Journal of Internet and Software Engineering Vol: 1, No 2, 2024, Page: 1-21

Enriching Grammatical Understanding of Using Japanese Part of Speech in *Dokkai* Learning with the AI-Powered Oyomi Application

Nisrina Ishmah Mahira*, Iswi Nur Pratiwi, Evlyn Jane Putri, Sevia Dwi Yanti, Najla Putri Afifah, Daffala Viro Hidayah, Husni Mubarok Ramadhan, Humannisa Rubina Lestari

IPB University

DOI: https://doi.org/10.47134/pjise.v1i2.2617
*Correspondence: Nisrina Ishmah Mahira
Email: nisrinaishmahmahira@gmail.com

Received: 01-02-2024
Accepted: 15-03-2024
Published: 30-04-2024

Abstract: This research focuses on the impact of the Oyomi application on the comprehension of Japanese word classes (part of speech) and sentence structures. The primary issue addressed is the need for efficient and effective language learning tools. The objective is to explore the role of artificial intelligence (AI) within the application in enhancing *Dokkai* learning. The methodology encompasses a comprehensive analysis of the two principal features contributing to *Dokkai* learning, the utilization of AI technologies, and a comparison between traditional learning vs AI-powered mobile learning methods. Data collection involved simple linear regression statistical analysis using an F-test and correlation coefficient to gauge the relationship between the usage of the AI-powered Oyomi application and the comprehension of word classes in *Dokkai* learning. The F test results of 0.01 < 0.05 indicate a significant contribution and a correlation coefficient of 0.8 means the strength of the relationship is very strong. These findings show that AI, when integrated into language learning applications like Oyomi, can provide a more efficient and effective learning experience, especially in Japanese reading comprehension.

Keywords: Artificial Intelligence, Dokkai, Grammatical, Part of Speech, Semantics

Introduction

The goal of foreign language learning in Indonesia is to align with the advancements in science and technology globally, thereby enabling Indonesia to become part of the international community. In the current context of globalization, the Indonesian population will have greater opportunities if they learn multiple foreign languages, one of which is Japanese, for various needs such as communication, professional, and academic purposes (Reswari et al., 2020), especially among university students, who play a crucial role as agents of change in shaping the future (Reza Pradhana et al., 2020). A survey conducted by the Japan Foundation in 2021 revealed that there are 711.732 Japanese language learners in Indonesia at multiple levels. The high interest in learning Japanese is driven by the market demand in Indonesia, which requires graduates with Japanese language skills (Setiana, 2023). These various needs in this era of globalization make foreign language proficiency a key asset in facing the complexities of international relations and increasing cross-cultural cooperation. As a country facing a labor crisis due to a lack of human resources, Japan is opening various job opportunities for foreign workers, especially Indonesians, across multiple sectors. This creates a high demand for Japanese language proficiency in Indonesia (Tombalisa et al., 2022).

Mastering the Japanese language is quintessential for learners aspiring to articulate effectively in both written and spoken forms. Therefore, it is essential for a Japanese language learner to master the four language skills, namely reading or *yomu ginou* (読む技能), speaking or *hanasu ginou* (話す技能), writing or *kaku ginou* (書く技能), and listening or *kiku ginou* (聞く技能). Reading is one of the receptive language skills in written language. It is called receptive because, through reading, one can receive new information and experiences conveyed by the writer through the text to the reader. Everything obtained from reading allows individuals to strengthen their thinking ability, sharpen their perspective, and broaden their horizons. Among these four skills, reading will be the main focus of this research because language learners need to study. In the field of education, reading comprehension also affects student success. Success in reading can be measured by how well they understand the content of the reading. Therefore, a high level of understanding is needed to grasp the meaning contained in the text, especially in the context of the learning process (Indriawati, 2023).

The teaching and learning of reading in Japanese language education is known as *Dokkai* (読解), which consists of two syllables: *doku* (読), meaning reading, and *kai* (解), meaning comprehension. Besides involving the process of understanding information, this activity also allows Japanese language learners to hone almost all aspects of their language abilities. This includes the ability to recognize kanji, romaji, katakana, and hiragana characters, as well as skills in grammar patterns or *hyougen bunkei* (表現文型), translation or *honyaku* (翻訳), and information analysis obtained from reading activities (Wijayadi et al., 2018). Reading Japanese has unique linguistic features, including characters, vocabulary, pronunciation, and grammar. Regarding letters, the Japanese use kanji as symbols with meanings, hiragana and katakana are other types of characters. Students need to make a significant effort to understand the meaning of Japanese texts, especially since written texts in Japanese do not use spaces between words (Philiyanti et al., 2019).

Language errors include errors in phonology, morphology, syntax, and semantics. Phonology is a branch of linguistics that studies and analyzes the sounds produced by humans and considers them an integral part of a language. Morphology is a field of linguistic study related to morphemes, including the analysis of word structure, form, and classification. Syntax is a branch of linguistics that studies the internal parts of sentence structure, such as phrases, clauses, and sentences. Semantics is a branch of linguistics that explores meaning in language (Muzaki et al., 2023).

Many students in Japanese language learning often encounter difficulties in understanding the content of a reading text due to the variety of characters, vocabulary, and complex sentence patterns in Japanese. Another significant challenge lies in the grammatical structure differences with Indonesian, as agreed by Natalia et al. (2022), the limitation in recognizing various forms and functions of word classes (part of speech) in Japanese sentences, the lack of deep understanding of context and culture, and ineffective learning due to limited access to learning resources. This can become an issue in understanding correctly, especially if only using traditional media and conventional learning methods (Gunawan et al., 2020). Many applications and textbooks must provide in-depth explanations or adequate exercises regarding word classes and their usage in various sentence contexts. Students often only gain theoretical understanding if they can apply it practically in conversations and everyday media. This usually confuses students and takes longer for them to master. Besides the difficulties, limitations, and challenges mentioned, some syntactic errors in translating Japanese also frequently occur, such as spelling mistakes in writing, including in scientific writings and mass media (Ardipradja et al., 2019).

