

CM4105: Honours Project - Requirements Analysis

Introduction

To achieve the project goal in creating an eLearning application for bagpipe music theory, a certain level of requirements is needed to ensure that the project is on a path to completion. Therefore, this project will focus on the front-end development of an application that would provide a fun and interactive style of learning using game development styles used in most eLearning applications. Using a combination between front-end and back-end technologies will ensure that the project will successfully incorporate all Functional and Non-functional requirements throughout the project.

With the use of MoSCoW methodology used to prioritise requirements into the three sections shown in the table below labelled, “Must have”, “Should have” and “Could have”. The Must have requirements are the primary functions of the application needed to be complete to ensure that the project works and provide a basic achievable level. The Should have requirements are the secondary functions of the application which are required to ensure that the application can be elevated to suit the overall project. The Could have requirements are the final functions to be implemented if there is time within the specified time allocated to the project or if the proposed task is feasible.

Functional Requirements:

- Create an intricate design using storyboards, templates, and flow charts, that will explore the main design of the application, detailing how each function works, sounds, and will play out within the application. Full explanation into these designs must be incorporated into a tutorial of the application either using the designs and/or video explanation, therefore development stages will be easily implemented with varied information that will build the implementation process.
- Asset designs will be implemented, creating all assets from scratch from buttons to audio keys. This will ensure copyright can be implemented and that all functions are easily accessible. With the creation of reusable assets and fresh audio recordings ensures that the project will not experience any copyright infringement and will ensure that the product at the end of the project can be used on the market.
- The application must be created and developed for mobile device usage, mainly iOS and Android phones, as well as tablets. This application will be tailored for individuals who may use this on the go or in a classroom environment, as tailored for all bagpipe learners therefore the application must be suitable for quick fire lessons, the ability to mute, pause, take screenshots/download the course could be implemented into the final product.
- Within level selection, stages could be unlockable which require the user to have a minimum score value and complete previous levels, unless certain parameters such as age or experience is implemented. Each level must have a minimum of 5 activities ranging from basic memory training to typing/drag-and-drop mechanics; these activities will occur in a random order and could be triggered at the users request in the main selection menu.
- Each level will could be accessible to continue learning after each use, if a user exits the application while a level is being played, the user's main interactive menu should display the previous level and be able to continue from last entry. The user will be able to track what area they can focus on, statics could be available to the user to explain areas of difficulty and steps to improve areas, then priorities for future refresher sessions.

Non-functional Requirements:

- Documentation and forms will be provided to test users.
- Software required to complete the project and how they benefit the project include:
 - Adobe XD will create the main storyboards, templates and walkthrough designs of the project which will then be displayed to then be created in Unity.
 - Adobe Illustrator will be used to create all image assets that will be implemented into Unity as part of level design.
 - Adobe After Effects will be incorporated into the project to create videos as an introduction to each new note or section for the application
 - Adobe Audition will be used to record the sound of the bagpipe chanter and announcer voice within the application.
 - Adobe Media Encoder will be used to encode all video software and other file types to be converted if necessary.
 - Unity is the main product used in creating the application, using script functions, assets and other key elements, this software is key for creating the application.
 - Visual Studio Code will be incorporated into creating scripts for the application in partnership with Unity.
 - Microsoft Word will be used to create all documentation for deadlines and testing purposes.
- All evidence will be recorded via weekly logs with supervisor, tasks updated on Trello board, and all requirements of deadlines and key stages through a Gantt Chart.
- Within this project, deadlines will be met, and all relevant documentation and files will be sent through My Moodle, the deadlines for the final report, proof of concept, and poster/demo are currently not live. However, once updated these deadlines will be implemented into the Trello Board and Gantt chart.

