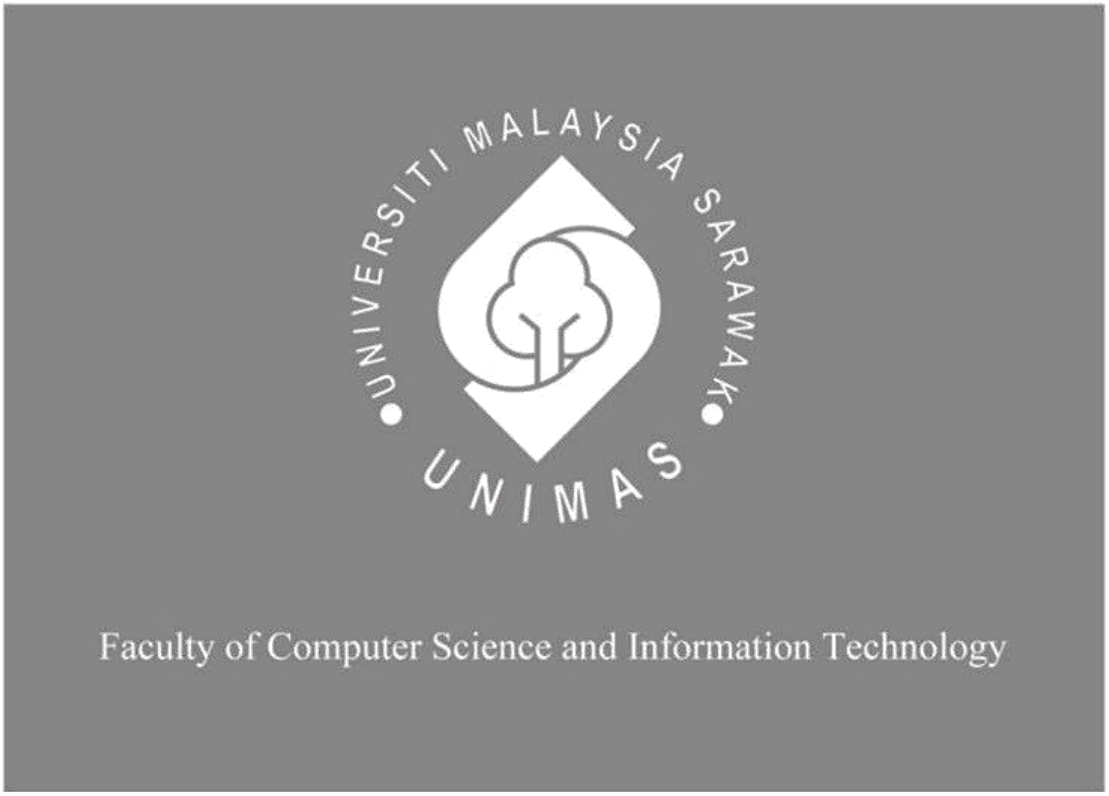

LEARNING BASIC JAPANESE USING AUGMENTED REALITY (HIRAGANA CHARACTERS AND BASIC COMMUNICATION, hiRAR)

FARAH HAZIQAH BINTI BAHAROM

Bachelor of Computer Science with Honours

(Multimedia Computing)

2020

LEARNING BASIC JAPANESE USING AUGMENTED REALITY (HIRAGANA CHARACTERS AND BASIC COMMUINCATION, hirAR)

FARAH HAZIQAH BINTI BAHAROM

This project is submitted in partial fulfillment of the requirement for the degree of Bachelor of Computer Science with Honors (Multimedia Computing)

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I hereby declare that final year project report entitled **Learning Basic Japanese Using Augmented Reality (Hiragana Characters and Basic Communication, hirAR)** submitted by me to Faculty of Computer Science and Information Technology, University of Malaysia Sarawak is carried out by me under guidance my supervisor Dr Mohamad Imran Bin Hj Bandan.