Additionally, errors in using particles, words, and Japanese language structures can occur due to a failure to transfer meaning from the source language. Word errors include omission, addition, letter writing, use of words out of context, and word changes. Meanwhile, structural word errors include errors in omission, addition of words, word order errors, structure form errors, and changes in the form of a sentence. These errors occur due to several causes, such as:

a. Language Transfer or *Genkou Ten'i* (言語転移), is the impact of the mother tongue's influence on the second language being learned. Failure to transfer the intention or meaning from the source language can result in interference (negative language transfer).
b. Overgeneralization or *Kajou Ippanka* (過剰一般化), is an error that occurs due to the inability to master the rules of the second language (target language).
c. Transfer of Training or *Kunrenjou no Ten'i* (訓練上の転移), is an error that arises due to negative influence when the teacher delivers material using two different languages.
d. Learning Strategy or *Gakushuu Sutoratejii* (学習ストラテジー), is the occurrence of incorrect learning methods that can cause language errors.
e. Communication Strategy or *Komunikēshon Sutoratejii* (コミュニケーションストラテジー), is an error that occurs due to a lack of knowledge and communication skills in situations where one cannot utter certain words or expressions, leading to the replacement of one word with another.

Japanese has a complex sentence pattern structure with various word classes (WOLOK, 2018). This makes non-native speakers face difficulties in understanding the

content of available reading texts. To avoid mistakes, a deep understanding (Surya et al., 2022) of the use of word classes and the accurate interpretation of semantics in Japanese texts is necessary (Budiman et al., 2023). Language interference is a common problem faced by language learners in Indonesia, which can complicate learning. Language interference occurs when the structure and patterns of the mother tongue or previous language disrupt the understanding and use of the new language, such as Japanese (Sudipa, 2020). Juariah et al. (2018) revealed that the position of Japanese among the mother tongue, Indonesian, and English is an important consideration because these two languages are often more dominant in academic environments and daily activities. Therefore, prioritizing time and effort to learn Japanese to reduce oddities can be a challenge.

Having good *Dokkai* skills is very important for anyone learning Japanese. One will struggle to fully adapt to Japanese without adequate reading skills. Moreover, their Japanese language proficiency will only progress if they can access additional information in their learning process, ultimately hindering their learning. To help learners who still lack Japanese reading skills, an automatic application is needed to help streamline the time spent analyzing the grammar usage of word classes to understand information from a reading. Word class learning is taught so students can recognize or know the classification of words written based on their roles and functions in the Indonesian language structure (Sinaga, 2023).

The presence of the Oyomi mobile application with artificial intelligence (AI) technology in language learning has created new opportunities for a more personal and interactive approach, making it easier for individuals, especially students, to find information through reading (Putri et al., 2023). This application allows users to deepen their understanding of the grammar usage of word classes, translate, and listen to Japanese pronunciation quickly.

This research aims to reveal how effectively the Oyomi application can enrich students' Japanese language understanding through an AI approach. Thus, it is expected to significantly contribute to developing more innovative Japanese reading learning practices and prepare students to contribute to an increasingly integrated global environment (Damayanti et al., 2023).

Methodology

This research is built on "Understanding the Use of Japanese Word Classes in *Dokkai* Learning" as the dependent variable and "Use of AI-powered Oyomi Applications" as the independent variable. Both variables are used to analyze the relationship between variables, where the dependent variable is influenced by the independent variable (Waruwu, 2023). The manipulated variable is the independent variable, while the measured variable is the dependent variable (Fauzi et al., 2023). Independent variables can be manipulated with indicators, such as the level of comfort in using the Oyomi application and student activities while using the Oyomi application (for example, marking word classes in sentences, translating meanings, translating text from images, analyzing websites and ebooks, understanding sentence patterns, and saving analyzed content). Dependent variables can be measured by several indicators, such as students' ability to recognize, understand, identify, and use word classes when reading Japanese texts. In addition to independent and

dependent variables, there are other variables that can affect the experimental results. The researcher seeks to control these variables to make the survey results more valid using a control variable. Control variables controlled by researchers are useful for reducing the influence of other factors on the dependent variable. These control variables use indicators, such as students' motivation to learn Japanese and knowledge of the Oyomi application.

The research methods used are a literature review and a cross-sectional study. A cross-sectional study is a study to observe the relationship between risk factors and impacts by collecting data at a specific point in time (point-time approach) (Kesmodel, 2018). Each subject is observed only once, and measurements are made of the subject's status at the time of the study, allowing for clear identification of the process, outcome, and cause-and-effect correlation. This study will measure the relationship between variables at one time. A literature review is a search for literature research from various journals, books, and other scientific articles published online to form another piece of writing on the topic raised. The aim is to obtain a strong foundation to build a new thinking framework to be grouped based on the variations in understanding obtained (Fajar et al., 2022). Researchers also compile summaries of relevant main results and synthesize them to find trends, issues, and solutions to enrich understanding of word classes in reading Japanese texts with an efficient working method (easiest and fastest without compromising the desired results) (Syam, 2020). In addition, this research will also include a deep understanding of up-to-date sources on how artificial intelligence technology is applied in this application and contributes to the learning process.

