Use of *Mrs.Kanji* Web Application to Enhance Japanese Kanji Learning

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Abstract—This paper presents *Mrs kanji*, a web application for learning Japanese *kanji* characters developed by authors over the past one and a half years. This study aims to create and develop applications that are used for learning and memorizing *kanji* letters based on the website application, which contains 101 letters that have been grouped in a thematic form accompanied by illustrative picture learning models, *mnemonic* hints in English and Japanese, how to read meaning (Indonesian and English), examples of words, search features (*hiragana, romaji, kanji, and meaning*), glossary and exercises and three types of practice or quiz. The method used in this study is DBR (Design-Based Research) with a descriptive contextual model. The product outcome is problem-based learning so that the survey was first carried out with a non-test instrument in the form of a questionnaire taken randomly or random sampling twice with the first survey results participated by 52 respondents consisting of beginners and people who were proficient in Japanese with the aim to identifying the needs of users regarding the applications. The second survey was administered to 19 people consisting of users and experts who tested and evaluated the website-based applications. The results of the data analysis show that the application has fulfilled the aspects of effectiveness, validity, and practicality with the category of "Good". The available *kanji* is incomplete so it is recommended that further research can develop this application better.

Keywords: e-learning, illustrative picture, kanji, mnemonic hint, web application

I. INTRODUCTION

The advances in technology in recent years, the invention of the Internet and the advent of personal computers have been signaled as the reasons for the introduction of new technologies in today's classrooms (Luque-Agullo & Martos-Vallejo, 2015). The rapid change in the learning environment is the result of speedy developments in the information and communication technologies that have affected all areas of our life (Tayebinik & Puteh, 2012). For this reason, many educational institutions have begun looking for new teaching models to fulfill the following objectives: to meet their students' needs parallel to new technological introductions, to provide more effective learning activities and to promote the environment that motivates the students. Either in Primary, Secondary or Higher Education, digital learning becomes instruments with sophisticated practical functions. Based on questionnaire results (April 2019) that 40.4% of 52 respondents studied kanji through gadget such as cellphones or PCs. Books remain a guide in learning something but the weight of carrying books and thick dictionaries make gadgets the solution, there are many applications on IOS and Android to help learn Japanese but there are rarely models or methods in learning *Kanji* in the application.

Students with the first language (L1) background following the Roman alphabet systems find learning *kanji* complicated (see Matsumoto, 2013; Rose & Harbon, 2013; Shimizu & Green, 2002; Tamaoka, 2014; Tamaoka & Yamada, 2000; Toyoda & McNamara, 2011). Therefore, Japanese writing system consists of a combination of logographic letters, adopted from Chinese, and syllabic *kana* (Rasiban, 2019). kanji is the most difficult and complex letter to learn for learners with an alphabet background, because the typology of *kanji* and alphabetic is different (Bourke, 1996; Gamage, 2013; Rasiban, 2019; Toyoda, 1998; Watanabe & Toyoda, 1994).

Previous research in Rasiban (2017), suggested that the results of the research "Katakana memory hint in improving Katakana through Android applications" 70% showed the effectiveness of Android applications and improved *Kanji* mastery with mnemonic methods through multimedia that have been tested on 29 students gained 77.16% in the post-test, so it has been proven that mnemonic is suitable for application in learning Japanese, especially kanji. This study develops a website-based application with Illustrative picture and mnemonic hint models for learning Japanese, especially kanji as a medium to facilitate memorizing and memorizing kanji for alphabetic based students.

This research question is (1) what basic kanji in the Illustrative picture and mnemonic hint model will be used in the web application; (2) what features do students want to learn and memorize kanji through the application; (3) how is the kanji web-based application content for easy and fun learning with illustrative picture and mnemonic hint models through a web application as a media.