FARAHHAZIQAH

Farah Haziqah binti Baharom (55936) JULY 2020

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ABSTRACT

Nowadays, people are more interested in learning the Japanese language as a second or third language. Still, at the same time, it requires a lot of practices and a lot of effort to master in the language that we unfamiliar with. The new learners have experienced several challenging aspects in the process of learning the foreign language as a second or third language. Learning process started to get complicated when the interaction between the learning tools and students is scoped down to static text, so it is hard to visualize and failed to focus. This is of the main reasons hirAR mobile application is developed for the students who want to learn the Japanese Language. There are existing systems which help to learn the Japanese language in a fun way, but most of the systems only focus on characters learning but not for learning phrases and communication learning. With the mobile application using Augmented Reality (AR), in education used as learning tools, it provides new digital media that results in teaching and learning enhancement. The main objective of this project is to develop a mobile application platform for Japanese Language studies that will be used by the students who are taking Japanese Language Level 1. By using this application, the mobile app using augmented reality for Japanese learning is proposed to give exposure to the Japanese language learner to explore the Japanese language in an engaging way.

ABSTRAK

Pada masa kini, ramai orang lebih berminat untuk belajar bahasa Jepun sebagai bahasa kedua ataupun bahasa ketiga tetapi pada masa yang sama, ia benar-benar memerlukan banyak masa dan usaha untuk menguasai bahasa yang asing untuk kita. Beberapa aspek sukar telah dialami oleh pelajar baru dalam proses pembelajaran bahasa asing sebagai bahasa kedua atau ketiga. Proses pembelajaran mula sukar apabila menggunakan interaksi alat-alat pembelajaran lebih lebih lagi jika ianya statik menyebabkan pelajar sukar untuk menggambarkan sesuatu aspek dan gagal untuk fokus. Ini adalah satu sebab utama aplikasi mudah alih hirAR dibina untuk pelajar yang ingin belajar Bahasa Jepun. Terdapat sistem yang sedia ada yang membantu untuk belajar bahasa Jepun yang menyeronokkan tetapi kebanyakan sistem hanya memberi tumpuan kepada watak-watak pembelajaran, bukan untuk frasa dan komunikasi pembelajaran. Dengan aplikasi mudah alih yang menggunakan *Augmented Reality* (AR), pembelajaran menggunakan aplikasi hirAR dalam pendidikan akan digunakan dalam pembelajaran sebagai alat bantu mengajar dan menyediakan media digital baru yang akan meningkatkan cara pembelajaran. Objektif utama projek ini adalah untuk membangunkan satu platform aplikasi mudah alih untuk kajian Jepun Bahasa yang akan digunakan oleh pelajar-pelajar yang mengambil Bahasa Jepun. Dengan menggunakan aplikasi ini, aplikasi mudah alih yang menggunakan realiti diperkukuhkan lagi untuk pembelajaran bahasa Jepun yang dicadangkan untuk memberi pendedahan kepada pelajar yang belajar bahasa Jepun untuk meneroka bahasa asing tersebut dengan cara yang menarik dan efektif.

CHAPTER 1
INTRODUCTION

1.1 Project Title

Learning Basic Japanese Using Augmented Reality (Hiragana Characters and Basic Communication, hirAR)

1.2 Introduction

Nowadays, Augmented Reality (AR) has become really popular and commonly used in many fields, for example, medical, entertainment and educations. According to (Kipper, 2013), Augmented Reality is breaking its infancy that makes the future applications in the future are massive. In short, AR has been widely used in very innovative ways and has the potential to make it beneficial to people and can provide learners with contextualized data and information in real-time (Godwin-Jones, 2011).

The literature recently aimed at the development, advantages and early implementation of AR technologies (Yuen, Yaoyuneyong, & Johnson, 2011). Besides, Kessler (2018) described these studies as proportionally simple, temporary, and small sample in exploring nature. Klopfer & Squire (2008) also stated that the design-based researches did by the researchers were mostly related to this technology. Some studies also revealed that augmented reality technology was proven to leave a positive impact on the learning environment. Furthermore, researchers stated that students rated greater motivational attention, contentment and satisfaction while learning using augmented reality environment rather than text-based learning environment (Chen & Tsai, 2012).

