Application of Learning Material with a Gamification Model Approach as an Innovation in Learning Japanese Kanji Letters

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Abstract. Language is a tool for interaction in the form of sounds that come out of the mouth. Unlike Indonesian which uses the alphabet, Japanese has three types of letters, namely: hiragana, katakana, and kanji. Because of the letters in Japanese kanji very numerous and different from what people who live in are used to seeing outside Japan every day, not to mention the differences in how to read onyomi & kunyomi. Some people have difficulty memorizing and reading all the kanji letters Japan, as happened at SMA Sejahtera 1 Depok. Therefore, it is necessary more effective and interesting learning method solutions. educational games can be used an interesting learning medium because it combines learning with play. The design of this educational game uses the Game Development Life Cycle method (GDLC). This research uses a mix-method approach that combines qualitative and quantitative approaches. The results of this research are educational games for Android and computer platforms. The results of beta testing pretest posttest showed an increase in the average score of respondents was from 6.9 in the pretest to 8.8 in the posttest.

Keywords: Educational Games, Japanese Letters, Japanese Kanji.

1 Introduction

In contrast to Indonesian which uses the alphabet as its letters, Japanese has three types of letters, namely: hiragana, katakana and kanji. Because the number of letters in Japanese is large and different from what people who live outside of Japan see every day, there are also differences in how to read. Difficulties in learning kanji are not only experienced by Indonesians, but Japanese people also experience difficulties in learning kanji [1] As happened with the students at Sejahtera 1 Depok High School, some students were confused because even though it was still one kanji letter, there were differences in how to read it.

Previous research study [2] the effectiveness of teaching and learning material usage as perceived by Japanese language beginners. The study utilized teaching and learning materials such as stroke order practice, pictures, and activities to assist the learning process, which involves memorizing Hiragana, Katakana, and Kanji characters. The study recommends the use of teaching and learning materials and activities to enhance the learning process for beginners of the Japanese language. And in the other research

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[3] The results showed that students stated that learning kanji is important, more than students stated that the addition of learning media with e-learning with structured material was the right learning method. The problems that occur when learning kanji are that it is difficult to memorize kanji because it has many meanings, it is difficult to write kanji because there are many streaks, and boredom arises because the learning process is monotonous. Also, previous research [4] the impact of an online word recognition application on the reading skills of Italian Japanese learners. The application is designed to enhance learners' automatic word recognition abilities by incorporating principles of reaction time research and gamification. Japanese being a complex writing system that requires mastery of orthography and phonology, automatic word recognition is a crucial aspect of fluent reading. Reaction time research has demonstrated that the faster a person can recognize a word, the more fluent their reading becomes. This research focuses on the development of games as educational media to help learn how to read Japanese kanji letters which are adapted to the user segment of high school students.

2 Method

In this research, data is needed to support and continue the research process. The required data will be collected using two techniques [5], interview and questionnaire. The interview was conducted face-to-face with the extra-curricular Japanese language teacher at Sejahtera 1 Depok High School as a representative of the Japanese language teacher. The questionnaire was distributed to students at SMA Sejahtera 1 Depok via the WhatsApp group twice. The questionnaire was distributed twice for pre-test and post-test. Then the results of the two tests will be compared to determine the effectiveness of using educational games. Making the kanji educational game for SMA Sejahtera 1 Depok uses the GDLC (Game Development Life Cycle) method by Heather Chandler [6] which can be divided into four development stages, namely: Pre-Production, Production, Testing, and post-Production.

Pre-Production, at this stage, we determine what kind of game to make and what material will be included in the educational game. Production, at this stage, the creation of an educational kanji game begins, which includes collecting and creating assets (sound effects and 2D assets). then combined into one game using unity and given functions by writing code. Testing, at this stage, alpha testing was carried out by researchers, then beta testing was carried out on respondents, namely Japanese language teachers and students of SMA Sejahtera 1 Depok. post-Production, the final stage is creating documentation and archiving. Documentation is created by making a report and archiving is done by collecting all assets for further development.

3 Result and Discussion

The final stage is creating documentation and archiving. Documentation is created by making a thesis report and archiving is done by collecting all assets for further development.

3.1 Requirement Analysis

In this research, researchers created an open world game as a medium for educational Japanese Kanji letters using Unity. Educational games will be packaged in the form of 2D games filled with various kanji studied at high school level and quizzes with three levels of difficulty as a place for students to practice. In making educational games, researchers use the GDLC (Game Development Life Cycle) [7] method where the needs analysis stage is included in the pre-production stage. The analysis was obtained after conducting interviews with Japanese language teachers.

3.2 Application Design

The educational game that will be made is about kanji letters. In it there is a way to read kanji letters onyomi and kunyomi. Then, there will also be an explanation of what is meant by onyomi and kunyomi. Apart from that, there is also a sound on how to read the kanji one by one onyomi and kunyomi. Then an example of the use of the Kanji letter is also given in an example of a word in Kanji form, next to it is given how to read it, then the meaning in Indonesian. The kanji letters were chosen from the book Nihongo Kirakira which is a Japanese language subject book for grades 10 – 12 at SMA Sejahtera 1 Depok.

