

Mobile Application for Learning and Memorizing Japanese Characters using Game-Based Learning

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ABSTRACT

The Japanese language has three writing system which are Hiragana, Katakana, and Kanji. To help with the pronunciation of Hiragana and Katakana characters, they include special accented characters known as '*Dakuten*' and '*Handakuten*'. However, most students have difficulties in remembering and recognizing Hiragana and Katakana characters and how these characters can be pronounced. Therefore, a game was developed to help students in memorizing, recognizing the different symbols of Hiragana and Katakana character, and increase a better understanding of them. This project uses the ADDIE model as a framework in Methodology because the model is commonly used in educational and instructional design development. The game involves two types, the first one is Memory Song Game and the second one is Match Puzzle Game. The game's theme is 'Pirate' where the player needs to find the character that matches the puzzle space while memorizing the characters through Game-Based Learning principle. Thirteen students in UiTM Jasin Melaka who are learning the Japanese language and who are also planning to take Japanese as a third language are involved to test the usability of the game. The majority of the respondents are satisfied the game is beneficial and good in the enhancement of learning in the Japanese language. It was discovered that they enjoyed the challenging part of the game. In conclusion, this project has successfully achieved all three objectives that have been identified at the beginning of the process.

KEYWORDS: Japanese Characters, Hiragana, Katakana, Game-Based Learning, Memorizing

1 INTRODUCTION

The Japanese language is one of the third languages that are available for UiTM Jasin students. For the student to understand Japanese or further their studies in the Japanese language, students are required to fulfil the prerequisite requirement which is to master Hiragana and Katakana characters [1]. To help with the pronunciation of Kana characters, they include special accented characters known as 'Dakuten' and 'Handakuten'.

However, it has become a concern when students have a problem remembering and recognizing Hiragana and Katakana characters and how these characters can be pronounced.

Aside from that, students have a lack of interest in learning through the traditional method in the classroom as it causes restrictions in dynamic communication [2]. Therefore, a game-based approach is implemented in this project as it can improve student motivation, engagement, and activity [3]. Other than giving motivation to students, it also helps them to pay attention and stay focused for a long time [4]. On top of that, the game activities involve how to solve problems and challenges that bring users with a sense of achievement [5]. The game developed is then integrated into a mobile application using the Android platform.

2 OBJECTIVES

There are three objectives to overcome the problems that have been identified in this project.

- 1) To design an application for learning Hiragana and Katakana characters with pronunciation.
- 2) To develop the designed game using Game-Based Learning.
- 3) To test the usability of the game.

3 SIGNIFICANCE

It is an interactive game system that provided a better guide compared to the textbook although it still implements traditional methods. User can allocate their own time and have a fun learning environment.

4 METHODOLOGY

This system implements the ADDIE model as a framework that was embedded with 5 main phases which are analysis, design, development, implementation, and evaluation as shown in “Fig. 1” [6]. This model is commonly used in educational and instructional design development with clearly defined steps to conduct instruction effectively. It also imposes a cyclical process that is sufficiently flexible to allow anyone to revisit and refine a step at any time [7]. It eventually helps to deliver the course smoothly and efficiently [8].

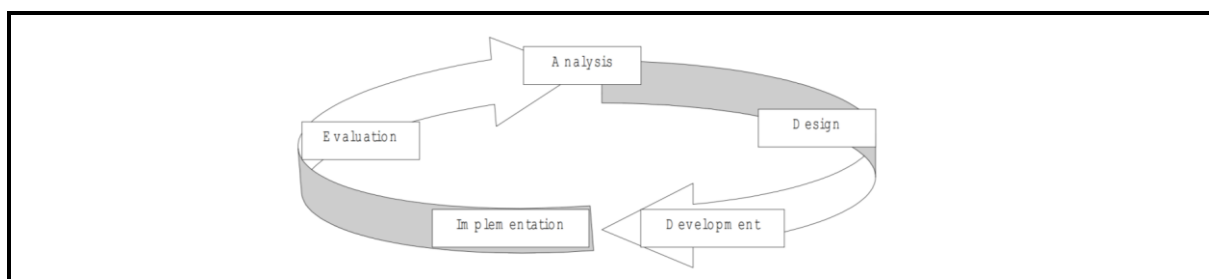


Fig. 1 The ADDIE Framework
(Source: Peterson, 2003)