The research approach is rational-empirical (deductive/quantitative) (Sudaryana et al., 2022). The quantitative approach is an approach that uses numerical data and exact science to test hypotheses and produce accurate conclusions. Data are measured, calculated, and analyzed using formulas and statistics, producing objective answers to research questions. This approach is ideal for investigating cause-and-effect relationships, generalizing, and testing theories (Ulfa, 2021). The data collection technique used is a survey technique (non-experimental) that uses a questionnaire as its research instrument (Kusumastuti et al., 2020). The survey aims to gather and study data from samples taken from the population (Syahrizal et al., 2023). The questionnaire can be distributed online using the Google Form platform with a Likert scale assessment. This research's data sources are primary and secondary data. Primary data is obtained from respondents observed directly through a questionnaire by distributing a list of questions. Secondary data can be obtained from magazines, newspapers, journals, and books related to this research (Prilano et al., 2020). Data collection through the survey will use a purposive sampling technique. This technique intentionally selects samples based on certain criteria relevant to the research (Kumar et al., 2023). In this case, the sample criteria consist of students who have an interest in and experience in learning Japanese and are active in using language learning applications. Then, the sample is selected from Oyomi application users who are currently or have been learning Japanese word-class grammar using that application. The population of this research includes all students of the Software Engineering Technology study program at IPB University Vocational School, class of 58, totaling 120 people, and the sample size is calculated using the Slovin formula proposed by Taro Yamane as follows:

$$n = N / (1 + (N \times e^2))$$

Explanation:
N = population size
n = sample size
e = margin of error (α) (Riono et al., 2023)

The Value e = 0.1 (10%) is used for populations with more than 100 (Wijayanti et al., 2023). The smaller the margin of error, the more representative the sample size will be because, technically, it is inversely proportional to the square root of n, but a large sample cannot guarantee precision (Prabowo, 2020). Thus, the sample size for this research's

$n = 120 / (1 + 120.(0.01^2)) \approx 54$ samples.

So, the sample for this research is 54 respondents. The data distributed through Google Forms will be accessed via Google Sheets and processed using Microsoft Excel software. The data is analyzed using descriptive statistical analysis techniques and inferential statistics. Descriptive statistics describe research data, while inferential statistics test the relationship between research variables using a one-way ANOVA test with a significance level of 0.05 (Wulandari et al., 2019). The data analysis method used is simple linear regression analysis to test the relationship modeling between one dependent variable and one independent variable (Muhartini et al., 2021) by interpreting the correlation coefficient of the multiple R-value.

Result and Discussion

A. Contribution of the Oyomi Application to *Dokkai* Learning

Oyomi is an application that functions as a "grammar analyzer" and "learning tool" for the Japanese language, offering various features to enhance the experience and comprehension of reading Japanese. Utilizing artificial intelligence, this application possesses machine learning capabilities that can analyze, break down sentences, mark word classes, and pronounce Chinese characters (kanji) in texts, improving reading efficiency. This capability also accurately produces the pattern structure of sentences and paragraphs, allowing users to understand the grammatical characteristics and meanings of the Japanese language.

Additionally, Oyomi provides an accurate online "translation" feature with audible translation results. Besides analyzing text, Oyomi can detect word conjugations and affixes with its built-in dictionary. The analyzed text is saved in the "history" feature within the analyze menu. Users can bookmark paragraphs, favorite sentences, and new vocabulary to study later (Softonic.com, 2024).

This application contributes to *Dokkai* learning through its two main features: the "part of speech" feature on iOS or the "pos mark" feature on Android, which marks word classes, and the "semantics" feature on iOS or the "structure" feature on Android, which breaks down the structural patterns of sentences.

a. Part of Speech / Pos Mark

A word is the smallest syntactic study object that hierarchically forms larger syntactic components, such as phrases. Similarly, it is stated that a word is the smallest unit in syntax, derived from a lexeme that has undergone a morphological process. Words are essential elements that form phrases, clauses, sentences, and discourse. In

Japanese, the term for word or vocabulary is "*kotoba*" (言葉) (Sari, D. E. et al., 2023). Japanese is one of the languages in the world that exhibits significant diversity in its grammar. One aspect of this diversity is classifying word classes, or "*hinshi*" (品詞). Japanese has various word classes, which can be categorized into ten groups: "*doushi*" (動詞) for verbs, "*i-keiyoushi*" (イ形容詞) for i-adjectives (also known simply as "*keiyoushi*" (形容詞)), "*na-keiyoushi*" (ナ形容詞) for na-adjectives (also known as "*keiyoudoushi*" (形容動詞)), "*meishi*" (名詞) for nouns, "*fukushi*" (副詞) for adverbs, "*rentaishi*" (連体詞) for prenominals, "*daimeishi*" (代名詞) for pronouns, "*setsuzokushi*" (接続詞) for conjunctions, "*kandoushi*" (感動詞) for interjections, "*jodoushi*" (助動詞) for auxiliary verbs or copula, and "*joshi*" (助詞) for particles (Muhlisian, A. A., 2018). *Fukushi* are words used to elucidate *yougen* (verbs, auxiliary verbs, i-adjectives, and na-adjectives). *Yougen* (用言) are words that can stand independently. *Fukushi* cannot function as the subject and solely serves to elucidate other words. *Rentaishi* is exclusively used to elucidate *taigen* (nouns). *Taigen* (体言) refers to words that cannot stand alone as predicates in a sentence (Rakian et al., 2021).