II. METHOD

A. Research Design

This research design uses the DBR (Design-Based Learning) method, which is a systematic education and instructional design in which the process includes the process of analysis, design, evaluation, and revision to achieve satisfactory results (Plomp 2007, in Clark 2013). So this

method is considered suitable for the research design for kanji material teaching materials that are grouped thematically. Therefore this study uses the DBR research method because it makes applications from the initial or zero stages to applications that are made through the stages that exist in the DBR, such as the design, validation, test revision until the final results.

B. Data Collection Techniques and Kanji Material in Mrs. Kanji Web Application

Data collection techniques in this study (1) identify basic starches that will be used as content in this application; (2) looking for illustrative pictures and mnemonic hints for 101 *kanji* letters taken from various sources such as the book "Kanji Look and Learn", to websites such as cn.fotolia.com and pinterest.ca .; (3) create and disseminate a questionnaire to find out what web applications are desired by respondents or learners online with Google Form; (4) looking for web applications for learning Japanese that already exist to be studied, studied and used as references for this research application; (5) design the application with images, then create animated characters using Adobe Photoshop CS6 and create a website logo using the online logo maker to make it look attractive.

Kanji in this Mrs. Kanji web application from various sources namely *kanji* list N5, N4, N3, N2, N1 from JLPT Resouces http://www.tanos.co.uk/jlpt/, basic kanji in the Japan Foundation's book *Nihongo Kanji Nyuumon* (2004) as many as 110 *Kanji,* and *Shokyuu Hyouki II* (Writing Basic Kanji II) books (The Department of Japanese Language Education FPBS UPI, 2015) amounted to 119 kanji, after which they were screened and grouped thematically with kanji criteria which can be illustrated and given a mnemonic so that kanji are collected. The list of thematically selected kanji is as seen in Figure 1.

白	黒	赤	青	頭	首	半	金	銀	毎
体	足	髪	歯	北	南	東	西	右	左
上	中	下	前	後	外	犬	馬	猫	魚
牛	鳥	虫	羊	虫	豚	円	週	年	曜
一	二	三	四	五	六	七	八	九	十
百	千	万	夜	時	今	早	晩	久	夏
春	秋	冬	日	月	火	水	木	金	土
山	川	天	雨	海	花	風	地	夜	暗
石	河	感	草	湖	光	米	菜	島	星
雪	竹	果	葉	林	森	夫	親	人	父
母	友	女	男	子	妹	兄	姉	弟	妻
耳	王	皇	帝	心	顔	目	口	手	肉
熱	冷	甘	汚	塩	辛	笑	泣く	怒	幸
悲	恥	痛							

Fig. 1. Kanji list in Mrs. Kanji Application

C. Mrs. Kanji Web Application

This application design based on the results of the analysis in the previous stage. The design to be made is the data structure, user interface, sequence diagrams, class diagrams and application module designs.

This research also uses software that is a tool to create media and develop it, as for the tools needed by researchers for making applications, namely: (1) Online Logo Maker, as a tool for making web application logos; (2) Adobe Photoshop CS6, as a tool for creating animated characters for web applications; (3) Hypertext Preprocessor (PHP), as a language for creating websites; (4) My Sructured Query Language (MySQL), to make data accessible in web applications or called databases; (5) Hypertext Markup Language (HTML), as a language for displaying information on web pages or commonly called tags; (6) Cascading Style Sheets (CSS), as a language for designers to make writing on web application pages more colorful; (7) Bootstrap, to create various tools and libraries so that the browser is easier in terms of usage; (8) Font Awesome, to create a variety of vector icons to beautify the page.

III. FINDINGS AND DISCUSSION

This study results using the illustrative picture and mnemonic hint models. In this study, two trials and revisions were carried out to achieve maximum results.

