

Nihongo Hiragana Now (A Mobile Learning Application for Japanese Language Level 1 that translate Hiragana to Romaji and English)

Natasya Zulfitri Binti Sainuddin
Faculty of Computer Science & Information
Technology
University Malaysia of Sarawak (UNIMAS)
Kota Samarahan, Sarawak
56911@siswa.unimas.my

Jonathan anak Sidi
Faculty of Computer Science & Information
Technology
University Malaysia of Sarawak (UNIMAS)
Kota Samarahan, Sarawak
jonathan@unimas.my

***Abstract*— This report is about the development of mobile application for Japanese Language Level 1 in UNIMAS. The project aims to develop a mobile application for the students that currently take Japanese Language Level 1. This application provides an innovative approach for interactive learning environments by utilizing digital technologies among undergraduates' students which can help the them to gain an understanding in Japanese learning. By using this application, students can learn Japanese anytime, anywhere and even outside the class session. Nihongo Hiragana Now can enhance students learning skill as it provides quiz and audio for memorising, listening and pronouncing during the learning sessions. Even though the proposed application is simple, but surely will give a huge impact on those students who use this application. Before the development process of this application is conducted, the existing mobile applications that are related to this application are reviewed to gather the features and functionality that are suitable and practicable.**

Keywords-Japanese Language Level 1; android; mobile application; interactive

I. INTRODUCTION

This project is a Japanese Learning application for education that is capable of providing interactive and interesting learning to grab attention and higher possibility of understanding and enjoying the subject that being taught. Basically, the app is proposed to design an android mobile application for student to learn basic level of Japanese with the use of the multimedia such as images, text, and audio. The project targeting a college student who learnt Japanese Language in Level 1 to help them to learn basic level of Japanese language in Hiragana writing script. It contains some basic characters, vocabularies and pronunciations of Hiragana writing script that translate Hiragana into Romaji and English. This application also including the basic greetings in Japanese culture, basic phrases and core words in Hiragana writing system for level 1 Japanese Language.

OBJECTIVES

There are several objectives that needed to be achieved at the end of this project:

- 1) To develop simple mobile learning application of Basic Japanese Language for UNIMAS students who are taking Japanese Language Level 1 (PBJ0033) at UNIMAS.
- 2) To design and propose suitable mobile learning application for Japanese Language Level 1 using Hiragana writing system.
- 3) To help the students that learnt Japanese language Level 1 to understand better in Hiragana writing system for easier learning in Basic Japanese Language.

SCOPE

The project scope is focused on all student that learnt Japanese Language in Level 1 in UNIMAS. This application will assist the user in learning Japanese by translating Hiragana words into Romaji and English words. The application will consist of multimedia such as text, and audio. The proposed application will contain learning module and quiz module in Japanese Language Level 1 syllabus. The learning module is used to present the course materials for the students to learn and understand the Japanese language while the quiz module will allow students to evaluate and test their understanding about the lesson learn in learning module. However, there is limitation to the application such as the application only can work online. The target user for the project are the student of UNIMAS who are taking Japanese Language for Level 1 and must be user of an Android-based devices.

LITERATURE REVIEW

This part describes a literature review done on learning application for Japanese Language Level 1 that translate Hiragana to Romaji and English. There is existing mobile application to translate Hiragana to Romaji that are most similarly

to the proposed application that will be reviewed together in this chapter.

In this chapter, there are detailed review of the existing mobile application, detail on the research background, extensive description of the existing mobile application, competitive analysis which is comparing the application to be develop with the available application presented in tabular form, the features that is going to be implemented into the mobile application and chapter synopsis.

RELATED WORKS

A. Simple Hiragana (Manamu, 2018)

Simple Hiragana is a Japanese learning application through mnemonic images and flashcards developed by Manamu. This learning application is targeted on beginner learners to memorize the character of hiragana in super easy and quick way. The application points out similar characteristics for user to learn on how to distinguish the characteristics.