Task	Explanation
Must Have	
Design Templates	Creating full function design templates using Adobe XD. With the prototyping style of XD, this allows the developer to see how each page should work and the full functions of it.
Story Board Designs	This basic principle will instruct the developer how each stage works, level by level. Including how the user interacts with the application, what is displayed and what should not be shown.
Create assets	Using Adobe Illustrator, assets such as musical notation (notes), buttons, etc. will be created and edited into sprites.
Create Scripts	Using Visual Studio Code, scripts will be the back end on how the application will be created, from randomising activities to keeping statistics on how well a user performed.
Create Trello Board	A Trello board will be used to create a specific list of requirements that allows the developer to have a clear motive on what is required and when it needs to be completed.
Create Gantt Chart	Unlike the Trello Board, a Gantt Chart holds more information on how each week has progressed, showing what needs to be completed, as well as when deadlines will come up.
Multiple Levels/courses	Creating courses will including multiple levels within them with varied activities ranging within each, allowing for the user to have an engaging experience.
Minimum of 5 different activities	Within the levels, a randomised script will activate that will allow the level to decide how many activities can be displayed before the end.

	The minimum value will be 1 and maximum will be 5, each level will be designed the same however the combination of what letter or not will appear will be randomised.
Tutorial	A full tutorial will be available using Adobe After Effects, this will be displayed for the user to watch whenever required. Allowing the user to play a sample level that can be reused at any time.
Assessments	Assessments at the end of each section will be required to achieve a performance grade for the student, therefore once reached a "pass" the user could progress, if they gain "fail" they have to retry.
Testing Documents	All documentation will be created using Microsoft Word.
Video Recordings implemented	At the beginning of each level describing a new note, phrase or exercise a video demonstration will be shown.
Should Have	
Create Account	Possible create account for students, organisations, or teachers, this will require consent forms and possible limitations if users are under 18. Basic accounts such as Google or Facebook Accounts may be implemented.
Database for accounts	Databases for accounts would be required if accounts are implemented, this will need to be stored on an online account management systems/database.
Database for saved course	Possibility for creating a unique profile which means all data will be saved, such as results, progression on levels and areas to improve.
Basic Settings	Settings such as mute, light mode/dark mode and contact us will be implemented.
Out with Links	Video links will be accessible through a private YouTube Account demonstrating all videos and introduction for the application if the user requires.
Could Have	
Implement 3D Elements	Focus of assets will be primarily 2D in nature, however if elevation is required 3D assets and animations would provide a beneficial foundation.
Accessible through multiple devices	The application was to be created for all iPhones, iPads/tablets, and Android devices, however if possible creating a laptop/desktop version would be beneficial to all users. Possibility for Web Application Version within the foreseeable future.
Advanced Settings	Advanced settings such as edit account, upload music to play/identify/learn could be implemented to provide a possible learning community within the application. Possible comment sections and forms could prove useful for all generations.
Unlockable Levels	On first opening of the application all levels except the tutorial will be locked unless provided with proof of skill level, (possibly implemented by a teacher account). However, all levels will be unlocked after the completion of the previous level
Random Tests	Possibly within learning a new lesson, at the end during a test phase the user can prompt to keep learning the same note, continue or try a random test. This will incorporate one of the 5 activities using the notes provided within that level, to ensure that other notes are not used.

Testing:

- Testing will be implemented after each design process when creating the application by the developer, this will ensure each section is thoroughly tested to ensure no

errors, crashing or issues occur when progressing. During individual testing phases, carried out by the developer, each test will be recorded with live feedback from the developer to give a wider picture of what could happen. Set scenarios will be carried out by the developer during this process to ensure all areas have been regularly checked. Spontaneous testing will occur that will ensure that the developer is giving a realistic viewpoint on how development is progressing or not.

- User Testing will be implemented at the final stages of the project, participants will be required to complete a form that allows their data to be recorded for testing purposes only and that they have signed consent that will allow users to fully test the product.

The following testing will be carried out:

- White box testing – Users who know about the product and how it was created will carry out a survey, function test and usability test, while knowing each element of the application thus having a clearer view.
- Black box testing – Users who have no knowledge on how to create, implement the product or have no knowledge on the subject, which will carry out the same testing as the white box user.
- Survey Monkey – This gives a generic view on how the product worked and gives basic information on how the users navigated and enjoyed it.
- Function testing – this is document that asks a user to complete a scenario while the developer observes, they will note how the user completes the task, how long it takes and how successful the test was to the user.
- Usability testing – This style of testing ensures that the user goes through the entire product testing every button, movement and sound, following the guidelines provided.