UniiLanguage

IMCAT

Requirements (Final)

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02.27.2022

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Revision History

Version 1.0

- Date: 1/23/22
- Added the statement of work, stakeholder analysis, technical constraints, WBS, and Gantt chart

Version 1.1

- Date: 1/27/22
- Added assumptions, functional requirements (use cases, user stories, use case diagram), and non-functional requirements

Version 2.0

- Date: 2/8/22
- Refined non-functional requirement descriptions to feature specific details
- Updated Use Case Diagram to reflect updated requirements
- Edited functional requirements to reflect current project direction
- Updated Statement of Work to be consistent with other documents

Version 3.0

- Date: 2/27/22
- Updated wording in Non-Functional Requirements
- Revised Statement of Work to reflect more specific project vision
- Elaborated on assumptions
- Removed irrelevant functional requirements, added one new one, and reworded others to reflect more specific project vision
- Updated Use Case Diagram to match updated functional requirements and their shifted targets

Introduction

Statement of Work

UniiLanguage is a web-based application designed to reinforce language maintenance and acquisition in students who are in the process of learning a new language. Geared towards use in a classroom setting for elementary school students, but applicable for use between the grades of K-12, the application will serve as an accessory to teachers who wish to incorporate it as part of a language-learning curriculum, or those who simply wish to use it as a practicing and reinforcing tool.

For the scope of this project, this application will consist of one mini-game that involves having students draw the prompt provided in distinct time intervals of 10, 30, and 60 seconds (the 10/30/1 game). This mini-game is designed to be primarily accessible in an independent manner (pre-programmed with an existing prompt list for each available language), but can include a method by which students can input a course code to access a custom-designed prompt list for use in a curriculum setting.

Within the span of twenty-one weeks, this project will have been designed, developed, and deployed, following the specifications laid out within this document, and with an emphasized focus on both usability and accessibility. This application will then be utilized to assist language-learning students (including, and perhaps especially, those who are learning English), as well as to apply the benefits of the Olson-Gillingham method in the context of a multi-sensory approach to language maintenance and acquisition.

Assumptions

1. Users will have access to the internet in order to use the application.
2. Students will have access to a Chromebook or some other web-compatible device.
3. The system will be utilized by the intended audience (teachers, students, etc.)
4. The users' devices will have enough storage capacity to run the program.
5. The server for the application host will be reliable and persistent.
6. Students will be using this application to recall previously learned terms.
7. Students will not be using this application to learn new material.
8. Students have a basic understanding of technology.
9. Students have a basic understanding of how to use digital drawing boards.
10. Students have the tools to be able to draw digitally (e.g., mouse or tablet).
11. Students will have a baseline knowledge of at least one language in order to navigate the application.

Functional Requirements

Use Cases

Requirement: Asynchronous operation
Priority: Must Have
Description: Students can use the application to practice drawing prompt exercises independently from any location, regardless of device and time. They can practice as many exercises as they want, without assignment, as a simple learning and reinforcement tool.

Requirement: Web-based framework; the system must be able to be hosted on a server
Priority: Must Have
Description: The application must be web-based and shall be accessed from a browser from any device. The application must be able to be hosted on a server. It shall accommodate for a variety of screen dimensions and follow web design principles and practices.

Requirement: Drawing Board for students to use
Priority: Must Have
Description: This is the main feature of the application. Students shall be able to draw within a designated area using their mouse or touch-screen device.

Requirement: Timed drawing intervals
Priority: Must Have
Description: Students will be given three timed intervals during which they will be able to draw the prompt provided in the designated area. Outside of the area's specified time interval, they will not be able to edit the drawing.

Requirement: There should be a home page where students can select the language they want to practice.
Priority: Must Have
Description: Students should be able to select a language they want to practice when they are on the website.

Requirement: Students should have the option to begin another drawing prompt after completing one.
Priority: Must have
Description: After finishing the drawing session, the system shall prompt the user if they would like to start a new drawing session with a new prompt.

Requirement: App can generate its own prompts off of basic sight word lists
Priority: Must Have
Description: The app should be able to generate its own prompts based on pre-programmed word lists so that students are able to practice using the application without the need for a teacher's assignments.