There are three lesson parts in this learning application which are Test, Draw and Overview. The Overview is an introductory lesson that tells learners what the lessons is about. In overview also learner can see the whole chart of the standard Hiragana characters. Draw pages show the breakdown of each character in Hiragana for learner to practice drawing each of the character that shown. The Test pages are shown a character to test the learner from what they already overview and practice draw from the previous pages. In this page also a hint is provided about the sign information, and a suggestion on how user can remember it through the picture.

B. Learn Japanese-Hiragana-Romaji (Movilfin,2018)

Another example would be Learn Japanese-Hiragana-Romaji. It is a mobile application game memory developed by Movilfin for learners to memorize Hiragana alphabets. This game application is targeted on student that know the basic character of Hiragana and want to enhance their knowledge through the game. Figure 2.5 shows that there are four main features in this application which are list of games' levels, the content of each level, Hiragana characters questions and list of answer in each level.

Learn feature in this game provides all the character of Hiragana the translation in Romaji. It is differentiating the lesson from Hiragana into Romaji and organized based on the sequence of the Hiragana characters for user to choose the level. It helps the students to recognize the alphabets. In questions feature, an object is displayed using random bubble sizes that contain each of the Hiragana characters in it. Moreover, in the answer list feature, a character is displayed, and user need to choose the correct answer regarding the character that displayed. User must answer the question from the list of answer given that provided in each question.

This game application does not provide any images or animation. Besides, the application does not provide enough content as it is only covering Hiragana character from A to N. There is no instruction provided to guide the user to play the game in each lesson level. There is only next and previous button for user to navigate the courseware. However, there is a nice colour tone and high contrast level between the graphic and background in this game application.

C. Learn Japanese: Phrases, Vocab & Hiragana (AndroldJ19,2019)

Learn Japanese application is another Japanese learning application developed by AndroldJ19 that provide

reference and quick access to commonly used vocab and phrases in Romaji. This application contains some basic phrases in Japanese and also list of hiragana characters. The core function of this application is to provide reference and quick access to commonly used Japanese vocabulary and phrases displayed in Romaji. The application does provide an English to Japanese translation feature based off Google's Cloud Translate API. The purpose of this application is to provide a simple method of translation and too complex. This application contains three lesson part which are Phrases, Favorites and Hiragana. The first part of the application is Phrases part. In this part, a corresponding GIF image visual of stroke order patterns are used and need user to long press character tile to view.

The second part is the Favorite page. This part is the home screen widget to enable user to have quick access to the English and Japanese Translate function. The last part contains all list of Hiragana characters and the translation in Romaji.

TOOLS USED

A. Android Studio

Android Studio is the official integrated development environment (IDE) that will be used to develop the proposed mobile application which runs on Android platform. It supports Java which will be the programming language used for coding. Android Studio uses a Gradle-based build system, emulator and code templates. (Rouse, Walter, Rouse, M, & Rouse, n.d.).

RAPID APPLICATION DEVELOPMENT (RAD)

For this mobile application development, the model is based on Rapid Application Development model (RAD). Rapid application development is a method of software development which heavily

emphasizes rapid prototyping and iterative delivery.

This methodology is believed to promote better user participation during the application development so the end user is close to user need. The user feedback received through frequent iterations and prototype releases will benefit by giving evaluation and solutions to real life solutions. By using a rapid application development method, the deficiency and weakness inside the application software can be identify earlier as every model is tested separately to identify and adapt the components quickly so that major problems with the prototype can be avoid.

Table 1: The phases and activities of RAD for the proposed application

Rapid Application Development (RAD) model comprise of four main phases, which are planning requirements, user design, rapid construction and lastly, cutover. The main process for this model is user design, which is the prototype development. The requirement is gathered through series of research, survey and interview and the user feedback will be analysed to develop the prototype. Users' suggestion will be used to improve the prototype and the process is repeated as often as necessary until the final design confirmed.

