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A Web-based Learning system for the Japanese Language [a.]Proficiency Test in Sri Lanka

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Abstract— *The Japanese Language Proficiency Test (JLPT) is a standardized exam that assesses non-native speakers' understanding of the language as well as their reading, writing, and listening skills. The majority of people in Sri Lanka take JLPT to obtain the required qualifications to study and work in Japan and improve their knowledge of the language. However, they have fewer requirements to gather the information and proceedings about JLPT. Due to its complexity and numerous letter patterns with varied meanings, the Japanese language is challenging to learn for Sri Lankans. The purpose of this research is to investigate the issues that occur to people when they are following JLPT. As primary data, this study mainly focuses on the survey that was conducted through social media platforms from the participants from those who have already completed JLPT. This used statistical methods which were quantitative and used published research studies related to the research area as secondary data which are qualitative. According to the survey results, the researcher identified the main problems that responders faced when they did the JLPT. To overcome these problems, this paper proposed a web-based Learning system with the Japanese bot as an assistant for those who are taking JLPT, and this describes the main functions that have to be included for this proposed system and how it could be helpful for the people who are doing this examination. As a future avenue, this system could be implemented as a multi-language system with the J-bot for the other language examinations in Sri Lanka.*

Keywords— **Web-based learning system, Japanese, Japanese Language Proficiency Test, Chatbot**

I. INTRODUCTION

In this turbulent world language acquisition is quite a challenging task, because different languages are widely used by many people to communicate with each other. The majority of people are learning Japanese, due to several reasons such as study, work, and residencies. The Japanese language has a variety of word patterns that make it incredibly intriguing. Japanese mainly consists of three different alphabets called Hiragana, Katakana, and Kanji. As the base of the Chinese Language, Kanji characters always have various possible definitions. These three concepts are essential for every person who is willing to learn and understand Japanese. The Japanese Language Proficiency Test (JLPT) is one of Sri Lanka's most challenging exams for students who are following the Japanese language. There are five levels in JLPT, starting from N5 to N1 (N5, N4, N3, N2, and N1). The N1 level is considered the most difficult and complex level, and the majority of people are unable to complete it due to its difficult grammar, vocabulary, listening, and different Kanji characters. All these test levels are administered simultaneously, often from 12 p.m. to 5 p.m. in Japan and other selected countries. Each level of the paper has three sections, they are Grammar, Vocabulary, and Listening. In these three sections, the content of each paper is different from each level, and the time slots of the papers are based according to each level. In Sri Lanka, this examination is provided only by the Japanese Language Education Association of Sri Lanka. Most of the students in Sri Lanka participate in this examination to improve their language knowledge and to get more scholarships for their higher studies.

A. Problem Statement

Learning a language will be more accessible to every student when having a supportive assistant. In Sri Lanka, it's hard to find a specific system to guide the people who are following the JLPT exams. Most of the students are searching for a proper place and educated people to obtain knowledge about this examination. Not only students but also other people are taking this exam to meet the requirements to visit Japan for their higher education or jobs or residencies. Since the Japanese people are not very proficient in English, there are more prospects for those who know Japanese. Japan does not accept anyone who did not take this exam from other countries (Yang, Gao, 2020). This test is very challenging for Sri Lankans, and this is held twice a year, on the 1st Sunday of July and December. Due to a lack of exam preparation skills, most Sri Lankans failed this exam. If they fail, they have to wait

around one year to do that level again. There are 100 kanji and 800 vocabulary words to learn for the N5 level. In comparison to the N5 level, other levels are more complex. For each level of the JLPT, there are various pass marks. People must score more than the minimum required to pass the test. They will only be successful if they perform well in the JLPT. Further, it is not possible to find learning methods and consultants or assistants in Sri Lanka to help people score more on this test. Moreover, most of the time students have to find Japanese classes to study this language from the beginning. As a result of a lack of self-studying or self-analysis, they occasionally failed to use proper grammar standards or were unable to write Japanese letters in the proper style. Consequently, students frequently have to take the JLPT multiple times to pass the same level, which raises the cost of the exam. The majority of people in Sri Lanka are unable to afford additional classes or multiple attempts at the same level of this exam due to the country's economic crisis and the fact that the exam fee changes every year. As another issue, most people are doing this examination while they're working. They are suffering considerably because they cannot find any classes or tutors who are willing to fit their schedules. However, many people need to train and guide themselves to score more on this examination.