The following is the answer to the research question, (1) the *kanji* characters in the application are 101 in N5 and N4 grades which can be seen in Table 1 101 *kanji* list (see Fig. 1); (2) the features desired by respondents for this application have many requests, including all JLPT *kanji* grades from N5 to N1, there are *kakijun*, example words, pictures, games, kanji origins, history, *rikusho*, kanji recognizer, then easy to use, free, attractive appearance, can be disseminated and obtained from trusted sources; (3) It is not just a matter of application appearance but *kanji*, mnemonic and pictures are selected through a long selection and case studies so that the contents of the *kanji* learning application are very suitable to be used as teaching instruments, as well as independent and group learning because there are models designed to stimulate vision and memory in remembering so can more easily memorize and learn *kanji*.

A. Basic Kanji in the Illustrative Picture and Mnemonic Hint Model used in the Web Application

The illustrative picture model is actually called the picture and picture model. The picture and picture model is a learning strategy that uses pictures as a learning medium, Suprijono (in Huda 2014). In other words, this strategy is similar to non-example examples, which means that pictures are the main tool in the learning process. This research makes the name of the model "illustrative picture" because the image used will be related to the mnemonic, so the image will help the purpose of mnemonic.

This model is popular as a way of learning for various subjects in 2002. Aripin (2014) this model has innovative features, because it attracts learning interest, creative because every learning requires creative thinking in paying attention to pictures. This means that this model has an active, innovative,

creative and fun character. This study will only take a picture and picture model as an illustration that can train learners to see the *kanji* letters from another perspective with the aim that they can be understood and easily memorized by the learner, for example, is as follows in Figure 2.
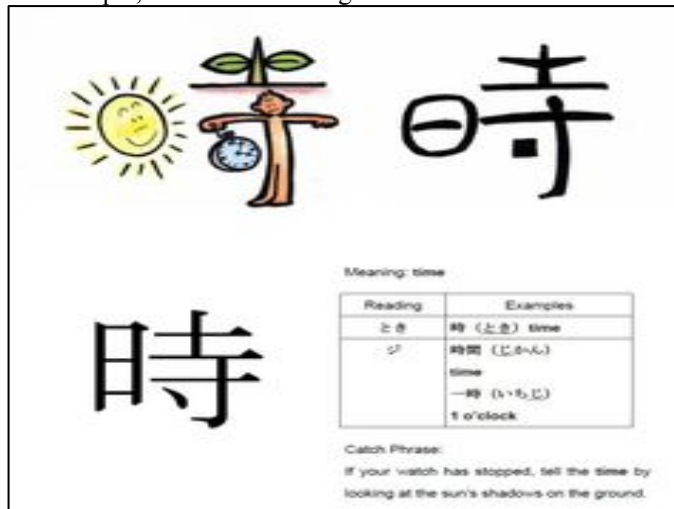

Fig. 2. Picture *Kanji* for *Kanji 'toki'* means *'time'*

And the mnemonic hint that was used came from the source of the book "*Kanji* Look and Learn" by Erri Banno, Yoko Ikeda, Kaori, etc in 2009. "*Kanji* Look and Learn" was used as a source, because the source was clearly used as teaching material and had been researched by concerned. Mnemonic is a technique to make it easier to remember something done by making a formula or phrase, connecting words, ideas and fantasies (Rasiban, 2013) and for example, is to explain the meaning of the color *'black'* described as "The rice field (田) was burned and the *soil* (土) turned black" then followed by an explanation in Figure 3.

Fig. 3. Mnemonic Hint for *Kanji 'kuro'* means *'black'*

For illustrative pictures sourced from several sites such as cn.fotolia.com and pinterest.ca, the selection of illustrative pictures follows the available mnemonic data, because mnemonic will affect the illustrative picture and vice versa so that between mnemonic data and illustrative picture must be compatible even if it comes from a different source. Illustrative pictures and mnemonics must be able to stimulate memory by seeing images and keywords.

This research is an early-stage study so that *Kanji* is limited to the number 101 with grades N5 and N4 for this following *kanji* List data along with how to read (*on-yomi* and *kun-yomi*) *hiragana* and *furigana*, grade (level) N4 and N5 only, thematic classification and meaning in language

Indonesian and English, illustrative pictures and mnemonic hints are 101.