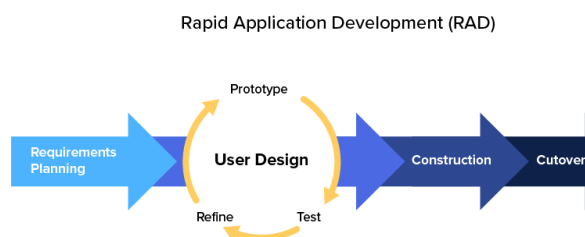


Figure 1: RAD process

REQUIREMENT ANALYSIS

The section is to identify is to identify user requirement and specification of the application. The information collected are analysed completely before system design takes place. The requirements that will be discussed are user requirements, system requirements, hardware requirements and software requirement.

Phases		Activities
Planning Requirements		a) Analyse problem statement b) Determine objective c) Define functional requirement
User Design	Prototype	Logical Design <ul style="list-style-type: none"> • Context Diagram • Dataflow Diagram (Level 0) • Dataflow Diagram (Level 1) • Entity Relationship (ER) Diagram
	Refine	a) Demo the prototype b) Collecting feedback from user c) Change the prototype based on the collected feedback. d) Rebuild a new version of prototype
Construction		a) The implementation of the proposed project b) Perform overall testing on the final development
Cutover		a) Record the result of testing. b) Project documentation.

C. Workflow Design for Proposed Application

A. User Requirements

In this section, some information gathered before implementation are the need of user, function of the proposed application, workflow and working environment of the application has been collected. Existing systems has been selected as the source to stimulate the requirements of the proposed application as it provides an excellent source of detecting and revealing existing requirements. The existing mobile applications related to the proposed application has been review and observed to gather the user requirements.

The technique used in this project to determine user requirement is through questionnaire. The questionnaire is conducted online by using Google Form. A share-able link of the questionnaire is posted in WhatsApp groups. The feedback gathered from the respondents would further define the user requirements for the proposed system.

B. Data Collection

For each set of questionnaires, it has 10 questions and the questionnaire are distributed to 40 students to answer the questions. Through the questionnaire, the data can be collected and analyse. Furthermore, the questionnaire has prepared different question for the students such as their knowledge using mobile learning application to learn and future improvement for the proposed application.

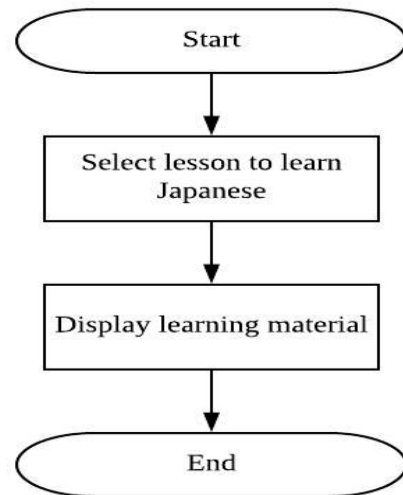


Figure 1: The flow diagram of Main Screen

In this proposed application, flowchart diagram is used to represent the process of Nihongo Hiragana Now application.

IMPLEMENTATION

In this part, the main focuses are on the implementation part where all the design and requirements that have been identify and stated from the previous chapter going to be implemented into one fully functional system or application. This chapter presents the implementation Nihongo Hiragana Now application which based on the design in Chapter 3. The outcome of the application is shown with a brief description.

Main page

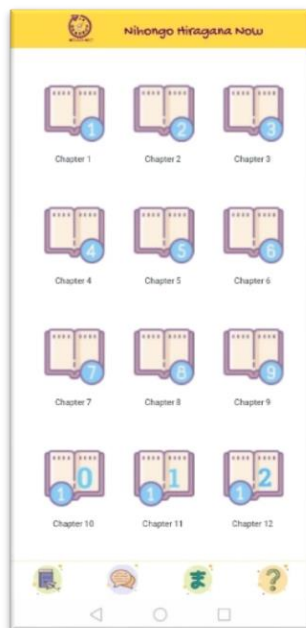


Figure 2: Main Page of Nihongo Hiragana Now

Figure 4.2 presents the main menu page of Nihongo Hiragana Now application. There are twelve chapters that provided including four extra learning pages at the bottom tab bar in the main menu page. Each chapter contain a topic in Japanese Language Level 1 syllabus including the translation of Hiragana to Romaji and English. The four extra learning activities at the bottom tab bar which are “Exchange Greetings”, “Basic Expressions”, “Hiragana Characters” and “Quiz Section”. Student can click any section in the main menu page to enable them to proceed to the desired page.