B. Aim

The purpose of this research paper is to identify the problems faced by JLPT exam takers and to develop a Web-based learning system with a Japanese bot called "J-bot" as an assistant (An assistant is someone who guides you to achieve your primary target) for those taking the JLPT exams. Along with the technology, this system will be more useful for the ones who are doing these JLPT levels.

C. Research questions

Q1: What are the existing researches conducted to identify the Learning system for the Japanese Language?
Q2: How does the system and Japanese bot will be usable or practical for the users?
Q3: Does this kind of concept appeal to users?
Q4: Does this kind of system encourage individuals to study and do well on the JLPT exam?

D. Objectives

Based on the research questions bellowed research objectives were derived.

- To identify the problems, available systems, techniques, and unique features.
- To evaluate the users' ideas about existing systems problems and key issues.
- To identify the most suitable method to solve the identified problem based on the literature and the survey.

According to the research questions, this research describes the existing research papers that appear with the learning systems and their unique features. This will provide an analysis of how this system will be helpful to people who are learning Japanese. For that, this research includes a survey that was conducted through social media platforms like WhatsApp and Instagram for the ones who did the JLPT.

II. LITERATURE REVIEW

A recent study focused on investigating the effects of chatbots on user questions and directives on student participation (Daniel Bailey, Norah Almusharraf, 2021). It contrasts the various user outputs based on the user's inquiry as posed by the chatbot by using a conversational agent that guides students through their own storytelling process without being overly prescriptive. These chatbots asked questions in various age groups and categorized what they wanted. This can be applicable to the web-based learning systems' chatbot to know various age groups and the levels that they are going to do in JLPT.

Chinese Characters in a Web-Based Learning Environment examined how students perceived the character-learning techniques they use when enrolled in a Chinese online course to survey students' experiences taking the web-based course in Chinese characters and the effectiveness of teaching strategies and practices employed in the online environment with a focus on the following three frequently used strategies: orthographic and radical knowledge, visualization of characters, and rote learning. In web-based learning environments, learners believe that memorizing Chinese characters by rote is the most efficient method(Yang and Gao,2020). A significant portion of the study material includes visual representations of the strokes, the order of the strokes, the components, and the configuration patterns of some Chinese characters in picture and video form. These features can be applicable to the web-based learning system for the JLPT students by showing some videos of how to write the correct Japanese characters in the correct way.

A self-learning chatbot from user interactions and preferences, which has an assistant who is cognizant of the user's needs. Once at least five orders have been placed, the chatbot can comprehend the user's needs in the meantime, the server, which attempts to represent the user, gathers the needs and essential fundamental information (Thosani et al., 2020). The server uses natural language generation, to communicate parameters to the second agent and to question it about various aspects of pizza, such as its toppings and style. This can be introduced to the J bot by asking the user

for information on the dates of their tests and helps to maintain their daily schedule with studies. Moreover, Collaborative, and training of social bots in learning communities in which the students can develop, train, and use these bots that can be self-hosted virtual learning environments by relying on the OpenAPI requirements provided (Neumann, de Lange, Klamma, 2019). Deep learning technologies are used by these social bots to provide personalized feedback. According to the preliminary analysis of this research, end users can build social bots, but they still require some help. This system was given a brief introduction at the start. The task was divided into two parts: first, the bot had to assess the questions posted in the area, and then it had to alert the users in a designated conversational channel when a response to a question had been received. An excerpt of the API that contained the necessary attributes for the conversational integration was made available to the participants. This can be used for the proposed system's chatbot which can be trained to respond to specific events in predetermined ways.

