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School of Computing

**Honours Report**

***eLearning Application/Game on Bagpipe Musical Theory***

**Lewis Maitland 2022**

This report is submitted as part of the requirements for the degree of

**BSc (Hons) in Digital Media Computing**

at Robert Gordon University, Aberdeen, Scotland

**I confirm that the work contained in this Honours project report has been composed solely by myself and has not been accepted in any previous application for a degree. All sources of information have been specifically acknowledged and all verbatim extracts are distinguished by quotation marks.**

Signed ......... Shape

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Abstract

In this final report, full coverage on how the project excelled, from start to finish, including how each individual document worked in partnership with the continued support from the team, and how it did not work well due to personal pressure and other reasons supported within this assignment. Also, all documents, files and resources will be available in the GitHub Open repository which will be available with the following link, as well as submitted in the comments section in the submission area. Overall, the project was a success in some cases but not in many ways as predicted.

Acknowledgements

Firstly, thank you to Yang Jiang, my project leader for all the helpful and constructive advice throughout the project, without her wisdom on the project, how to better myself and research as efficiently as possible this project wouldn’t have happened at all.

Thank you to John Issacs, for the continual support through multiple lectures and advice on how to both improve my project as well as enrich it further. John has helped with other projects in the past and has given me the confidence to build up my reputation and continue to benefit my own wellbeing and growth as a student.

Thank you to all the students who took part in helping with the project from advice to help within the creative field to bring this project into reality.

Finally, a big thank you to my bagpipe instructors, players and students that have helped build my reputation as a bagpipe instructor and allowing me the opportunity to create a product that would benefit the world. Although the project has not finished and is still in testing phase at the end of this honours project, I am still very grateful for all the continual support from everyone that I have received from during and throughout the project.

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# Chapter 1

## Introduction

The project goal was to create an application/game that would benefit individuals when learning the complicated and intricate theory behind bagpipe music, how to pronounce the lettering in the form of a communication form known as Canntaireachd. While also being able to view it on sheet music as both individual notes and as a sequence of notes, as well as identifying how to play that note on the practice chanter. This style of application would provide users with a universal guide on how to learn musical theory using techniques that have been passed down through the generations. Adapting it into the modern-day reality since mobile applications are the road forward for any theme or learning style. With the Covid Pandemic causing a significant influx of mobile and internet users at an increase of “50% and 70%”(Beech, M. 2020) where around “184563 apps released in the time window of July 2019-May 2020” (Samhi, J. Allix, K. Bissyande, T.F. & Klein, J. 2021) from the Google play store alone, from Figure 1.1.

# Chapter 2

## Design

Design was the principle to how the application was going to look and flow throughout the project, based on extensive research made from the literature review, on colour theory design, application design trends of both 2021 and 2022. Also, product design, promotional design, how to create musical notation onto a computer and be appealing to a growing audience of both young and old.

### 2.1 Flash Card design

As all students learn any language, equation, or passage of text, they will tend to use flash cards, with a question on the front then the answer on the back, one of the best ways of learning. Some instructors will use the same style of teaching for their bagpipe learners for Bagpipes especially for younger students. Using the design concept of a flashcard is the main reason to create an eLearning application that would reflect the same teaching style; however, the difference would be that this one is digital. This style of flashcard is shown in Figure 2.1, showing the way these flashcards were created and used from 2004 till today.

### 2.2 Adobe XD

Adobe XD is an application used to design software, websites, and games for multiple applications. With its simple design style, varied ways of creating content and building up a design portfolio this is the simplest way to draft the main design of the application. When building the application on Adobe XD, as seen in Figure 2.2, the application allows designers to create a prototype version which allows them to fully see it work, as in view it on a phone and click buttons to activate and therefore show how the application will work. This was the simplest way to ensuring that the application worked perfectly and could then be created using Unity.

# Chapter 3

## Development

The development of the application was created first from Adobe XD as stated previously, since I was more experienced in that field than in Unity, due to the overall project needing Unity to style, develop and create the game, this was a key application to explore and therefore grow in this field. With more time in researching how the game engine worked, the application would have fully grown more, than it did during the project.

### 3.1 Unity

In Figure 3.1, the reason behind using Unity as explained through the literature review, this application was chosen and is currently being used for the application in the project and after as it is the easiest and most widely accessible platforms for create an eLearning application/game. With the design of this scale, full development was created on Adobe XD and then using the prototype section, this was used to create the development section in Unity. Due to a lack of experience with Unity, more help was needed to find exactly how to create the application and ensured that it worked as intended.

# Chapter 4

## Testing

When testing an application like this, multiple theories of how to test and successfully evaluate the tests was mentioned both online and through past experiences. The two methods used for the project were to test using students which did not work due to the lack of content for the application. However, the main testing was using an approach all if not most web designers use.