Chapter Content page



Figure 3: Display the page of Chapter 3 and 8

Figure 4.3 shows the example content of the chapter for learning module in Chapter 2 and Chapter 5. For each chapter, there will be a topic that display after user clicked on the chapter button from the main menu page. For example, the figure above display topic for “Hobby” which contain in the Chapter 5. When user click on the “Hobby” button, they will be directed to a next page to learn about the topic given. In the topic lists page, they can learn the words that written in Hiragana and the translation in Romaji and English. Each button from the lists will provide an audio in Japanese to enable the user to learn to pronounce the words. User also can choose any words they want by clicking on the words that displayed as some transition which is up to down or down to up style has. been applied in the topic list section.

Figure 4.3 shows the Essay section part that contain in Chapter 12 page. There are four mains topics that cover all the lessons from

the chapter given. The topics in this page are “My Family”, “My Lunch”, “My Activity/ Routine”, and “My Hobby”. These topics are the simple essays example that contain in the learning module of Japanese Language Level 1. User will enable to view the essay sample and the translation in Romaji and English. The essay will combine the words and phrases from the previous chapter provided.

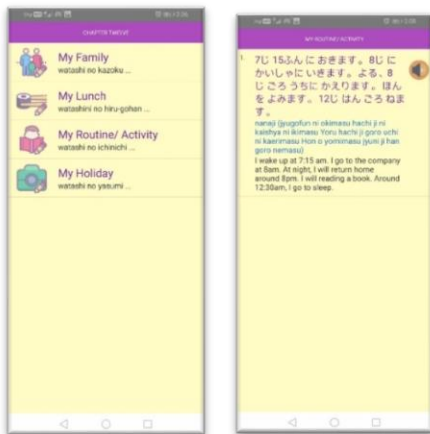


Figure 4: Display essay page

Quiz Page

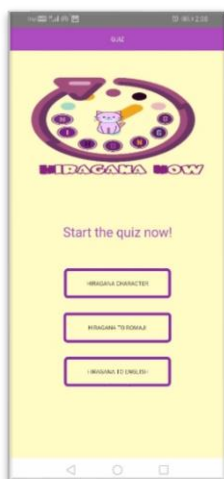


Figure 5: Display Quiz Page

Figure above shows the list of quiz in Quiz page. As mention from the figure 4.5, there are three types of quizzes provided which are “Hiragana Characters”, “Hiragana to

Romaji”, and Hiragana to English”. User can test their memory through this quiz after reviewing all the chapters provided. This quiz can help the user to practise the learning module anytime and how many times they want. The user is given freedom to choose any of the quiz option they want to test.

User Testing Requirement	Results (Yes/No)
Learn Japanese Language using Hiragana in application	Yes
Manage design of learning module	Yes
Categorized design for learning module	Yes
Manage the type of translation in learning content	Yes
Provides interaction with Hiragana characters for student to pronounce correctly	Yes
Provides different type of quizzes to improve learning	Yes

Figure 6: Display the requirement for user testing

TESTING

This part describes the fundamental requirement user testing and system testing which consists of the functionality testing and usability testing. The main purpose of testing is to improve the quality of the proposed system and to find out the reasons which could affect the performance and the accuracy of the application. In this section, the requirement for user testing and system testing are carried out and a further discussion of the results are explained in the section below.

User Testing

A test of the basic requirement had been done by developers to ensure if the proposed application is performed as designed and fulfilled users and examiner's basic requirements.

Functionality Testing

Functionality testing is carried out to make sure that all the functions in the proposed application are working properly and developed based on the functional requirements in requirement analysis and design.

Questionnaire for User Evaluation

In this project, a questionnaire has been spread out through online to the targeted users to give some feedback for the proposed application. The questionnaire consists of the workflow of the application and some related important questions regarding the user interface design.