Artificial Intelligence chatbot as a language learning medium that examines the wide chatbot varieties and the viability of using them as a tool for language acquisition (Haristiani, 2019). An AI chatbot can be used to help students practice their reading and writing skills. It can also provide a variety of grammatical structures and terminology and provide quick and helpful feedback on their spelling and grammar. When a user sends a message, the chatbot's fundamental workings start. Natural Language Processing (NLP) was used to process the message, and the chatbot responded by referencing the database that was already available. This study additionally looked at Gengobot, an author-developed chatbot-based Japanese language learning tool. As a result, Gengobot has a lot of potential as a tool for learning Japanese, particularly for grammar, but its technology and features still need to be improved. These features can be applicable to the system's chatbot by using feedback when the user has done these levels successfully. The assistant system's ultimate goal is to enable a student to perform a variety of tasks, including consulting exam questions from a repository and asking for recommendations about learning material (Fernando et al., 2016). It can also provide recommendations about course material and ask questions about a course. It demonstrated the student's exam questions that related to particular ideas in the subject they were learning. These questions were taken from previous exams that have been stored in the proper location. Likewise, the web-based system also can be implemented by giving a self-analysis about the users and their knowledge of Japanese and what level they can participate in and also can provide past exam questions for particular levels.

A leveraging chatbot to improve self-guided learning through conversational quizzes, which describe the creation of the @dawebot, the Telegram bot, which uses multiple-choice tests to instruct students in any subject (Pereira, 2016). Students can test their knowledge using this bot at any time and at any place. Therefore, bots can decide whether to send each student individualized IM messages, propose quizzes to each one, or warn the teacher about pupils who need extra help. These approaches are also applicable to the J-bot. The bot asks you a few questions or conducts a quiz after you finish each level. Further, this aids in keeping track of the person who responded to the questionnaire to learn about their grades and where they need to improve the most.

An automated reply to students' queries in an e-learning environment using a web bot. This aids in accelerating students' learning curves. That identified Pandora bots that are competent in conversational dialogue-based questions and responses (Farhan et al., 2012). When a query is asked as if it were to a human, and the response is provided in place of the pre-programmed text message, the web bot will automatically respond the next time a question of a similar nature is posed. This concept can be used in the J-bot such that users can ask questions about their circumstances, and the bot will assist further.

Web-based open environment for foreign language teaching was focused on the new web-based environment for foreign language education, teacher-student interaction, open educational resources, and evaluation systems. The absence of a real language environment might be compensated for by a web-based virtual language environment, which would also help students develop their oral English (Yang, 2011). This new open English teaching mode, built on the foundation of information technology, places equal emphasis on the process and the results. In terms of organizational structure, it combines traditional classrooms with online virtual classrooms, and in terms of learning styles, it compares in-person learning to learning over a network. An educational experience that is focused on the needs of the students encourages initiative learning. To foster an environment that is open to foreign language teaching, educators should completely open up the language information, teaching materials, teacher-student interaction, and a thorough evaluation system. For the proposed system for the JLPT, the users can learn by themselves with the assistance of the chatbot and the learning methods of Japanese grammar, vocabulary, and listening.

A supporting Q&A in a web-based Japanese language learning environment. This e-learning system for learning Japanese is suggested in this paper as a question-and-answer format. Students ask questions through the system, and teachers respond. In order to

reduce the burden on teachers, the system first determines whether the question has already been answered in the FAQ (Yuqin, Chengjiu, and Ogata, 2009). If it has, the system will then provide an automatic response. The student who asked the question will receive the teacher's response via email after it has been submitted by the teacher. Likewise, the website will open with the appropriate response. This system is based on Linux, Java is used as the programming language, MySQL is the database and Apache is used as the web server. For the proposed learning system these features can be added by using many more quizzes for each level and give them a self-analysis what their knowledge level and what are the things that they have to improve more before participating in the JLPT. Moreover, web-based English learning that offers some courses with online learning environments like chat rooms, class meetings over the internet, pen pal search engines, and similar tools are typically provided by courses (Sarica and Cavus, 2008). This system includes writing (grammar) activities, reading activities, and listening activities through the web. By using these features in the web-based learning system for the JLPT, Students can improve their reading, writing, listening, and pronunciation of Japanese through these kinds of activities, which they can hear on the system.