The purpose of this project is as the learning approach for the student who wants and interested in learning basic Japanese through Augmented Reality. It focuses on teaching basic Japanese for the Hiragana characters and basic communication, mainly for students who wish

to learn a foreign language. Through this application, the user can experience a fun learning and interactive gameplay. This application helps to introduce a fun way of learning in education instead of the traditional way. Students are more likely attracted to experience this learning rather than reading a book or learning in hours' classes.

With this regard, Augmented Reality in different ways, can provide extra digital information about any subject, and make complicated information easier to understand. These days, there is a lot of excellent examples of Augmented Reality in education all around the world. The connection of AR between reality and digital content have been improving, providing more options for teachers and students (Ibáñez, Delgado Kloos, Leony, Garcia Rueda, & Maroto, 2011). With the existence of AR, learning will be more exciting and fun. When the user points the device at the printed flashcards, a beautifully rendered 3D Japanese characters will pop up on the screen. The application also has a fun quiz for the user to experience exciting gameplay and take a break from learning. Therefore, due to these situations, the mobile app For Learning Japanese Using Augmented Reality (Hiragana Characters and Basic Communication, hirAR) has been proposed considering that the potential of combining smartphones and Augmented Reality for education is significant.

1.3 Problem Statement

Interactive learning allows the user to participate in the learning environment. However, the conventional way of education does not satisfy the students, and the learning activity started to experience bored and not fun at all. According to (Cheng, Yang, & Andersen, 2017), many Japanese textbooks used in the classroom manage to teach Japanese basic sentence structures with a relatively small vocabulary. It can be completed within 240 hours of a semi-intensive two-semester course, and it is also limited to full text with less interpretation. It may seem a heavy load to the students as it is limited to a full-text version with less visualization. Before a

student can expect to read with ease, they will face a much larger stock of bored. Brown (2003) stated that the interaction between the learning tools and students is limited to static pieces of stuff such as text. It seems hard for the students to visualize, and they will easily fail to focus.

As most people use their smartphone, so the new release of the ARCore for android and ARKit for iOS is a perfect blend of the physical and digital environment that allows the user to get a first- hand experience of the "unreal" object.

Augmented Reality is a term for a live direct or an indirect view of a physical, real-world environment (Kipper, 2013). In order to overcome this problem, a mobile application with Augmented Reality (AR) features should be added. By using the interactive mobile app using the Augmented Reality, it can enhance the view, and the user can experience a fun learning process. As part of an interactive and engaging learning approach, some multimedia elements will be added in the mobile application such as pictures, graphics, sounds, and animation. It is used to enrich the learning environment and to let the students to fully involve in the learning activity (Wu, Lee, Chang, & Liang, 2013).

1.4 Scope

The project focuses on Japanese basic Hiragana characters that consist of 46 characters and some basic sentences and phrases for communication. The intended users of this mobile application learning tool are only for Android smartphone users. The syllabus used in this hirAR mobile application is the content from "Marugoto A1 Katsudou" textbook only. This textbook is one of the books used worldwide mainly for level 1 learner or beginner according to the Common European Framework (CEFR) standard. The final results of this mobile application can be downloaded only from the Play Store.

1.5 Aims and Objectives

Completion of this project aims:

i. To develop a mobile application platform for basic language studies that acknowledges the student to understand more in communication and characters that totally different from English concept.

ii. To conduct testing of a mobile application to its intended user.