Result of Questionnaire

The following are the evaluations made which show the result collected from the 15 respondents. Below is the data collected from the questionnaire.

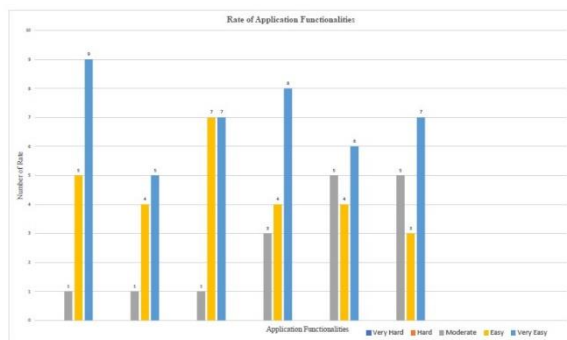


Figure 7: Summary of the ease use of application functionalities

Figure 4.8 shows the result of six questions in rating the ease use of application functionalities of the proposed application. According to Figure 4.8, most of the users think it is very easy to learn the topics through the chapters that provided in the application. Besides, some of the respondents are able to learn the Hiragana to Romaji and English. There are 7 of 15 respondents find that it is very easy for them to learn the Hiragana through the audio as they can try pronouncing the word correctly. Some of the respondents also having trouble to pronounce the phrase in the basic greetings section because some of the words are hard to pronounce. It shows that most of the respondents are able to answer the quiz easily and improve their learning as they try to memorize the word or character in the lesson page before answering the quiz section. Therefore, all the functionalities in this application such as learning section and quiz section has meet the user requirement.

Rate of Consistency of User Interface Design

Number of Students

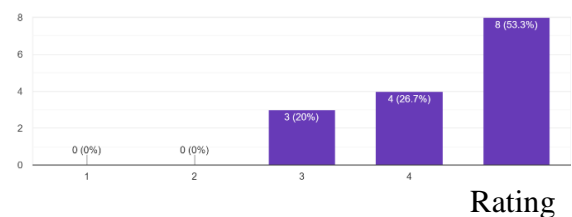


Figure 8: Rate of Consistency of User

Figure 4.9 shows the result of the rate of consistency of user interface design in the application. There are 53.3% of students find that the user interface design of Nihongo Hiragana Now is consistent in every section. Some of the students also give good rating on the consistency for the design of user interface.

Rate of Functionality of Each Learning Module

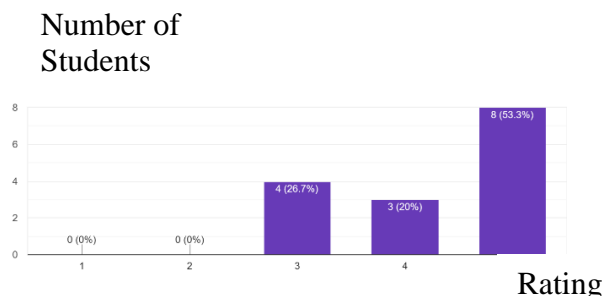


Figure 9: Rate of Functionality of Each Learning Module

From the Figure 4.11, more than half of the respondents rate the functionality for each learning section is excellent. The reason is the proposed application contents the learning unit in Japanese Language Level 1's courses and easy for them for understanding as the content is simplified from the book. There are 20% of them think the functionality of the application is good and the other respondents give a moderate rating. This is because the respondents want more contents from learning unit in textbook in this application.

Application Benefit in Learning Process

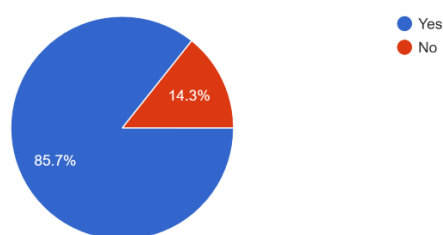


Figure 10: Application Benefit in Learning Process

Figure 4.12 shows that there were 87.7% respondents find that the Nihongo Hiragana Now application is benefit to the users for their learning purpose whereas only 14.3%

respondents think the proposed application does not give benefit to the users for learning. The of the respondents have given some suggestion for the future improvement of the application so it will be more beneficial in learning process.