III. METHODOLOGY

This is an exploratory study to determine the issues faced by people who are doing JLPT exams in Sri Lanka and to develop a web-based learning system with a Japanese bot called "J bot" as an assistant for those taking the JLPT exams. Both the primary data and the secondary data were used in this study. The first objective of this research paper is to identify the problems, available systems, techniques, and unique features by using past research papers. To achieve this objective this research paper identified the basic problems that the people are facing while doing this examination and observed it. This used the secondary source that includes published research studies related to the area of the study in section II. It helped to identify the previous systems, available systems, and technologies that they have used when developing web-based learning systems and bots. It mentioned many unique features that have been used in learning systems regarding E-Learning, Artificial Intelligence, Natural Language Processing, and many more.

The second objective of this research paper is to use a survey to identify the users' ideas about existing systems problems and key issues. As the primary source, it includes a questionnaire that is designed for the ones who participated in the JLPT exams. The distribution of this survey among a specified sample of individuals using social media platforms like WhatsApp and Instagram is done using a Google form. The responses and the sample, which consisted of 68 participants out of 75 people overall who did JLPT, were compiled and statistically evaluated to provide the results. They mentioned so many problems that they faced and those were lack of preparation, knowledge gaps, lack of finding study materials, etc. They could not find a proper system to guide them to do this JLPT examination.

The third objective is to identify the most suitable method to solve the identified problem based on the literature and the survey. According to this survey it mentioned that they would like to have a web-based system to guide them more than the mobile application. Also, web-based technology types are very useful for users and this is mentioned in section II.

In this study, the issues that the responders are having with the JLPT were first identified. Then the support that got from the supervisor and discussed how this is applicable for the people and also identified the scope of this research and whether it has usability. As the third step, the research was conducted using research papers that were related to the study and it was examined and selected the most appropriate research papers and got the best ideas from them. Next, created a questionnaire for the ones who did JLPT exams and gathered responses from the survey. Then a statistical analysis of the survey data was conducted. The final step is to summarize the results and provide the problem's conclusive solution by using the results.

IV. ANALYSIS

This research concentrates on the analysis of primary data gathered from a survey. This survey data was examined using a statistical method and received 68 responses out of 75 through a Google form. This survey was conducted for the ones who did the JLPT. For this survey, it used social media platforms like WhatsApp and Instagram and sent it to 75 people. This mainly focuses on the problems that the responders encountered when taking the JLPT levels and identifying which JLPT level they have done mostly and which JLPT level they have failed frequently. These results were helpful to proceed with this study.

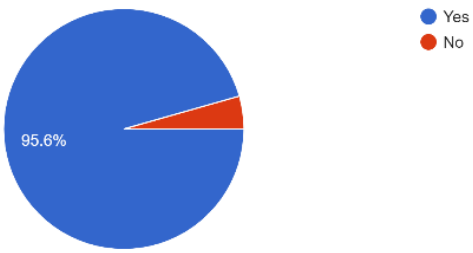

Figure 1. Responses about the ones who did the JLPT.

Figure 1, it shows the responses that got from the responders who did the JLPT previously, and the majority of them participated and done the JLPT, and

it's a percentage of 95.5%. The rate of 4.4% that didn't do the test levels previously.

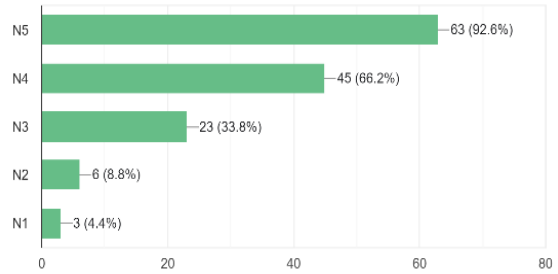

Figure 2. Responses about the levels that were completed in JLPT.

