r's or the accents the speech recognition would see that as not the correct Spanish word being said. So I needed to make sure that the Spanish words that they were hearing on the audio for them to say were well pronounced and clear for them to understand.

Development

To develop this product I first had to record myself asking the user to say various Spanish words and phrases. I converted all these voice recordings of myself into mp3 files. I then had to sort out each mp3 file into categories, depending what I was asking the user to say. If I had the user say a breakfast related item I pushed all the mp3 audios into the Breakfast Array. I did the same to the lunch, snack, and dinner audios as well. Each array included five audios. Which asked the user to say five different Spanish words. On top of having arrays that would ask the user to say one Spanish word that was either part of the breakfast, lunch, snack, or dinner categories, I also had an additional set of arrays for breakfast, lunch, snack, and dinner which would ask the user to say a phrase. The arrays that asked the user to say one Spanish word were part of level one of my product. The arrays that asked the user to say a phrase with the word they had previously learned from level one were part of level two.

```
Breakfast.push(loadSound("Beans.mp3"));
Breakfast.push(loadSound("Coffee.mp3"));
Breakfast.push(loadSound("Eggs.mp3"));
Breakfast.push(loadSound("Milk.mp3"));
Breakfast.push(loadSound("Potatoes.mp3"));
Lunch.push(loadSound("Rice.mp3"));
Lunch.push(loadSound("Soup.mp3"));
Lunch.push(loadSound("Hamburger.mp3"));
Lunch.push(loadSound("Chicken.mp3"));
Lunch.push(loadSound("Salad.mp3"));
```

I also had to record myself saying a greeting of either “Good Morning...”, “Good Afternoon...”, or “Good Night” depending on the time of day it was.

Greetings Audio

If a user used the product in the morning they would be prompted with a “Good Morning...” greeting followed by various audio recordings asking the user to say different Spanish foods related to Breakfast. The same would be applied if the user used the product in the afternoon, for lunch or snack Spanish words, and at night time for words to say in Spanish that would be typically eaten for dinner time.

In order for my users to access the correct array of audio recordings that were dedicated for specific time frames, I used if-statements to see what time of day the user was accessing my product. I used PST to measure the time of day. I also added switch statements inside each time of day if-statement to measure how far along the user was in the product. If the user was still on level one of the product then the switch statement would be using only the data from case 1. If the user was on level two of the product then the switch statement would be using only the data from case 2. These cases on the switch statement signified the level that the user was now on.

```
if (`${pacificHour}` >= 15 && `${pacificHour}` < 17) {  
  switch (level) {  
    case 1:  
      if (num == 0) {  
        Snack[0].play();  
        Snack[0].onended(startRecognition);  
        food = "uvas";  
      }  
      if (num == 1) {  
        Snack[1].play();  
        Snack[1].onended(startRecognition);  
        food = "nueces";  
      }  
    }  
  }  
}
```

With each correct word that the audio would ask the user to say the user would move onto the next audio in the array. When the user reached the fifth audio recording and successfully said the word correctly they would then go onto the next array that was meant for level two.

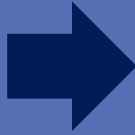
In order to show the images on the product I also had to import each png image that was meant for each food that the person had to say in Spanish. So whichever food was being asked to say from the audio, that image of the food was shown to the users. I concatenated the food, that was being asked, with the ".png" in order for the correct image to show.

```
if(food != undefined){  
  | imgFood = loadImage(food + ".png");  
}
```

I also made sure to add the food name onto the top of the screen to make sure people knew how it was spelled.

As for the images of the leaf, caterpillar, cocoon, and butterfly, I imported all images as png, except for the caterpillar which was a GIF. I had three different if-statements indicating which level the user was on. If the user was on level one they would see the caterpillar wiggling on the leaf. If the user was on level two they would see the image of the cocoon on the leaf. If the user had completed all two levels then they would see the image of the butterfly.

```
if(level == 1 )  
    image(imgLeaf,300,200,300,120);  
    image(movingCaterpillar, caterpillarStartPos, 175,200,75);  
if(level == 2)  
    image(imgC, 300,50,300,400);  
if(level == 3)  
    image(imgB, 300,50,300,400);
```

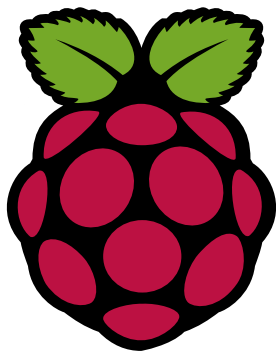


Future Scope

What would I change

If I were to continue working more on this product I would use a raspberry pi along with a screen, speakers, microphone, and sensors. Instead of me using my phone to operate the product. I would also make the product much more smaller. In order for a person to take it with them everywhere they go and keep it in their pockets. In order to blend in with their everyday lives.

I would love to make my product a small compact Spanish learning device that will be activated when the user is near the device. I want my device to be able to teach people Spanish when they least expect it. My device would be a thing that reminds the user to begin their Spanish lessons and will quickly prompt the user to start speaking in Spanish.



Work Cited

Anna Maria. 2024. Can Alexa teach languages? Yes—and here's how. *FluentU*. Retrieved from <https://www.fluentu.com/blog/learn/can-alexa-teach-languages/>