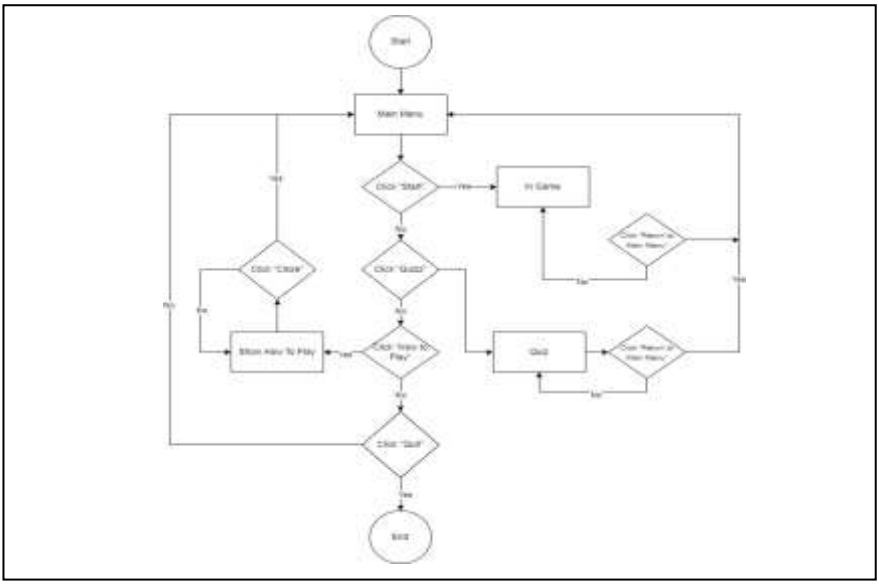
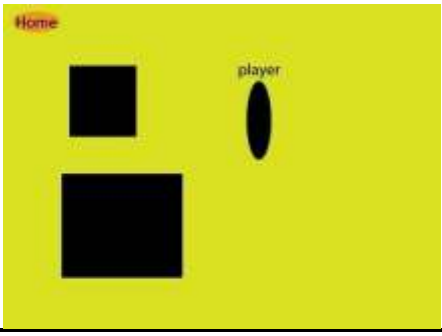


Fig. 1. Flowchart of application.

3.3 Application Storyboard

To make it easier to identify what assets are needed, below is a storyboard for the application as listed in Table 1.

Table 1. Application storyboard snapshot.

Scene	Display	Description
Main Menu		Display when the player first opens the application The “about us” button is not used Asset: start button, quiz button, way button play, exit button
In Game		Display after the player squeezes the player's "Start" button will move the scene to in game Asset: Return to main menu button, interaction button, material object, character player

3.4 Application Development

Based on the GDLC or Game Development Life Cycle stages [6], where in making this game it is used for learning or better known as game based learning [8] [9], this stage is the production stage. This stage includes the process of making the necessary parts which are then put together into one to produce an educational game. At this stage, several software are used, such as Adobe Illustrator to create 2D assets, Unity to put it together, then continue writing the code so that it becomes an educational game that can be played. Apart from the two-software used for production, there is also supporting software, namely Unity Dev ops Version Control, to make it easier to control game versions. In application development, after creating a storyboard as a reference, the next step is creating 2D assets, and the recording and editing process. Sound recording is carried out using Voice Recorder software from a computer. After the sound recording is complete, the recording results are then imported into Unity, then for recording the material will be placed according to the kanji, for sound effects the buttons will be placed on each button that is needed.

Code is written so that an object has a function and can be played with. Code writing was done in Unity using the C# programming language. The overall script display in Unity can be seen in Figure 2.

```
Unity Script (61 asset references) | 0 references
public class ButtonMateri : MonoBehaviour
{
    public AudioSource audioSource;
    public AudioClip audioClip;

    0 references
    public void PlayAudio()
    {
        audioSource.Stop();
        audioSource.PlayOneShot(audioClip);
    }
}
```

Fig. 2. Display of code.

3.5 Application Testing.

In this research, there were two testing stages, namely alpha testing and beta testing. Alpha testing is carried out by internal parties to test whether the functions in educational games function properly. Beta testing was carried out by external parties, namely Japanese language material experts and students of SMA Sejahtera 1 Depok to test the feasibility and benefits of the educational games in this research [10] [11].

Based on Alpha Testing data on buttons, sounds and objects in the game which have been carried out by internal parties: Overall, the educational game is functioning correctly, and you can continue to fill in the material and tutorials according to the space that has been prepared. Based on Beta Testing data by Japanese Language Experts to test feasibility and determine whether there are errors in terms of material in the educational games in this research. It can be said that how to play the educational game in this study is easy to understand, and the tutorial is useful to help understand [12] [13].

Based on Beta Testing data by Sejahtera 1 Depok High School students with a total of 30 respondents to test the feasibility and benefits of educational games in this research. It can be said that: 1) Of the 30 respondents, 25 student experienced an increase in their scores, 3 people experienced no change in their scores, and 2 people experienced a decrease in their scores between the pretest and posttest; 2) There was an increase in the respondent's lowest score from four on the pretest to six on the posttest; 3) There was an increase in the average score of respondents from the previous 6.9 in the pretest to 8.8 in the posttest; 4) Of the 30 respondents, 26 student chose electronic goods compared to books as the learning media they were interested in. It can be explained as follows: 15 people chose cellphones as the learning media they were interested in; then 11 people chose computers; Finally, four people chose the book.

4 Conclusion

The research on the development of an educational game aimed at facilitating the learning of Japanese kanji has yielded several noteworthy findings. Firstly, the study

led to the creation of an open-world game using Unity as a platform for immersive learning. Through Alpha Testing, it was determined that the educational game functions as intended. Furthermore, the Beta Testing phase demonstrated the game's effectiveness in aiding the memorization of kanji characters. This was evident in the observed improvement of average scores, which rose from 6.9 in the pretest to 8.8 in the posttest. Importantly, experts in Japanese language materials have endorsed the implementation of this educational game in Japanese language classes, emphasizing its relevance and applicability to language learning.

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