Digital Language Arts Training System

Software Requirements Specification

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Revision History

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| **Project Overview Statement** | Project Name:  Digital Language Training System | Team: Red |  |
| Problem/Opportunity: Our world is becoming ever increasingly connected across social and business landscapes as a result of internet-based technologies that can bring together individuals from disparate communities which have traditionally been localized according to geographic constraints. Today individuals and business firms are able to connect and interact within a radius of coverage that covers most of the developed world. As a result, communities have become more diverse as people coming from all cultures and locations can more easily connect, interact and transact with one another. While geographical boundaries have been broken via such technologies, there still exists language barriers amongst the many connected individuals who are unable to speak and understand the native tongues of those to whom they are connected.  The online language arts learning market is expected to be between $4-$8 billion during by 2024 [1] [2]. Indeed there is a recognizable demand for language training products worldwide who’s market majority is currently shared between two firms: Rosetta Stone Ltd. [3] and Duolingo Inc. [4] [2]. Rosetta Stone Ltd. offers a subscription based digital training platform that covers 30 languages through an online classroom styled delivery and also offers live one-on-one online tutoring via virtual web meetings [5] and has developed a social network presence within which users can interact on Facebook [6] and Twitter [7]. Duolingo Inc. covers 26 languages (including Klingon for avid Star Trek Fans) using a gamification styled delivery which is based on both an ad-free and fee based subscription models and provides an integrated social community that allows users to follow and compete with others in their Duolingo network [4].  Although the market for digital language arts training applications have been reached by several competing entities, we view opportunities to be captured within the space. Our analysis of the products offered by Rosetta Stone and Duolingo are disjoint along both the personal tutoring and gamification components. In our view there is room for significant improvement to the level of interactivity and engagement possible through a digital language arts learning platform. Namely we recognize the potential for value to be added by offering, in addition to language arts training via traditional modalities offered in existing solutions, a cognitive computing based solution that creates an intuitive virtual tutor than can be available to the user on demand via an audio-visual-text-social media based interface. Our aim is to 1.) hybridize traditional digital language arts learning modalities having demonstrated market success, 2.) expand upon current platform technologies offered using cognitive computing based solutions, and 3.) integrate said technologies into a uniquely defined product that offers market leading high quality and engaging language arts training that is cognizant of each individual user. | | | |
| Goal: Provide a multi-platform digital language arts training system that engages the user through a cognitively aware gamified interface. | | | |
| Objectives:   1. Provide a language arts training regimen via an interactive digital interface which implements the following modalities 2. Support for text and pictographic based multiple choice exercises 3. Support for text and pictographic based fill in the blank exercises 4. Support for “listen” and “respond” based exercises where user responses may be speech or written text 5. Maintain user engagement via the following modalities 6. Support for modular learning where modules are used a micro-courses focusing on one particular aspect of the language learning process 7. Support for beginner, intermediate and advanced levels of difficulty for each language learning task 8. Support for gamified based user performance based reward system that considers the level of difficulty, consistency, frequency of and performance of the user’s engagement with the learning system exercises 9. Support for in app community connectivity allowing for users to connect, socially interact and compete in user group created learning competitions 10. Support for an individualized virtual cognizant tutor and learning companion 11. Support for user to set and adjust weekly goals for performance and engagement and continuously have access to feedback metrics related to user goals | | | |
| Success Criteria:   1. Aggregate and stratified user performance according to goals set by the user (See Objectives: section D) being met and exceeded. We will consider our product to be successful if users consider themselves to be successful during their learning journey. We aim to have at least 90% of our users reach at least 90% of the goals they set. 2. Size of user base compared to current market leaders 3. User learning system usage metrics from (aggregate and stratified) based upon 4. Frequency of weekly usage on daily scale > 5 days per week 5. Number of lessons attempted vs completed across all users > 90% 6. Frequency of exercises receiving correct response within the first attempt > 80% 7. User progression metrics that track for language skills development within and among beginner, intermediate and advanced levels: We aim to see all users progress through all modules of each level of difficulty consistently according their achievement of the short- term goals they set weekly. | | | |
| Assumptions:   1. The development and QA team are well equipped to build and deliver the software that can run even on the low-end devices with relatively slow internet speed. 2. There is a bug reporting system in place where users can report issues that they run into while using the application. These bug reports need to be read, analyzed and assigned to the correct team so that the issues can be fixed in a timely manner. 3. There will exist teams of composed of senior management, product/project managers, language experts, gamification experts, and social media designers who will work within cross-functional groups including all relevant UI, machine learning and database developers throughout the adaptive agile development and launch processes. | | | |
| Risks:   1. All requirements not being identified at the beginning of the development phase leading to a requirement inflation at the later stages of the project and could threaten the budget estimates and deadlines. 2. The system might be prone to hacking and can lead to theft of user information and loss of data. 3. Server breakdown could lead to loss of data if there are no backup servers in place. | | | |
| Obstacles:   1. Designing the application in such a manner that the reading, writing and speaking skills of the user learning a new language is fully tested. 2. Designing the translation algorithm such that it presents the most appropriate translation to words and phrases depending on the context. 3. Monitoring and analyzing the usage metrics and figure out if user activity has dropped and coming up with new features to make the application more engaging for the users. 4. Designing the system in such a manner that it can be used offline. 5. Making the system platform independent so that the user experience is uniform regardless of the device the user is using to run the application. | | | |
| Prepared By:  Team Red | Date: | Approved By: | Date: |