1.6 Brief Methodology

Rapid Application Development (RAD)

In this project, Rapid Application Development had been chosen. Rapid application development (RAD) is a form of agile software development methodology which emphasizes on working software and user feedback. RAD requires strict planning and testing. (G. Coleman & R. Verbruggen, 2016)

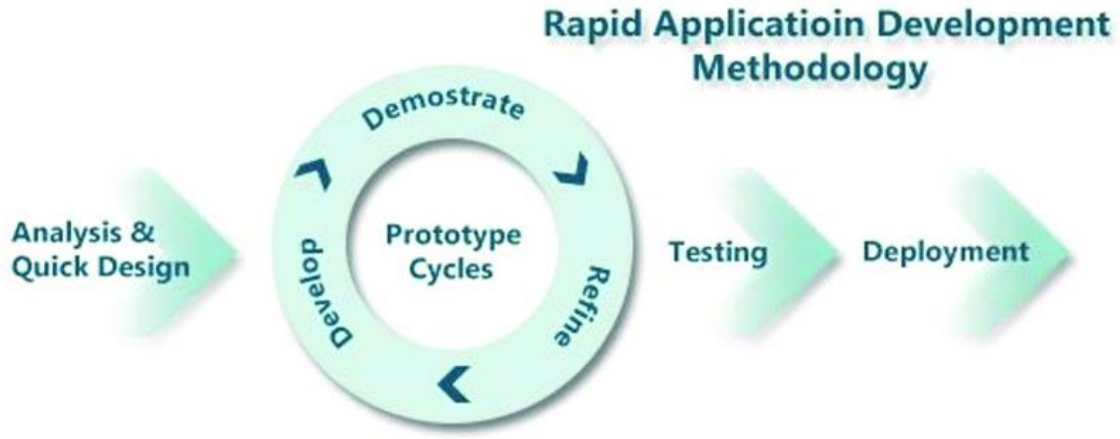

Figure 1.1 Rapid Application Development (RAD) Model (Lucidchart Content Team, 2018, May 23).

Phase 1: Analysis and Identify the Requirement

As kick-start, the project, study, and review of the functionalities for the mobile application is needed. Through this study, the types of rules and skills suitable for the user will be identified. The study also covers the development criteria such as interactivity and feedback so it will be much easier to identify the important criteria that should be included in this project.

There are a few AR development platforms that can be applied in educational tools. The study covered the AR development platform features such as operating system compatibility and tracking requirement are identified for this project.

Second, programs and software which will be used to make the user interface of the proposed app, the 3D modelling, animations, and others. For this project, programs needed are Mixamo , Adobe Illustrator and Maya.

Phase 2: Design an Interactive AR Framework

The design phase shows how the proposed framework will be implemented. The project developer needs to design the related requirements for the proposed project. The user interface, scripting, 3D modelling and others will be designed in this phase too.

Phase 3: Development

Rapid Application Development will be used as the development methodology in this project. Rapid Application Development has a shorter life cycle compared to other methodology which allows the developer to break the project down into smaller and more manageable tasks. Furthermore, it makes everything easier for the developer to add additional functionalities and features without having to repeat the whole development process. With a shorter planning phase and a focus on highly iterative design and construction, RAD is able to accomplish more in less time without sacrificing user satisfaction.

Phase 4: Testing and Evaluation

There are two main testing in this stage, which are functionality testing and user acceptance testing. Functional and usability testing are both important and vital in this testing process. Functional testing is carried out to ensure that the product behaves according to the functional requirements without taking design principles into consideration. In contrast, usability testing focuses on customer acceptance and how well the customer can use the product to complete the required task. Usability testing investigates all aspects of the usability of a product, including overall structure, navigational flow, and layout of elements on a page, clarity of content and overall behaviour.

Phase 5: Deployment

The deployment phase is the final phase of the methodology. The application must fulfil all the requirements and has to past the testing phase. The error that occurred during the testing will be resolved. In the final phase of Rapid Application Methodology, the application will be put under production. After the application passed all the testing, the product is ready to go for live.