Requirement: Students should have the option to save their drawings.
Priority: Good to Have
Description: After finishing each prompt from their chosen language set, the system shall prompt the user if they would like to save their drawings for future reference.

Requirement: Data compressibility for client-side storage optimization
Priority: Good to Have
Description: The application shall compress the drawings in order to reduce the amount of storage required to store drawings created by users.

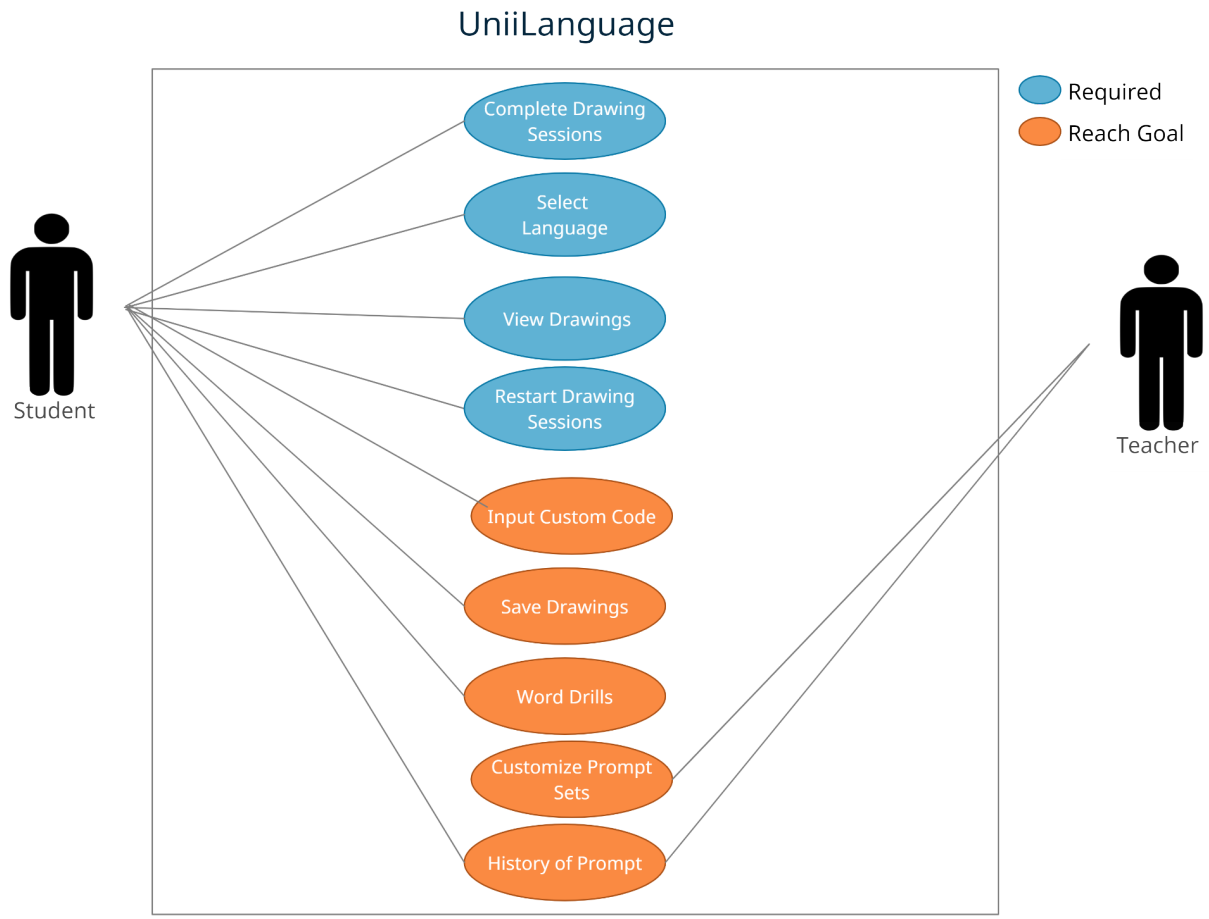
Requirement: App can track previously assigned prompts using browser cookies

Priority: Good to Have
Description: The app should not give users repeated prompts by keeping track of previously assigned prompts using cookies in the user's browser.