In Indonesian grammar, auxiliary words play a crucial role in sentence construction. In Japanese, auxiliary words are commonly referred to as particles. According to Kawashima (Masrokhah, 2019), particles are word classes that cannot stand alone. In Japanese, particles follow a word to indicate its relationship with other words in the sentence and give it a specific meaning or nuance (semantic). A particle can have more than one semantic function (Alifah, 2024). The number of particles in Japanese is significantly higher than in Indonesian or English. These particles' varied meanings and functions pose a significant challenge for students in understanding simple and complex sentences.

The "part of speech" or "pos mark" feature in the Oyomi application is a marking button with various colors, accessible through the analyze menu. Users can enter Japanese words or sentences to be analyzed according to their needs. These words or sentences can be input in several ways: typing directly using the smartphone's integrated keyboard, entering a website URL link, drawing or writing each character using the "draw kanji" feature, inputting voice through the "microphone" feature, or scanning an image using the "scan" feature.

This feature in the Oyomi application is useful for analyzing the entered text by breaking it down into sentences. Each sentence is then categorized into word classes and marked with colors to identify the class of each word. Yellow is used for nouns, pink for adjectives, green for verbs, purple for adverbs, blue for particles, and gray for auxiliary verbs. This feature can also analyze pronouns, conjunctions, numbers, prefixes (at the beginning of words), and suffixes (at the end of words) without color marking. Additionally, the feature provides buttons to activate the "footnote" and "romaji" features. The "footnote" feature displays the name of each word class type below the analyzed sentence. The "romaji" feature shows Japanese words in Latin letters, facilitating reading and pronunciation for users unfamiliar with Kanji, Hiragana, or Katakana characters. However, in version 1.2.26, the "romaji" feature is only available on iOS.

Example: 金曜日に日本人のともだちとこうえんにいきます。

Translate: I will go to the park with my Japanese friend on Friday (eng).
Saya akan pergi ke taman bersama teman Jepang saya pada hari Jumat (ind)

Figure 1. Analysis result with Romaji button enabled.

Figure 2. Analysis result with Footnote button enabled.

Figure 3. The difference in color marking buttons on iOS and Android platforms.

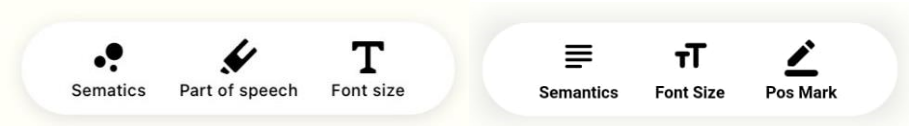

Figure 4. The difference in the name of the "Part of Speech" or "Pos Mark" feature.

Figures 1, 2, and 3 illustrate using the "part of speech" or "pos mark" feature in the Oyomi application, which helps identify the classification of Japanese word classes. As seen in the analysis of the above sentence, it includes 4 particles: the particle "*ni*" for expressing time or movement with a destination (Sahudi, 2020) as in Table 1, the particle "*no*" for connecting modification between nouns, as in the phrase "Japanese friend," and the particle "*to*" as a *yougen* connector afterward, meaning "with" or "together with" (Annastasya, 2020). In addition to particles, there are also 4 nouns: "*kinyoubi*," "*nihonjin*," "*tomodachi*," and "*koen*." Lastly, the verb "*ikimasu*" comes from the word "*iku*" a class 1 verb. This verb is changed to the formal positive form "*masu*" as the present tense in Japanese (Suryani, A. I., 2021).

Tabel 1: Translation of every word in Japanese

Japanese Characters	Translation (eng)	Translation (ind)
日本人のともだち と 金曜日, に日本人, ともだち, こうえん	Japanese Friend with Friday, Japanese, Friends, Park	Teman Jepang Dengan / Bersama Jumat, Orang Jepang, Teman, Taman

b. Semantics / Structure

Semantics is a branch of linguistics that studies meaning (Ray, S. A. 2019). It can also be defined as the relationship between words and their concepts or meanings, where the existing context determines the expression or discourse (Gani, S. 2019). Semantics is a part of language structure or sentence patterns that deals with the meaning of expressions and the structure of speech meaning (a series of sounds used for communication, speech, and talking) (Ginting, H. et al., 2019).

In Japanese sentence structure, *Shugo* (主語) is the subject that performs the action in the sentence. *Mokutekigo* (目的語) is the object that receives the action from the subject. *Jutsugo* (述語) is the predicate that expresses the action or state of the subject. *Hosokugo* (補足語) is the adverb or complement that provides supplementary information about the time, place, manner, or condition in which the action occurs. The disparity in sentence structure between Japanese and Indonesian can be observed in their transitive structures: Indonesian employs the SPOC (Subject-Predicate-Object-Complement) or SPOA (Subject-Predicate-Object-Adverb) structure, whereas Japanese utilizes the SAOP structure. Furthermore, in terms of word order, Indonesian uses the pattern of DM (*diterangkan-menerangkan*), On the contrary, Japanese uses MD (*menerangkan-diterangkan*) pattern (Lianna, 2021). The head-first system is followed in Indonesian, with verbs/predicates placed before objects. Structurally, Indonesian sentence patterns follow the SPO (Subject-Predicate-Object) system. However, the head-last system in Japanese is used, where verbs/predicates are placed after objects, forming the SOP (Subject-Object-Predicate) structure. A lack of semantic understanding can lead to interference from Indonesian to other languages (such as Japanese), potentially causing reversed structures (*menerangkan-diterangkan*) at the phrase level, incorrect use of particles, or sentence structures that violate the rules where it should be SOP in Japanese, but becomes SPO due to the influence of Indonesian (Sudipa, M. H. D. 2020).