B. Features used in Mrs. Kanji Web Application

The first stage is analyzing the problem and surveying user desires regarding the desired application design by spreading an online questionnaire through Google form in April 2019 and then getting responses from 52 people. After the response, the results of the questionnaire were analyzed to design the application design starting from the function up to the display made with the storyboard, making a diagram of the design of learning media, as well as making and selecting the components used to make the learning media developed. Components used include; backdrop, animation, application material design, and research instruments.

Furthermore, creating a web application media with some software that requires a fairly difficult programming language. Making this web application using some software such as PHP, MySQL, CSS, bootstrap, and awesome fonts. The next stage is the application development stage. The development phase is carried out by creating and searching for illustrative pictures for mnemonic hints and also *kanji*. Then create additional views such as characters and logos for the application to make it more attractive to users created with online logo makers and Adobe Photoshop CS6.

The next stage after the learning media has been made, the application must be accessible online by uploading the webserver application. After that, the learning media are validated by the material expert and the media expert. After being assessed by technology experts, media experts, teachers and users, web applications created and developed are classified as "Good" criteria with an average score (3.02) from users and (3.11) from experts, so that the learning media Web applications meet the validity aspect. Suggestions and input obtained from the validation results are used as a reference for improving this web application learning media. The suggestions and input were more technical matters from the web application, as explained in the evaluation of the application.

During the implementation phase random product tests were conducted, such as Japanese language students 2015, Pasundan 2 high school students, lecturers, Japanese language teachers, and technology media experts through virtual chat by sending an application link then testing it directly then giving scores, suggestions, and evaluations via Google questionnaire form that has been sent together with the link.

The evaluation phase is done by analyzing the research data in the form of assessments and suggestions from both users and experts. Based on the results of the study the average score of users reached 3.03 and 3.11 from experts belonging to the criteria of "Good". These results are viewed from the aspect of pleasure by 2.8, motivation by 2.7, easy of 3.5, and interest by 3.1 with good criteria in Figure 4.
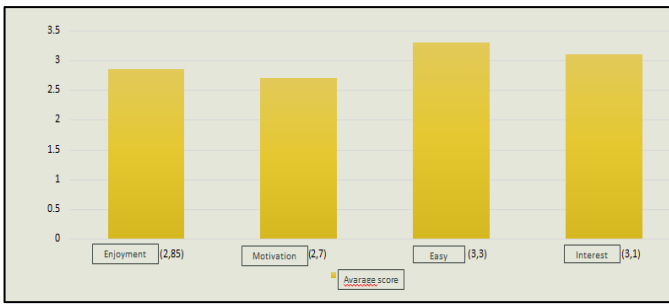
Fig. 4. Questionnaire Data Average Score

For the assessment results from experts, for the quality of the application material (in Figure 5) obtained a score of 3.2 in the good category, the quality of the contents and the purpose of the application obtained a score of 3.2 in the good category and finally the technical quality with a score of 2.7 in the good enough category.
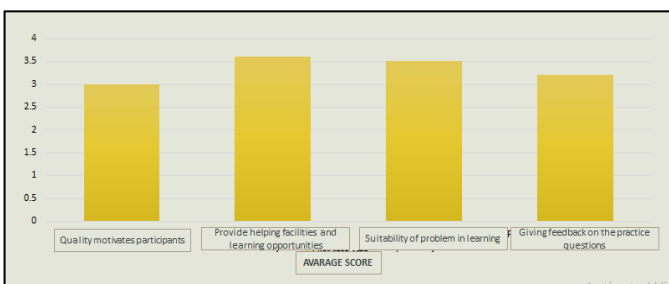

Fig. 5. Results of Quality Content and Application

So that for the technology itself is still needed development and revision but overall with a value of 3.03 and 3.11 in the good category.