5 RESULTS

The application system is divided into two types of game namely “Memory Song Game” and “Match Puzzle Game”. Both consisting of Hiragana and Katakana characters. In "Memory Song Game", the user needs to drag and drop the card that matches with space according to the respective rows. It has three levels which are easy, medium, and hard based on the number of hints given and the timer score deducted for each different level. Each level is then separated

into five parts to include all the 46 characters in Hiragana and Katakana. The final score will be displayed after the user has completed the game. “Fig. 2” shows the screen capture of Medium Level Hiragana and Medium Level Katakana respectively.



Fig. 2 Medium Level Hiragana Screen Capture (Left side) & Medium Level Katakana Screen Capture (Right side)

Meanwhile, in “Match Puzzle Game” it uses the concept of Drag and Drop game as shown in “Fig. 3”. The game will help users in understanding of ‘Dakuten’ and ‘Handakuten’ learning in Japanese. Video teaching is provided to show how to change the pronunciation from a basic Hiragana and Katakana characters. The player needs to put the puzzle in the right space so they can get the right changing characters.

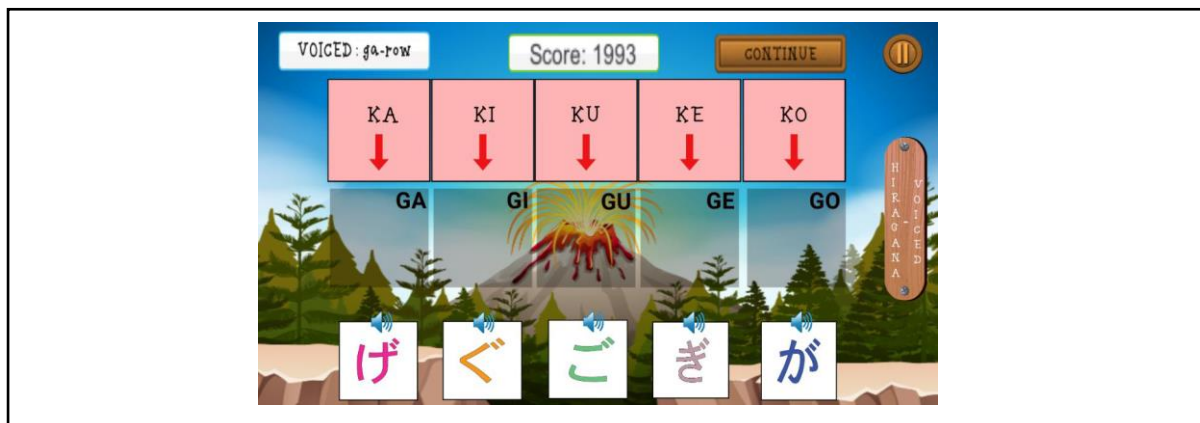


Fig. 3 Match Puzzle Game Interface

Usability testing is conducted to evaluate the usability of the developed game. In this testing process, users' facial expression is used as a technique to evaluate the system ease of use. This technique has been mentioned by three sources [9], [10], [11] that users' facial expression when playing the game is mapped with identified expressions.

Based on the findings result as illustrated in Fig. 4, it can be concluded that most criteria have received positive feedback from the learnability/content aspect. Most of the respondents voted agree and strongly agree despite some of them voted for neutral and disagree. This shows the designed application is helpful and has delivered good content through the game.