In Japanese, meaning encompasses various types, such as:

a. Lexical meaning, also known as *jishoteki-imi* (辞書的意味) or *goiteki-imi* (語彙的意味), is the actual meaning of a word according to its reference, derived from sensory observation and independent of grammatical elements. It can also be described as the original meaning of a word.
b. Grammatical meaning, referred to as *bunpouteki imi* (文法的意味), is the meaning that emerges due to grammatical processes.
c. Denotative meaning, also called *meijiteki imi* (明示的意味) or *gaien* (外延), relates to the explicit meaning associated with an object or idea and can be explained through componential analysis (explicit).
d. Connotative meaning, known as *anjiteki imi* (暗示的意味) or *naihou* (内包), is the meaning arising from the feelings or thoughts of the speaker and the listener (implicit).
e. Basic meaning, referred to as *kihongi* (基本儀), is the original meaning possessed by a word.
f. Extended meaning, called *tengi* (転義), is the meaning that appears as an extension of the basic meaning, often resulting from figurative or metaphorical use (Kurniawan, 2020).

Imiron (意味論), or semantics, also includes: *ruigigo* (類義語) or synonyms (words with similar meanings), *tagigo* (多義語) or polysemy (a word with multiple meanings), *douonigigo* (同音異義語) or *homophones* (two or more words with the same pronunciation but different spellings and meanings), *hangigo* (反義語) or antonyms (words with opposite meanings), and *jougekankei* (上下関係) or superordinates (words used to express broader ideas or concepts) (Widiastika et al., 2024).

To address the differences in sentence structure between the two languages, the Oyomi application features a tool that analyzes sentence structures or patterns, known as semantics on Android and structure on iOS. This feature can only be accessed after the analysis result shows the sentence broken down into individual word meanings. Beneath these broken-down words, three feature options appear as follows: “study,” “read,” and “translate.” Users can select the “study” feature to proceed to the next page, which includes the “semantics” or “structure”, “vocabulary,” and “grammar” features. The “semantics” or “structure” feature is not only for analyzing sentence structures or patterns but also for sorting modification relationships between short sentences and helping users understand the grammatical characteristics and meanings of the Japanese language.

Figure 5. The difference in the name of the “Semantics” or “Structure” feature.

Figure 5 is an example of the use of the “Semantics” or “Structure” feature. As the example above shows, the structure starts with the subject "I." The subject "I" does not need to be written or spoken explicitly in that sentence context.

It is followed by the time expression "*kinyoubi*" (Friday), then the objects "*Tomodachi*" (Friend) and "*Koen*" (Park), and finally the verb as the predicate "*iku / ikimasu*" (go/will go). Based on the analysis results of this feature, the structure used in this sentence adheres to the rules of the Japanese language, specifically the SAOP structure.

In Japanese, Ellipsis is called *shouryaku* (省略), Ellipsis is the omission of case components in sentences, understood from the context. Due to the heavy reliance on context in Japanese, Ellipsis frequently occurs in conversations. Unlike Indonesian, which uses prepositions as productive elements, Japanese uses postpositions that clarify the function of words in sentences. Particles (*joshi*), known as postpositions, come from the characters 助 (*akeru, jo*) meaning ‘to help’ and 詞 (*kotoba, shi*) meaning ‘word.’ Therefore, joshi can be understood as ‘helper words.’ A postpositional ellipsis does not alter the sentence’s meaning, allowing the listener to understand the speaker's intention (Pujiono et al., 2023). For example, in the sentence "*nipponjin no tomodachi*" means "my Japanese friend," the word "my" is omitted but understood from the postposition "*no*," indicating possession.

B. Application of AI Technology in the Oyomi App

1. POS Tagging

In the Oyomi app, the feature designed to identify parts of speech uses advanced AI to replace the manual process, which can be time-consuming, tedious, and expensive. This automation is crucial for enhancing communication efficiency between humans and machines through text or speech processing. The ability to analyze and categorize words in a text with appropriate syntactic tags based on context is a key element in Natural Language Processing (NLP). This process, also known as grammatical tagging, involves automatically labeling and classifying words, such as verbs, adjectives, adverbs, and nouns, revealing the function of each word, which is essential for understanding the structure of the language (Kurnia, 2022). Given its functionality, it appears that this feature utilizes AI technology, specifically POS tagging. This feature has numerous applications in NLP, including aiding in machine translation, word sense disambiguation, and question-answer parsing. The concept originated from the need to resolve ambiguity in word classification within specific contexts (Chiche et al., 2022).

2. Speech Recognition

The functionalities described in the Oyomi app, such as Speech-to-Text (STT) and Text-to-Speech (TTS), use the utilization of artificial intelligence (AI) for speech recognition. This inference is drawn from the observed capabilities of the app, which include converting spoken language into written text and transforming written text into spoken speech through advanced neural network models.

STT technology is used to convert verbal speech into written text. In the Oyomi app, users can use the "microphone" feature in the analyze menu to speak sentences or words, which are then converted into text. This process involves collecting voice data by directly activating the microphone in the iOS Oyomi app or using the microphone available on the user's smartphone keyboard for platforms other than iOS. The data is collected by recording the user's voice through the app, which then processes the audio to remove noise and enhance sound quality. The STT model analyzes the audio to convert it into text, and finally, the text output is displayed on the screen (Liu et al., 2020). This feature is highly beneficial for quickly inputting data without typing and helps practice pronunciation and understanding Japanese.

Conversely, TTS technology converts text into speech (Kaur et al., 2023). After analyzing a sentence in the Oyomi app, users can click the "read" button located beneath the analyzed and segmented sentence to listen to the correct Japanese pronunciation of the text. This process involves text analysis to understand context, pronunciation, phonation, fluency, pitch variation, voice, and intonation, which the TTS model then synthesizes to convert the text into audio that produces natural and intonated speech (Trivedi et al., 2018). The audio output is played through the user's smartphone speaker, helping users improve their pronunciation, intonation, and listening comprehension in Japanese.