1. Overview

The purpose of Part I of this document is to present the pre-planning related project components that composes the software requirements (functional and non-functional), use cases, system architecture and hardware requirements of the language learning system. Part II of this document will compose a detailed description of the planning phase of the language learning arts system development process and includes details of how cross-functional teams will be organized and which deliverables each will be responsible for. Part III of this document analyzes and quantifies the factors/events that may exist at any point during the planning and launch processes.

Part I

1. Definitions

3. Functional Requirements

3.0 Application launch and entry point

3.0.1 Splash screen will appear upon application launch

A picture containing object

Description automatically generated

3.0.2 Upon successful application launch, user will be presented with the training program progress section embedded within the main app interface

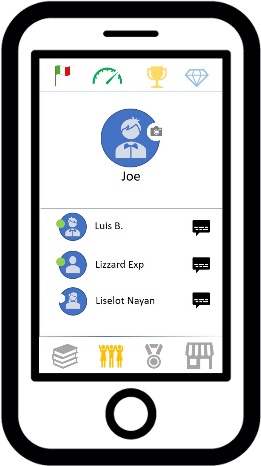
A screenshot of a cell phone

Description automatically generated

3.0.2.1 Lower buton bar of main interface will provide access to

3.0.2.1.1 User training program

3.0.2.1.2 User social media tools



3.0.2.1.3 Weekly League Standings “medal”

3.0.2.1.4 App Store “building with awning”

3.0.3.1 Upper button bar of main interface will provide

3.0.3.1.1 Language selector button “Flag”

3.0.3.1.2 Button to access practice lessons screen “Green Guage”

3.0.3.1.3 Button to access Trophy screen

3.0.1.1.3 Graphic Displaying number of gems earned

3.1 Language(s) Selection Screen

3.2 Trophy Collection Screen

3.3 League Standing Screen

3.4 Training Program

3.4.1 Training program Organizaton

3.4.1.1 Training program will consist of levels

3.4.1.2 Each consecutive level will represent a higher degree of learning difficulty.

3.4.1.3 Training program levels will consist of modules.

3.4.1.4 Each Module will consist of lessons focused on one aspect of the language studied.

3.4.1.5 Each lesson will consist of a collection of problem base translation exercises that are related to the aspect of focus.

3.4.2 Training Program Graphical Representation

3.4.2.1 Each Tier will be represented as a mutually exclusive directed acyclic graph.

3.4.2.2 Each module will be represented as a node having an in degree of one and an out degree of one.

3.4.2.3 Completed module nodes will be marked as completed graphically

3.4.2.4 Recommended learning path will be represented as edges connecting each consecutively recommended module (node).

3.4.2.5 Edges between a pair of two completed modules will be graphically distinct from edges between all other possible module pairs

3.4.3 Training program progression

3.4.3.1 Progression from one level to the next more difficult level will be allowed once all modules at the lower level(s) of difficulty have been completed satisfactorily.

3.4.3.2 Satisfactory completion of any module is defined as satisfactory completion of all lessons within the module.

3.4.3.3 Satisfactory completion of a lesson is defined as user having provided correct responses to all exercises within a single lesson attempt.

3.2 Lessons

3.2.1 Lesson Introductory Notes

3.2.2 Lesson Attempt

3.2.2.1 Lesson Exercises

3.2.2.2.1 Exercise Types

3.2.2.2.1.1 Textual Challenge/Textual Response

3.2.2.2.1.2 Textual Challenge/Multiple Choice Response

3.2.2.2.1.3 Audio Challenge/Textual Response

3.2.2.2.1.4 Audio Challenge/Audio Response

3.2.2.2.1.5 Interfacing With Tutor

3.2.2.2.1.6 Problematic Exercises

3.2.2.2.2.7.1Life Status

3.2.2.2.2 Lesson Performance Points

3.2.2..2.3 Lesson Completion Rewards

3.3 Practice Between Lessons

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