The above figure shows the responses who completed their JLPT levels, A percentage of 92.6% of the respondents have completed the N5 level, 66.2% completed the N4 level, the rate of 38.8% completed the N3 level, the rate of 8.8% completed the N2 level and percentage of 4.4% completed the N1 level. Most of the ones have completed the N5 level, and fewer people have completed the N1 level. The N1 level is more complex than the other levels and the three sections of the papers have difficult Kanji with varied meanings and it's hard to recognize what was the correct meaning for that particular Kanji character on the N1 level.

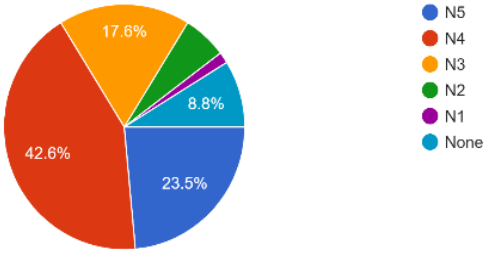

Figure 3. Responses about the levels that failed in JLPT.

The third question focused on the JLPT levels that have failed. Figure 3 shows the responders who failed the levels of this examination. The majority of responders failed the N4 level as a percentage of 42.6%. The rate of 23.5% failed the N5 level, as a percentage of 17.6% failed the N3 level, 5.9% failed the N2 level, as a percentage of 1.5% failed the N1 level, and others did not fail the exams that they have faced.

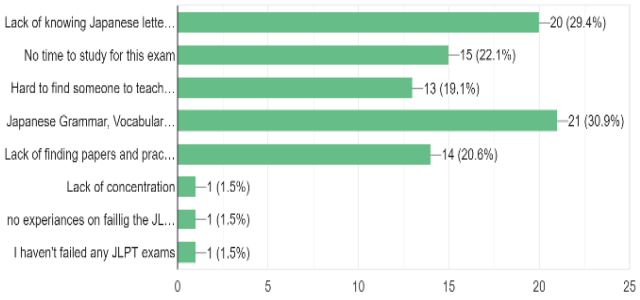

Figure 4. Responses about the reasons that failed in JLPT.

Figure 4 shows the reasons that the responders failed this exam. The majority had Japanese grammar, vocabulary, and listening problems as a percentage of 30.9%. Most of the responders had a lack of knowledge of the Japanese letters a percentage of 29.4%. The rate of 22.1% didn't have an exact time to study and 20.6% did not find the papers and didn't practice for the JLPT. As the percentage of 19.1% didn't find a person to teach about the examination materials. Some have mentioned they could have been able to concentrate better on the papers.

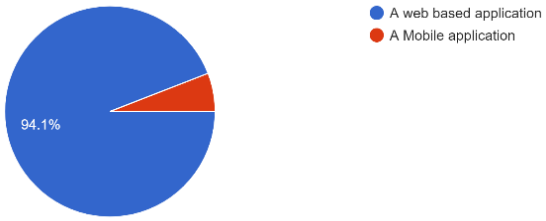

Figure 5. Responses about the ones who like to use the web or mobile application.

The above Figure 5 shows the responders who would like to use a web or mobile application to overcome the problems that they encounter when doing the JLPT. The majority would like to use a web-based application as a percentage of 94.1%. Some have mentioned that they would like to use a mobile application, and as a percentage of 5.9%.

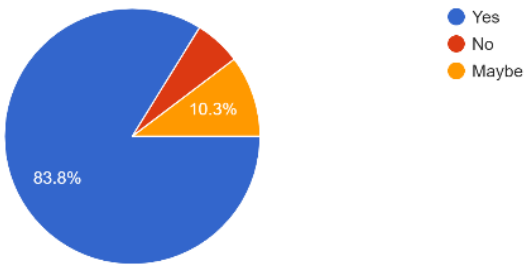

Figure 6. Responses about the ones who like to use an assistant.