3. Web Scraping

The "analyze" feature in the Oyomi app, allowing users to input web URLs for analysis, appears to utilize advanced AI web scraping technology. This inference is

drawn from the functionality observed in the feature, which involves extracting textual content from web pages for subsequent analysis.

Web scraping, also known as web harvesting, web data extraction, or web mining (Husada et al., 2019), is an artificial intelligence activity that involves extracting semi-structured documents from the internet, such as web pages written in markup languages like HTML or XHTML, using specialized software or scripts (Mufidah, 2022). This activity entails constructing agents to automatically download, parse, and organize data from web pages. The objective is to enable data retrieval from web screens to be faster, more accurate, and efficient by the web scraper, including text, numeric data, images, videos, and other elements. This method allows for the extraction of data from the World Wide Web (WWW) to be stored in a file system or database for subsequent retrieval or analysis (Hafiz et al., 2023). Web scraping is often referred to as screen scraping. With this feature, users can input the URL of the web page they wish to analyze according to their needs, and the application will automatically extract the textual content from that page. After the text is extracted, NLP is employed to analyze it using the POS Tagging process, which will then identify word classes and the structure or patterns of sentences used in the text. This feature is extremely beneficial for research, learning, and language comprehension, as it enables users to access a vast and diverse array of information sources from the internet.

4. Handwritten Recognition

The "draw kanji" feature in the Oyomi app appears to leverage AI technology for handwritten recognition, allowing users to draw or write kanji characters on their device screens manually. This inference is based on the functionality observed in the feature, where AI analyzes the drawn characters and presents multiple character options closely resembling the input. As users draw each Japanese character in the analyze menu, the app displays several character options that closely match the handwriting entered. Users can then select the appropriate character from the given options. This feature is useful for recognizing, understanding, and memorizing kanji characters interactively and practically. Moreover, it can adapt to various writing styles and skill levels, making it more flexible and adaptive.

Handwritten recognition is a vital area in artificial intelligence that provides an efficient method to digitize handwritten content, eliminating the need for manual text input and streamlining document storage and retrieval processes. This field, which falls under the broader category of image recognition, has attracted significant interest from researchers, including computer scientists and handwriting specialists. Handwritten recognition can be categorized into two main types: online and offline.

a. Online character recognition entails writing on an electronic surface, like a digital tablet, with a specialized pen or digitizer. This system captures characters as a sequence of strokes, including data on pen speed and movement, and recognizes characters in real-time as they are written. An example of this type of recognition is the "draw kanji" feature.
b. Offline character recognition involves converting handwritten characters from paper into a machine-readable format, typically through optical or magnetic scanning of documents. It can be further divided into optical character recognition

(OCR) and magnetic character recognition (MCR). Offline character recognition is more challenging due to the wide variety of character shapes, symbols, document quality, and the lack of stroke information.

In Japanese, spoken by over 125 million native speakers, research on handwritten recognition has made significant strides, despite still lagging behind English. Noteworthy efforts in this field include the Kuzushiji-MNIST dataset and the ETL character database, which are used for machine learning and OCR applications (Alhamad et al., 2024).

5. Optical Character Recognition

The "scan" feature is useful for scanning images into text. Upon considering its functionality, it seems that this feature utilizes AI technology for optical character recognition. OCR is part of the "scan" feature in the analyze menu. Optical Character Recognition (OCR) is a topic in digital image processing that studies converting scanned physical text images into machine-readable text (ASCII characters). Its purpose is to utilize automated techniques to simplify the text information retrieval process without manual retyping, saving time and reducing errors (Rapar et al., 2023). OCR plays a vital role in the domains of computer vision and pattern recognition. It encompasses the process of converting handwritten or printed text images into accessible, analyzable, editable, and searchable text. The application of AI and machine learning techniques, particularly deep learning models such as Convolutional Neural Networks (CNN) and Recurrent Neural Networks (RNN), has achieved models capable of learning complex patterns and structures in text data (with unique characteristics and structures), enabling accurate text recognition and transcription from images or handwriting. Optimizing training data diversity, such as text styles, fonts, and languages, makes it more adaptable to different scenarios and cultural contexts. Additionally, there are variations in text arrangement and layout, such as skewed or rotated text. OCR is quite sensitive to deformation, lighting, distortion, rotation, and scale changes, which can affect recognition accuracy. However, AI techniques such as transfer and reinforcement learning can enhance text recognition systems' performance and effectiveness by gathering more diverse data to handle variations and improve accuracy (Meng et al., 2023).

6. Document Parsing & Chunking

The "EPUB" feature in the Oyomi app incorporates advanced techniques for document parsing and chunking, likely leveraging AI technologies. While specific details regarding the AI implementation are not explicitly disclosed, the functionality enhances text comprehension and analysis from digital books, supported by sophisticated language processing methods.

Parsing analyzes the syntactic structure of the text in EPUB, identifying grammatical elements such as word classes and phrases and determining the relationships between those elements in sentences. For example, parsing will identify the subject ("dog"), predicate ("runs"), and modifier ("in the park") in the sentence "The dog runs in the park."

Chunking, on the other hand, groups words identified by parsing into larger, coherent units such as noun phrases (e.g., "big dog") or verb phrases (e.g., "running

fast"). LLM technology helps understand the broader context and provides deeper analysis, while RAG allows the system to dynamically access relevant information from external databases (Lin, D. 2024). Oyomi can accurately extract and present crucial information from .epub formatted documents, making it easier for users to learn Japanese by automatically analyzing sentence structures and word classes, thus saving time and enhancing comprehension of content in digital books.

