*Abstract*— Game-based learning aims at getting people to learn a certain subject or to acquire certain skills by means of playing. Educational games must fulfil both recreational and didactic goals in order to succeed. This paper introduces a spelling game called Voxspell, designed especially for ESL students to learn English orthography and vocabulary. A brief description of the game is provided, along with the software development process applied.

***Keywords*—**Game-based learning, orthography, spelling, vocabulary, English learning, software development process

# Introduction

Game-based learning is an attractive alternative option particularly for a generation who has grown up digital. The success of game-based learning experiences relies on two key characteristics: an effective pedagogical background and a sound entertaining support. Learning effectiveness of the game depends directly on the former, but the latter also deeply affects student’s motivation.

In this paper, an application for game-based orthography learning aimed at second language learners between eighteen and twenty five years old is presented. Traditional spelling exercises tend to be monotonous and tedious, which represents a critical handicap for maintaining the student’s interest and motivation. Memorising the English orthography also raises similar problems. The main advantage of game-based learning is to maintain student’s motivation by its recreational characteristics. It allows the development of repetitive learning tasks. Thus, it constitutes an ideal scenario for practicing orthography and vocabulary learning, by doing simple spelling exercises of incrementing difficulty.

The Software Development Life Cycle (SDLC) is applied throughout the development of the program to ensure the quality is satisfying. This includes techniques such as client meeting with the lectures, peer evaluation, and pair programming.

## DESCRIPTION OF THE GAME

The objective of any educational games is achieving a didactic goal while maintaining the entertaining value expected.

When designing this application, the easiest way of ensuring its entertaining objective was to adapt an existing amusing game and a media award feature. Nevertheless, the didactic factor had to be carefully introduced to integrate both the didactic and the recreational goals without jeopardizing each other.

The objective of Voxspell consists of spelling a maximum of ten words after pronunciation and getting a number of entertaining awards. Once each answer is submitted, the correctness of spelling is checked and the result recorded. If a satisfactory level of correct spelling is achieved, a number of awards are provided such as a Tic-Tac-Toe game and a media player to play music and videos.

Voxspell has four main functionalities: New quiz, Review Quiz, View Statistics, and Clear Statistics. The user is given the flexibility to load his or her own media and word list files before selecting one of the spelling levels available to start.

The New Quiz and Review Quiz are based on the traditional question answering to remind formal education testing and evaluations.

The New Quiz functionality provides the user a quiz with ten words from the current level to spell. With each word tested, a maximum of two attempts is provided.

Similarly, the alternative Review Quiz provides a quiz with a maximum of ten words that are incorrectly spelled previously.

The user submits the answer after each word is pronounced and receives instant response for the correctness of spelling. The voice/accent and speaking rate of the Festival Synthesis System utilised can be adjusted in both the Quiz functionalities. Additionally, the user can heard the pronunciation of each word multiple times without penalties.

If the user achieves a distinctive level of correctness, they can choose one of the followings: adjust the spelling level, play a reward video with or without echo effects, and play the Tic-Tac-Toe game.

The spelling level can be maintained or incremented by one.

The Tic-Tac-Toe game is a single player game with a voice synthesis feature, while the media player provides controls such as pausing and replaying a video for the user. Both reward options achieve the entertaining goal and motivate the user to improve the spelling accuracy.

The view statistics functionality presents the numbers of times each word is mastered, faulted, and failed individually.

The clear functionality clears the hidden files associated with the statistics after confirmation.

After each quiz, the user chooses one of the four options again or close the application. This strategy is intended to reinforce learning by means of repetition.

When restarting a new game after closing the application, this strategy does not apply and the words are loaded and selected randomly again.