C. Mrs. Kanji Web Application Content for Easy and Fun Learning with Illustrative Picture and Mnemonic Hint Models

The *kanji* application content illustrative picture and mnemonic hint models as media;

- Based on the research results of making this interactive media produce web-based applications for learning Japanese, especially *kanji*. These stages start from (1) the stage of data analysis, (2) the stage of making instructional media, (4) media validation and testing, and (5) the final stage of media.

- The validation of the quality of *kanji* learning media with an illustrative picture and mnemonic hints were assessed and tested by 6 people consisting of technology experts, media experts, and Japanese language teachers.

- Ratings from experts obtained a score of 3.11 in the "Good" category and ratings from users by 3.2 in the "Good" category as well so that the web application was categorized valid.

Based on the results of the assessment, the quality of this web application indicates learning media through a web application with the model "Illustrative Picture and Mnemonic

Hint" that has been made can help, facilitate, and attract the user's attention in learning Japanese, especially *kanji*.

According to a survey (April 2019) for Japanese language learners from high school level to postgraduate students, it can be concluded that difficulties for learners, especially beginners, that 48.1% of the 52 respondents randomly stated difficulties in memorization, the variety of *kanji* and the specificity of the writing are the *kanji* writing is an ideographic or ideogram. *Kanji* is a type of writing in the form of symbols or symbols that contain a meaning. *kanji* are ideographic letters, not phonetics, which means that each character represents concepts and ideas rather than sounds. Because of this there are many ways to memorize and learn a *kanji*. Rasiban (2013) in his research stated that mnemonic is a technique to make it easier to remember something done by making formulas or expressions or connecting words, ideas and fantasies or in other words mnemonic means a technique to focus memory in a certain way.

The link for the Japanese language learning Mrs. *Kanji* web application is http://mrs*Kanji*.000webhostapp.com/. The initial display starts with a welcoming character in Figure 6. All you have to do is click the sign-in button and, the user can log in and use this application.
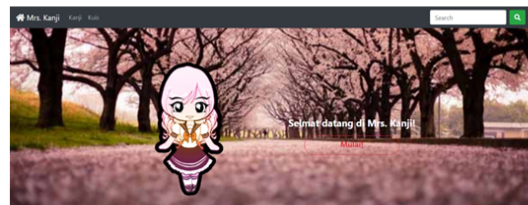

Fig. 6. Mrs. *Kanji* Web Application

The *kanji* content display, in Figure 7, contains several features such as word examples, illustrative pictures, mnemonic hints (in English and Japanese), how to read (*kun-yomi* and *on-yomi*), meanings of English, Japanese and Indonesian.
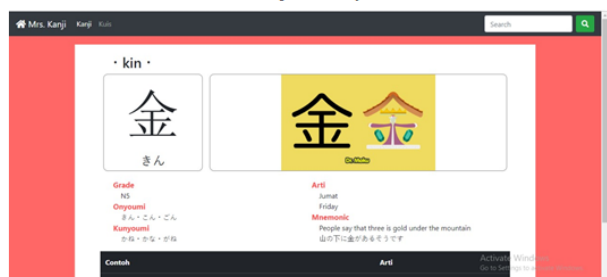

Fig. 7. The *Kanji* Content Display

The *kanji* that has been grouped thematically, like Figure 8 *Kanji* groups with color themes.

Fig. 8. *Kanji* groups with color themes

Display Quiz in this application is divided into several levels according to the difficulty. Level one is the easiest quiz, just clicking on the answer in the form of an image can fill the questions in the application, there is no time set for this quiz, so users are free to think and examine the questions and answers to be answered, following the display picture of the level quiz one in Figure 9.