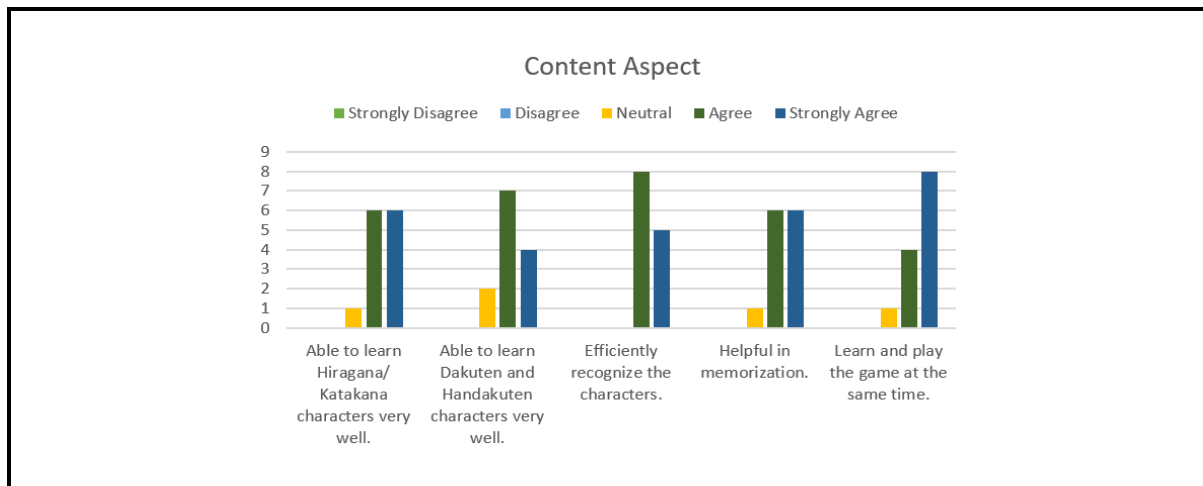


Fig. 4 Aspect of Learnability/ Content

6 CONCLUSIONS

The game has been evaluated through usability testing. Usability testing has been done through observation and questionnaire. Based on the evaluation, the test resulted that the total percentage of overall mean from usability testing is positive results with a score 85.6 % where the students are satisfied with the game designed and the game is beneficial to use for next time. As a conclusion, the three objectives that were first identified in this project is to design an application for learning Hiragana and Katakana characters with pronunciation using Game-Based Learning. Therefore, it is concluded that all three objectives have been successfully achieved.

REFERENCES

- [1] T. Takamizu, M. Shioi, and P. Lutes, "Overcoming Preconceptions of the Difficulties in Learning the Japanese Language for Science Majors," *Journal of Kagawa University International Office*, vol. 5. pp. 26–104, 2014.
- [2] N. Bano, F. Arshad, S. Khan, and C. Safdar, "Case Based Learning and Traditional Teaching Strategies: Where Lies the Future?," *Pakistan Armed Forces Med. J.*, vol. 65, no. 1, pp. 118–124, 2015.
- [3] A. Pho and A. Dinscore, "Game-Based Learning Overview and Definition," *Tips Trends Instr. Technol. Commitee*, no. Spring 2015, pp. 1–5, 2015.
- [4] M. Savari, M. N. Bin Ayub, A. W. Bin Abdul Wahab, and N. F. M. Noor, "Natural interaction of game-based learning for elasticity," *Malaysian J. Comput. Sci.*, vol. 29, no. 4, pp. 314–327, 2016.
- [5] M. Qian and K. R. Clark, "Game-based Learning and 21st century skills: A review of recent research," *Comput. Human Behav.*, vol. 63, pp. 50–58, 2016.
- [6] C. Peterson, "Bringing ADDIE to Life: Instructional Design at Its Best," *J. Educ. Multimed. Hypermedia*, vol. 12, no. 3, pp. 227–241, 2003.
- [7] A. L. Davis, "Using Instructional Design Principles to Develop Effective Information Literacy Instruction: The ADDIE Model," *Coll. Res. Libr. News*, pp. 1–3, 2013.
- [8] K. Shelton and G. Saltsman, *Applying the ADDIE Model to Online Instruction*. 2011.
- [9] M. Nasrul and A. Chowanda, "Navigation Key Using Face Expression in Endless Game," *Procedia Comput. Sci.*, vol. 00, pp. 1–8, 2018.
- [10] M. T. Akbar, M. N. Ilmi, I. V. Rumayar, J. Moniaga, T. K. Chen, and A. Chowanda, "Enhancing Game Experience with Facial Expression Recognition as Dynamic Balancing," *Procedia Comput. Sci.*, vol. 157, pp. 388–395, 2019.
- [11] P. M. Blom et al., "Towards Personalised Gaming via Facial Expression Recognition," *Proc. Tenth Annu. AAAI Conf.*, pp. 30–36, 2014.