The majority of the responders mentioned that they would like to use an assistant to focus on JLPT of 83.3% (Figure 6). As the percentage of 10.3% maybe like to have an assistant to guide them to the correct path, and also as a percentage of 5.9% preferred to avoid getting help from an assistant.

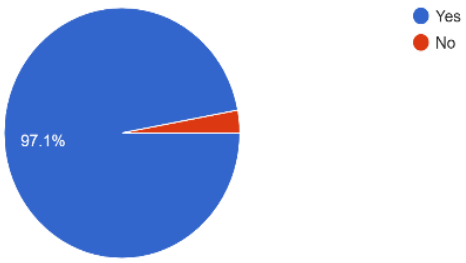

Figure 7. Responses about the ones who like to get help from a Japanese bot.

Figure 7 shows the majority of responders who would like to get some help from a Japanese bot which is an assistant and shows the correct path to practicing the exam levels of JLPT, and it's a percentage of 97.1%. Other 2.9% preferred to avoid getting help from a Japanese bot.

V. DISCUSSION

According to the responses that we got from the responders in section IV, the majority of 63 have completed the N5 level out of the 68 responders. And also, 29 have failed the N4 level. As mentioned above, 21 responders had problems with Japanese grammar, vocabulary, and listening skills. As the results are shown in the survey, 64 responders would like to have a web-based system to overcome the problems that they have. It mentioned 57 responders would like to have an assistant, and 66 responders would like to get help from a Japanese bot which is an assistant or consultant, and show the correct path to complete the JLPT levels successfully. Further, responders gave some suggestions to add new features to this web-based learning system, such as scheduling the study hours and giving some reminders. After studying, ask some questions and give some quizzes at the particular level and give some self-analysis about them, reward, appreciate, and motivate the user. And if the user gets low marks, the system will show what are the things that the user needs to improve more.

By considering the results and findings of the survey, it is appropriate to develop an automated web-based learning application with a Japanese bot which is helpful to the people who are doing the JLPT levels in Sri Lanka. In past research papers, they have mentioned teaching and tutorial-based AI chatbots, and they have used natural language processing and pattern machines. Most chatbots help with reading and writing skills.

VI. CONCLUSION AND IMPLICATIONS

The Japanese-Language Proficiency Test (JLPT) is one of the most challenging exams for those who are studying Japanese in Sri Lanka. Most Sri Lankans are taking this exam to get a qualification to visit Japan for their higher studies and employment. Most people have failed this exam due to the lack of exam preparation skills, problems with Japanese letters, lack of knowing Japanese grammar, vocabulary, and listening skills, couldn't manage their time for the studies and also not be able to find a proper person to teach them. The objective of this study was to develop a Web-based learning system with a Japanese bot called "J- bot" as an assistant for those doing the JLPT levels to overcome their issues. This system is a service support system that helps to schedule and consult the day of work with studying for the JLPT exam, giving some questionnaires, past papers, tutorials and all the learning methods that according to the users' level and users will motivate, reward, and appreciate through this system. It demonstrates the techniques for the learning systems and uses of chatbots previously. Then, examined the data gathered by using a survey and suggested a solution for this problem according to the problems that got from the responders. By considering the results, this paper proposed a web-based learning application with a J-bot that is applicable to people, and it can schedule their study hours and encourage and consult them for this exam. In the future, this can be implemented as the multi-language learning system for the French and Chinese examinations that are held in Sri Lanka.

As the future avenues, whoever is interested in doing studies on the JLPT learning management system with a chatbot can focus on how the user can examine their self-analysis and print or email their report to themselves. Consider adding some new features to the system and to the J-bot, such as a rating system, more listening practices, and meanings of the Japanese words in English according to the user level. In the future, this web-based learning system could be implemented as the multi-language system with the bots for the other language examinations such as French and Chinese that are held in Sri Lanka.

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