However, it is important to note that the specific AI technologies employed within the Oyomi app are not explicitly disclosed in this study, and further investigation or clarification from the developers may be necessary to confirm the underlying AI mechanisms.

C. Comparison of *Dokkai* Learning with Artificial Intelligence and Traditional Methods

Traditional learning still plays a crucial role in the education process. This method typically involves face-to-face interaction between instructors and students, the use of textbooks, chalkboards, and classroom discussions. Traditional learning has advantages in direct interaction, allowing instructors to provide immediate feedback and detect students' difficulties in real time. Additionally, this method enables direct discussions and collaboration among students, enriching their learning experiences.

The evolving educational landscape has sparked changes in teaching trends. Previously, instructors acted as active communicators, but now, both instructors and students play active roles thanks to the use of technology and learning media. Media refers to tools used to convey messages from senders to receivers, influencing thoughts, attention, feelings, interests, and focus. The use of instructional technology, such as websites and mobile technology (mobile learning), has numerous advantages, driving the development of the learning process in formal and non-formal education institutions.

Mobile learning is a learning model that leverages information and communication technology, especially mobile devices like smartphones, used in the teaching-learning process, with a focus on smartphones via Android and iOS platforms. This application can be an effective complement when combined with conventional learning methods, offering greater flexibility and accessibility than traditional learning methods, allowing students to learn anytime and anywhere (Nasution et al., 2021).

Mobile applications like Oyomi, utilizing artificial intelligence (AI), can provide a more personalized and adaptive learning experience by analyzing text and providing annotations related to word classes and semantic or sentence pattern structures in Japanese. This helps students understand the use of words in the correct context. Oyomi simplifies the learning process, as users don't need to have a deeper understanding beforehand to grasp the content and meaning of a reading. With Oyomi's assistance, users can learn Japanese more efficiently, aiding in remembering and understanding the content better. Furthermore, Oyomi offers flexibility in learning time and place, allowing students to learn whenever and wherever they need it. This is beneficial alongside the availability of AI features in Oyomi, creating an easier, interactive, dynamic, and enjoyable learning environment.

So, although traditional methods may not be as efficient or interactive as the use of artificial intelligence in deep analysis of sentence structures and word classes, and may not

be as flexible in terms of learning time and place, traditional methods also hold important values like direct interaction with instructors and group discussions that can enrich students' understanding. Therefore, a combination of both methods can provide a more comprehensive and effective learning experience.

D. The Influence of the Oyomi Application on *Dokkai* Learning Efficiency

According to Ghozali, the F-test aims to determine whether the independent variables influence the dependent variable. The significance level used is 0.5 or 5%. The criteria for the F-test are as follows:

1. If the F-test's significance value is < 0.05, then Ho is rejected, and H1 is accepted. This means that all independent variables significantly affect the dependent variable.
2. If the F-test's significance value is > 0.05, then Ho is accepted, and H1 is rejected. This implies that all independent variables do not have a significant effect on the dependent variable (Afriansyaf, B. 2021).

Table 2: F-test Results

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	11.57142857	11.57142857	13.06451613	0.01530799206
Residual	5	4.428571429	0.8857142857		
Total	6	16			

Based on the data from Table 2, the questionnaire results obtained a Sig. Value in the F-test of 0.01 < 0.05, indicating that Ho is rejected and H1 is accepted, meaning all variables related to "Usage of AI-powered Oyomi Application" significantly influence the "Understanding of Japanese Word Class Usage in *Dokkai* Learning."

Next, a hypothesis test is conducted to analyze the data or indicate the level of correlation according to the research problem. This calculation is performed to find the relationship between the dependent and independent variables. Interpreting the magnitude of the correlation coefficient is done using interpretations through the Multiple R value with the following interpretations:

Table 3: Correlation Categories Classification (Lumenta et al., 2023)

Coefficient	Classification
1	Perfect Level
0,800 - 1,00	Very Strong Level
0,600 - 0,800	Strong Level
0,400 - 0,600	Moderate Level
0,200 - 0,400	Weak Level
0,000 - 0,200	Very Weak Level
0	No correlation Level

After conducting a simple linear regression analysis, the correlation coefficient is obtained as follows:

Table 4: Correlation Coefficient Results

Regression Statistics	
The Multiple R Value	0.8504200643
The R Square Value	0.7232142857
The Adjusted R Square Value	0.6678571429
The Standard Error Value	0.9411239481
The Observations Value	7

Based on the data from Table 3 and Table 4, the questionnaire results obtained a correlation coefficient or Multiple R-value of 0.850, which means that, according to correlation categories, the strength of the relationship between "Usage of AI-powered Oyomi Application" and "Understanding of Japanese Word Class Usage in *Dokkai* Learning" is very strong. Furthermore, the coefficient of determination or R Square value is known to be 0.7 or 70%. This indicates that 70% of the relationship between "Usage of AI-powered Oyomi Application" is influenced by the "Understanding of Japanese Word Class Usage in *Dokkai* Learning," with the remaining 30% influenced by control variables.