Requirement: Customized Prompt Sets
Priority: Reach Goal
Description: Teachers should be able to create custom prompts associated with a course code in order to allow their students to access prompts associated with their curriculum.

Requirement: The app can generate its own prompts off of teacher-assigned word lists.
Priority: Reach Goal
Description: It would be nice for the app to be able to generate its own prompts based on word lists that are assigned by teachers, in place of the default sight word lists.

Use Case Diagram



User Stories

User: Student
Priority: Required/Must Have
Use Case: Student uses Uniilanguage to complete a randomized drawing session
User Story:
Matthew is a 3rd grader and native English speaker. He is enrolled in special education at his elementary school, and loves spending his free time on coolmathgames.com or playing Minecraft with his friends. He has Spanish class every other day, and today his Spanish teacher assigned him word drills and Unilanguage practice as homework. After he gets home and eats a snack, Matthew logs on to his family desktop computer and completes his Spanish word drills. He then navigates to the Unilanguage website and selects “Spanish” when asked what language he wants to study. Unilanguage prompts Matthew to draw a “Perro con un Sombrero'' (Dog with a Hat) in 10 second, 30 second, and 1 minute intervals. Unilanguage shows Matthew all his drawings after he completes them, and Matthew runs to the next room to get his dad and show him his silly drawings. Then, Matthew presses the “Start New Drawing Session'' button and completes 2 more drawing sessions to complete his homework.

User: Student
Priority: Reach Goal
Use Case: Student uses Uniilanguage to complete a custom, teacher-created drawing session and saves drawings
User Story:
Isabella is a 4th grader and native speaking Spanish speaker. She struggles with dyslexia and ADHD, and is working on better pronouncing her English “j”, “h”, “ch'' letter sounds. In class, Isabella’s teacher introduces a new list of animal words for the class to study. She gives the class a custom Uniilanguage code to help with some of these new words and letter sounds. When Isabella gets home, she opens up her Chromebook — lended out to her by her school — finishes her assigned word drills, and navigates to the Uniilanguage website. She enters the custom code provided by her teacher written down

in her notebook. The site accepts her code, then prompts her to draw a “Chicken Wearing a Jacket''. She giggles at the prompt, then proceeds to draw a chicken wearing a jacket three times in increasing intervals of 10 seconds, 30 seconds, and 1 minute. The website displays all three of her drawing attempts alongside the prompt, and asks if Isabella would like to save the images to her school computer. Isabella decides to save the images, then asks her teacher at school the next day if she can print out the pictures she saved to show to her mom. Isabella’s mom is delighted to see her daughter’s pictures and learn more about her daughter’s learning. She hangs the printed photos on the family fridge for everyone to see.

Non-functional Requirements

Requirement: Usability
Priority: Must Have
Description: The final product must be easy to use, in order to allow as many people as possible to benefit from it effectively. This includes children of much younger ages, and as such, it should feature easy-to-use navigation and non-strenuous text sizes/fonts. The product should also explicitly *not* feature a login system, as the client has stated that such features have slowed down the progress of learners in the past.

Requirement: Modularity
Priority: Good to Have
Description: As a project that is intended to be incorporated into a larger system of language drills and exercises, the product should be modular, with the ability to modify its exercises (such as with the timer, number of prompts, etc.) with minimal impact to the existing code framework in order to fit into future designs.

Requirement: Reliability
Priority: Good to Have
Description: The final product should be reliable, and a focus should be made on preventing avoidable errors, bugs, and crashes, in order to mitigate both the frequency and impact of any interruptions to the learning experience of its users.

Requirement: Accessibility
Priority: Must Have
Description: The final product is meant to be used as a ground-level language acquisition and maintenance tool by those who are first learning the language. As such, the product must be designed with such groups in mind, including, but not limited to, younger children, English Second Language individuals, and people with different

learning needs. Therefore, the product must be accessible to these groups, using accessible fonts, colors, and room to add varying default languages.

Requirement: Orton-Gillingham Values
Priority: Good to Have
Description: As a product built to make use of an Orton-Gillingham-related approach to instruction, it should be designed with multi-sensory and interactive elements in order to facilitate language acquisition and retention in its users. These include, but are not limited to, animations, feedback, color palettes, prompt sentence structures, and sound design.