CONCLUSION AND FUTURE WORK

This part presents a review of the requirement specifications from Chapter 1 to evaluate whether the proposed application fulfils the requirement. In this chapter also the achievements of the project with objectives will be concluded. For better enhancement, project limitations and suggestions for future works are proposed.

OBJECTIVES ACHIEVEMENTS

All of the objectives for the proposed application have been achieved successfully throughout the development process in this project. Table below show the summary of the three main objectives for the project.

Objectives	Achievements
To develop simple mobile learning application of Basic Japanese Language for UNIMAS students who are taking Japanese Language Level 1 (PBJ0033) at UNIMAS.	Achieved by allowing students to use Nihongo Hiragana Now application for their learning purpose.
To design and propose suitable mobile learning application for Japanese Language Level 1 using Hiragana writing system.	Achieved by allowing students to learn Hiragana writing system through the translation in Romaji and English.
To help the students that learnt Japanese language	Achieved by allowing

Level 1 to understand better in the Hiragana writing system for easier learning in Basic Japanese Language.	students to learn through chapters provided and improve their learning through the quiz.
---	--

Table 1: Display the Objectives & Achievement

CONCLUSION

In this paper, the overview of the proposed application has been described. This project proposed a mobile learning application for UNIMAS student that taking course PBJ0033 Japanese Language Level 1. An overview for the project including the objectives, problem statement and project methodology are present through this paper. For instance, some of the existing application have been analysed to guide the proposed project. To sum up, the process of development of Nihongo Hiragana Now from a proposed application into a real prototype had successfully being transformed. Besides, Nihongo Hiragana Now app have achieved all the intended objectives that list in previous section. In order to improve this application and make it successfully used, all the limitation and future works has been highlighted and recognized.

ACKNOWLEDGEMENT

I would like to take this opportunity to extend my gratitude and appreciation towards my supervisor, Mr Jonathan Sidi for his invaluable guidance, useful suggestion and motivation throughout the Final Year Project. Besides, I would like to express my grateful thanks to my examiner, Madam Amelia Jati Anak Robert Jupit who provide constructive comments and feedbacks regarding my Final Year Project. I would also like to sincerely thank the respondents that are willing to spare their

time to provide their feedback and contributed to this project. And of course, nothing could have come true without the support of my family and friends for their constant external support.

REFERENCES

- [1] Aisyah, A., & Krishnasamy, P. K. N. (2015, June 18). Knowledge transfer via Japanese language: Mechanism for innovations. Retrieved from <https://ukm.pure.elsevier.com/en/publications/knowledge-transfer-via-japanese-language-mechanism-for-innovation>.
- [2] Firebase. (2019, November 27). Retrieved from <https://en.wikipedia.org/wiki/Firebase>.
- [3] Heil, C. R., Wu, J. S., Lee, J. J., & Schmidt, T. (n.d.). A Review of Mobile Language Learning Applications: Trends, Challenges, and Opportunities. Retrieved from <https://polipapers.upv.es/index.php/eurocal/article/view/6402/7213>.
- [4] Introduction to XML. (n.d.). Retrieved from https://www.w3schools.com/xml/xml_whatis.asp.
- [5] Powell-Morse, A. (2017, November 2). What Is Rapid Application Development (RAD) and How Do You Use It? Retrieved from [https://airbrake.io/blog/sdlc/rapid-application-development#targetText=Rapid application development \(RAD\) describes, planning and sequential design practices](https://airbrake.io/blog/sdlc/rapid-application-development#targetText=Rapid%20application%20development%20(RAD)%20describes,planning%20and%20sequential%20design%20practices).
- [6] Rouse, M., Walter, D., Rouse, M., & Rouse, M. (n.d.). What is Android Studio? - Definition from WhatIs.com. Retrieved from <https://searchmobilecomputing.techtarget.com/definition/Android-Studio>