### 4.1 Ethics Forms

In Figure 4.1, the first page of the ethics form details why we need to be careful when creating an application for users who may need additional resources to help them understand the application further and therefore learn more about the application and then use it efficiently. As stated in the ethics form the possibility with working the children was a main factor in creating an eLearning application based on Musical Theory for the Bagpipes, as most of these users are children. A PVG was then needed, however due to being a teacher myself, I already have a PVG and continuously require it for work. Therefore, was no issue. Within the testing phase, only myself was used as the application was not fully completed.

### 4.2 Application testing

Due to the unfinished project as it is, testing the project was a key ingredient in ensuring that the main project was still working constantly, with the methodology of Agile for the project as seen in Figure 4.2. The testing was carried out at the end of each design, continuously testing the result to ensure that the application was working perfectly. This same style of testing is used by web developers to ensure that each element of the application works as it is intended. Due to my lack of knowledge on creating applications or games on Unity, this was the easiest and by far best way of ensuring that the project would not fail.

# Chapter 5

## Promotion

With promoting the application, focus was primarily on the poster rather than the demo of the application due to the main issue of the application still in development phase, known as Alpha Stage. Meaning the application is still in its main development stage and mid testing phase. Continuously testing and developing at each stage following the Agile Methodology stated in the Literature Review based on how this project would be completed and managed.

### 5.1 Poster and Demo

The poster was the primary focus in ensuring that the application was well detailed even though, the game was not finished. All statements made in the poster are true and due to the concept of the poster being more word oriented than picture, this through the experience off as most posters about a new application or game would involve images of the main game itself. However, in Figure 5.1, the full poster can be seen, within the GitHub Repository, the poster can be found here as well as the code .tex file can also be found.

As part of the requirements for the project, a demo was to be filmed and sent as part of evidence for the project, however none was sent and instead only the poster was sent. The reason behind this was the recording continually failed when showing off the project, due to the timing of this which was not properly organised the film was not priority only the poster was. The demo would also have showed the application go from a main menu to a starter screen and not show anything else of due to the lack of commitment to creating the project. The main game is completed but not tested. The elements, sound, development is created and working, however due to the lack of time management as I stated there would be in Figure 5.1 and 5.2, this would not have proved how effective the application was.

# Chapter 6

## Conclusion

The first half of the project, although the late submission of the literature review, was a resounding success, the passion for the project and the style of creating an application that would be used for people across the world was a revolutionary idea. However, after the start of 2022, production grinded to a halt. All motivation was gone. The application was not completed, still in testing phase and not good enough to even show it due to embarrassment of the project. However, within failure comes realisation, the way to progress forward, how the application will ensure continual learning becomes a reality. The project, therefore, was a success in more ways than just building an application that seems too good to be true.

### 6.1 Evaluation

The project had a high expectation, as stated in the Literature Review and in Figure 6.1, 6.2 and 6.3, with the right drive and passion, due to complications of illness, mental health and overall stress, the project went downhill at the start of 2022. If illness, loss of family members and potential war was not a factor during the time at university, while also not staying fully isolated at home due to high risk, stayed indoors for 2 years, the project success rate would have been higher. With the constant support of lecturers and other students, socially as well. Due to the lack of this, after literature review and the main documentation the main bulk of the project plummeted due to a lack of inspiration, need to complete tasks and an unwillingness to ask for help.

### 6.2 Future Work

As stated, this application was not fully completed and with the lack of evidence to provide throughout the project due to illness, mental health and overall worry, the steppingstones to ensure the success of this application are still in place. Continual development and testing will proceed after the end of the project. This application will be given more allocated time and training to ensure that the product is a success, not only for my own students but for students across the world. Funding would be the next issue, promoting this application will be possible with help from other companies within the similar bagpiping world. Contacts from these companies are already planned for, but more development of the product is required before approaching investors.

Overall, the project was a success in some ways, a success for the ability of not giving up even though very little was achieved, due to the stress of everything inside and outside of university, this project ensured that anything is possible and that all aspects of life must be taken into consideration before going through with any fully planned strategy.

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# Appendices and Figures

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Graphical user interface

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Figure 6.1 – Introduction of Literature Review

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Figure 6.2 – Introduction of Bagpipe Music Theory – Literature Review

Text, letter

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Figure 6.3 – Conclusion of Literature Review

Text, letter

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Appendix 1: Ethics Form

Appendix 2: Literature Review

Appendix 3: Poster

Appendix 4: Project Proposal

Appendix 5: Project Requirements

All appendices are in the GitHub Folder.