

# **Foreign Language Educational Game Software**

## **Computer Science Capstone Project I**

### **Gunma Prefectural Board of Education - Foreign Language Educational Game Software**

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*Software application to aid in English vocabulary and pronunciation through gameplay for Japanese students, elementary through high school.*

## Table of Contents

Project Description .....	3
User Overview .....	3
Requirements .....	4
Preliminary Results .....	4
Conclusion .....	7

## **Project Description**

This project seeks to develop a software application to aid Japanese elementary school students in English vocabulary acquisition and pronunciation through video tutorials, flashcard and gameplay. Students will practice speaking English vocabulary words via flashcards and games, advancing through levels as their vocabulary grows and their pronunciation improves. Instructors will be able to create and add custom vocabulary sets via Google Sheets interface. The final deliverable is a to be the educational software package capable capable of running on an iOS device.

## **User Overview**

There are multiple stakeholders involved and interested in this project, who include Student Users, General Users, and Instructors. The student users are those who will use the application for their own learning purposes. These include students in schools, targeted from 7th to 12th grade, who will be participating in a learning activity carried out by the instructor. The instructor oversees the operations of student users with tasks and creates vocabulary sets that prepares the students for learning, apart from the base vocabulary. The instructor is able to create custom vocabulary sets and share it with their student users with a unique class code that access the specific set. General users are those who download the app with no instructor, they can access the base vocabulary, but in order to add custom sets, they will need an instructor. They are still able to sign in using their accounts. For this project, the team has three user scenarios: student users, instructor users, and general users.

For student users, real time feedback(correct or incorrect) is given about their performance during game play. They can watch interesting animations during the game which clearly indicates in-game performance. As they are playing, they can create a nickname to be displayed on the leaderboard, as well as see their friends' scores on the leaderboard in real time. Instructors can get the performance data about the students through the leaderboard and can add custom vocabulary sets via Google Sheets. For general user, a pleasing main menu is displayed which can be changed into different seasonal colors. This software application can be used in at least two languages, English and Japanese.

## Requirements

A functional requirement of this project is to have a function that allows users to log in using their Google accounts for the ability to save progress and user information. Additionally, having a settings menu with options for vocabulary topics and language choice that changes colors to reflect the current season is a requirement so that the user would be able to customize as much of the game as they could. The ability for the instructor to view student progress is another requirement in order for the instructor to gauge student ability and proficiency .

A performance requirements of this project is to have a way to show real-time feedback about the student's pronunciation so that students are able to learn in the most efficient and quickest way possible. Another requirement is a way to translate menus from English to Japanese and vice versa for ease of use by many users. A way to display student nicknames and scores on the leaderboard for the student and instructors to view is another requirement that adds a competitiveness to the game for student enjoyment.

A constraint requirements for this project is iOS compatible code and gaming platform due to the game being run on Apple products, specifically, iPad. Also, storing student user information through Firebase with student's Google account is another requirement that allows students to save their product and eases the use of the game by allowing the student to play when convenient. Finally, storing instructor vocabulary sets on Google Sheets which can be accessed using Google Sign-In is a very important requirement that allows for instructors to choose the vocabulary they feel their students should learn.

## Preliminary Results

The results found when testing the application is that when a student user starts the application, they are presented with a start menu (*see below: Start Menu*). They then have the option of playing the game, practicing with flashcards, watching video tutorials, viewing the leaderboard, and customizing their settings. When the settings menus is selected, the student user has the option to view the menu in either Japanese or English (*see below: Menu Translation*) and can customize their vocabulary topics, how long the gameplay is, and toggle sounds on and off.

When the student user selects 'Gunma Chan Takes a Hike' from the start menu, the game will start and the character will start to walk towards the frenemy. The user has unlimited attempts at pronouncing the word until the character reaches the frenemy. Once the character reaches the frenemy, a health point is lost (*see below: Gameplay Prototype*). If the user correctly pronounces the word, the character will 'feed' the frenemy and the next vocabulary word is displayed for the user to pronounce.

When the student user selects 'Leaderboard' from the start menu, a leaderboard will display with the top ten scores in the game (*see below: Leaderboard*). When the instructor user selected 'Leaderboard' from the start menu, the same leaderboard will display but there is an option for the instructor to add a student and their score to the leaderboard.

### Deliverables:

#### *Start Menu*



## Menu Translation

Settings		Select vocabulary sets available for gameplay.	
Vocabulary Sets	Numbers	On	off
	Color/Shapes	On	off
Game Time	Countries	On	off
Sounds	Days/Months	On	off
Support	Feelings	On	off
	Subjects	On	off
About	Fruits/Foods	On	off
Language	Custom Set #1	On	off

  

設定		単語セットを選択してください。	
単語セット	数字	On	off
	色・形	On	off
時間の設定	国	On	off
音量設定	曜日・月	On	off
	気持ち	On	off
サポート	教科	On	off
このアプリについて	フルーツ・食べ物	On	off
言語設定	Custom Set #1	On	off

## Leaderboard

Leader Board

#1	Tory	20
#2	Bob Smith	12
#3		

Name  Score

### *Gameplay Prototype*

<https://drive.google.com/open?id=1ntO7QI41Hkrqo4Rs0taCJj1TNAplG-Bc>

### **Conclusion**

In conclusion, the foreign education game software is a game designed to help improve the English vocabulary and pronunciation ability of Japanese students through the entertaining way of gameplay. Our team was able to come together to work on this project, even with limited experience in building games. The team was able to implement a large majority of tasks in the product backlog into our prototype with the help of our mentor and sponsor. Many new things were learned along the way including version control, communication, and technical knowledge. The team, as a whole, has learned how to use version control to manage the development and share code with each other and our sponsors. The team also learned a lot about the game development through some of the seminar sessions within this semester that helped us to conduct research into solutions for our project. Initially, problems were encountered in the development but the team was able to overcome those obstacles and produce a game software prototype. In the future, we hope to finalize functions of the game like voice recognition as well as implement some more backend features using APIs to read the databases.