Fig.. 9. Level 1 Quiz

And the second level Quiz in the form of answers that need to be filled in is the *Kanji*, it is more difficult one level to fill in the questions as in Figure 10.
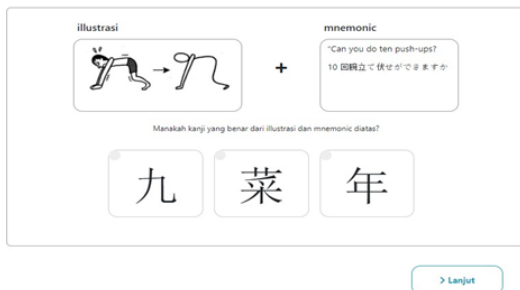

Fig. 10. Level 2 Quiz

For the level 3 quiz, it is more difficult, because the questions are in an essay state, and must be filled with correct *Kanji*, the following in Figure 11.
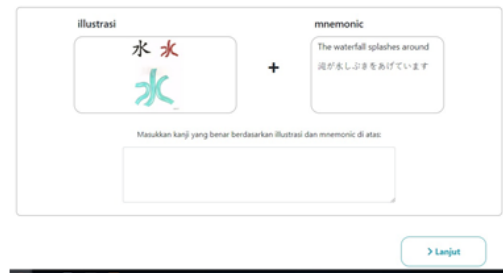

Fig. 11. Level 3 Quiz

Display Quiz in this application is divided into several levels according to the difficulty. Level one is the easiest quiz, just clicking on the answer in the form of an image can fill the questions in the application, there is no time set for this quiz, so users are free to think and examine the questions and answers to be answered, following the display picture of the level quiz one in Figure 12.

Fig. 12. Level 1 Quiz

And the second level Quiz in the form of answers that need to be filled in is the *Kanji,* it is more difficult one level to fill in the questions as in Figure 13.

Fig. 13. Level 2 Quiz

For the level 3 quiz, it is more difficult, because the questions are in an essay state, and must be filled with correct *Kanji*, the following in Figure 14.
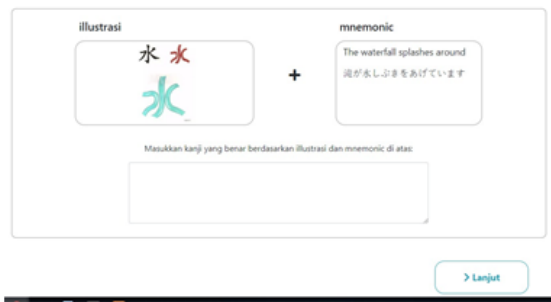

Fig 14. Level 3 Quiz

Based on the results of the assessment, the quality of this web application indicates learning media through a web application with the model "Illustrative Picture and Mnemonic Hint" that has been made can help, facilitate, and attract the user's attention in learning Japanese, especially *kanji.*

Then based on the results of the research that has been presented, resulting in an initial stage of research with a *kanji* limit of 101 with grades N5 and N4, it is hoped that subsequent studies can develop this study with a different grade with the *Kanji* example with illustrative picture and mnemonic hint models will be attached in the appendix.

IV. CONCLUSION

Kanji learning media with an illustrative picture and mnemonic hint models are made to help beginner and advanced learners in learning Japanese, especially *kanji* so that they can understand and memorize more easily even without the presence of a supervisor or teacher. Interactive learning media or web applications that have been made belong to the category very well. It can be seen from the validation that has been carried out by material and media expert lecturers as well as the opinions of respondents. This web application is made specifically for PCs or computers and laptops that can be accessed online. This web application can be used independently or in groups.

The weakness of this application is, it can only be accessed while online, categorized as if using a cellphone but cannot use the search and display features not arranged as on a PC. Then *kanji* is limited to 101 so it is not as complete as a large web application and there is no *kanji*'s writing way (*kakijun*). But in general, learners or users can use this web application to help in understanding and learning Japanese, especially *Kanji.* Specifically, the teacher or lecturer can use the web application to deliver Japanese material, especially *Kanji* to their students.

For further research, it is needed how to increase the order of this research and include features to add more complete material to support maximal web applications and from the media that have been produced, this research hopes that future researchers can develop or create new products for Japanese language learning media in the field of technology. better and wider.

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