1.7 Significance of Project

The significance of this project is to give an overview and educate users about the basic Japanese language with 46 Hiragana characters with some basic communication by using the latest and attractive technology which is Augmented Reality (AR). By implementing this technology for educational purposes, the user will enjoy their learning adventure using a mobile application and enhancing the user learning experience about the Japanese language.

1.8 Project Schedule

The project schedule is used as a guideline and reminder to develop the Mobile Application using Augmented Reality. Gantt chart is used to show the project duration and estimate each task duration. Figures below show the project schedule for developing the proposed project using the Gantt chart.

		PROJECT NAME	PROJECT DURATION	PROJECT START DATE	PROJECT END DATE
2		Final Year Project Schedule 1	115	September 19, 2019	January 11, 2020

TASK ID	TASK DESCRIPTION	TASK DURATION (DAYS)	START DATE	END DATE
1	Feedback and Comments	1	September 19, 2019	September 19, 2019
2	Submission of Brief Proposal	11	September 19, 2019	September 29, 2019
3	Submission of Full Proposal	7	September 29, 2019	October 5, 2019
4	Chapter 1	7	October 5, 2019	October 11, 2019
5	Chapter 2	22	October 11, 2019	November 1, 2019
6	Chapter 3	20	November 1, 2019	November 20, 2019
7	Final Year Project 1 Report	6	November 20, 2019	November 25, 2019
8	Final Year Project 1 Symposium	2	December 17, 2019	December 18, 2019
9	Submission of Final Report (Softcopy)	25	December 18, 2019	January 11, 2020

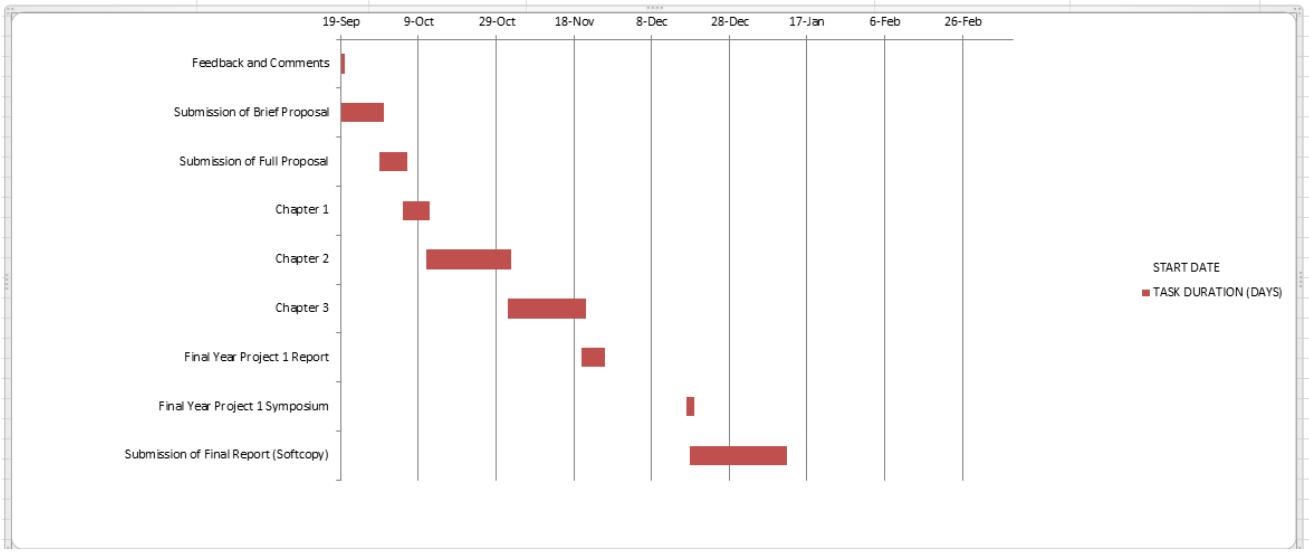

Figure 1.2 Project Schedule of Final Year Project & Gantt Chart Final Year Project 1