Conclusion

The research results indicate that the Oyomi application, supported by artificial intelligence (AI), significantly contributes to improving the efficiency of *Dokkai* learning, particularly in understanding the use of word classes and sentence structure in Japanese using features such as “part of speech” or “pos mark” and “semantics” or “structure”. Looking at the functionality of its automated features, some AI capabilities seemingly applied in this application include POS Tagging, Speech Recognition, Web Scraping, Handwritten Recognition, OCR, and Document Parsing & Chunking. The combination of traditional learning methods and mobile learning methods with the implementation of AI technology like Oyomi can provide a more effective learning experience by offering an easy, interactive, and dynamic learning environment. Additionally, AI also provides a more personalized, adaptive, and flexible learning experience. The results of the F-test and correlation coefficient indicate that the use of AI-powered Oyomi significantly influences the understanding of word class usage in Dokkai learning, with a very strong level of relationship strength. Thus, the application of AI technology in Oyomi has a positive impact on enriching grammar understanding, improving the efficiency and quality of *Dokkai* learning for users.

References

Afriansyah, B., Niarti, U., & Hermelinda, T. (2021). Analisis Implementasi Penyusunan Laporan Keuangan Pada Umkm Berdasarkan Standar Akuntansi Keuangan Entitas Mikro, Kecil Dan Menengah (SAK EMKM). *Jurnal Saintifik (Multi Science Journal)*, *19*(1), 25-30.

Alhamad, H. A., Shehab, M., Shambour, M. K. Y., Abu-Hashem, M. A., Abuthawabeh, A., Al-Aqrabi, H., ... & Shannaq, F. B. (2024). Handwritten Recognition Techniques: A Comprehensive Review. *Symmetry*, *16*(6), 681.

Alifah, R. F. (2024). Semantic of Case Particles Ni, De, E, and O as Locative Marker. *HUMANIKA*, *30*(2), 218-230.

Annastasya, F. M. (2020). *MAKNA DAN PENGGUNAAN PARTIKEL WA DAN GA DALAM KALIMAT ADJEKTIVA PADA BAHASA JEPANG RAGAM BAHASA TULIS (KORAN)* (Doctoral dissertation, Universitas Darma Persada).

Ardipradja, A. R. U., & Muhlisian, A. A. (2019). Analisis Kesalahan Sintaksis pada Penulisan Iklan Berbahasa Jepang. *Jurnal Sora*, *2*(1), 1-8.

Bambang Sudaryana, D. E. A., Ak, M., Agusiady, H. R., & SE, M. (2022). *Metodologi penelitian kuantitatif*. Deepublish.

Budiman, J., & Malayu, S. M. (2023). Semantic Structure Verb 'open'in Indonesian and Japanese: Natural Semantic Metalanguage. *RETORIKA: Jurnal Ilmu Bahasa*, *9*(1), 63-74.

Chiche, A., & Yitagesu, B. (2022). Part of speech tagging: a systematic review of deep learning and machine learning approaches. *Journal of Big Data*, *9*(1), 10.

Damayanti, E. M., Arsanti, M., & Hasanudin, C. (2023, January). Peran mahasiswa dalam menghadapi Pendidikan di era society 5.0. In *Prosiding Seminar Nasional Hasil Penelitian, Pengabdian, dan Diseminasi* (Vol. 1, No. 1, pp. 113-120).

Fajar, P., & Aviani, Y. I. (2022). Hubungan Self-Efficacy dengan Penyesuaian Diri: Sebuah Studi Literatur. *Jurnal Pendidikan Tambusai*, *6*(1), 2186-2194.

Fauzi, R., & Aji, K. P. (2023). ENHANCING PUBLIC SERVICE THROUGH COLLABORATIVE EFFORTS: A CASE STUDY OF EAZY PASSPORT SERVICE AT UNIVERSITY HANG TUAH HOSPITAL. *Jurnal Abdimas Imigrasi*, *4*(1), 11-17.

Gani, S. (2019). Kajian teoritis struktur internal bahasa (fonologi, morfologi, sintaksis, dan semantik). A Jamiy: Jurnal Bahasa dan Sastra Arab, 7(1), 1-20.

Ginting, H., & Ginting, A. (2019). Beberapa Teori Dan Pendekatan Semantik. Pendidik. Bhs. Indones. dan Sastra, 71-78.

Gunawan, F. N., Soepriyanto, Y., & Wedi, A. (2020). Pengembangan multimedia drill and practice meningkatkan kecakapan bahasa jepang ungkapan sehari-hari. *Jurnal Kajian Teknologi Pendidikan*, *3*(2), 187-198.

Hafiz, Y. A., & Sudarmilah, E. (2023). IMPLEMENTASI WEB SCRAPING PADA PORTAL BERITA ONLINE. Inisiasi, 55-60.

Husada, I. N., Fernando, E. H., Sagala, H., Budiman, A. E., & Toba, H. (2019). Ekstraksi dan Analisis Produk di Marketplace Secara Otomatis dengan Memanfaatkan Teknologi Web Crawling. Jurnal Teknik Informatika dan Sistem Informasi, 5(3).

Indriawati, S. (2023). PENGARUH METODE MIND MAPPING DALAM PEMBELAJARAN MEMBACA PEMAHAMAN TEKS DONGENG. *Jurnal Pendidikan Bahasa Jepang Undiksha*, *9*(3), 214-220.

Juariah, J., Hari, S., & Riri, H. (2018). ANALISIS PENGGUNAAN KATA GANTI ORANG PERTAMA" WATASHI" PADA KALIMAT PERKENALAN PEMBELAJAR BAHASA JEPANG. In *Prosiding Seminar Hasil Penelitian Semester Ganjil 2013/2014* (No. 1, pp. 161-175). Unsada.

Kaur, N., & Singh, P. (2023). Conventional and contemporary approaches used in text to speech synthesis: A review. *Artificial Intelligence Review*, *56*(7), 5837-5880.

Kesmodel, Ulrik S. "Cross-sectional studies–what are they good for?." Acta obstetricia et gynecologica Scandinavica 97, no. 4 (2018): 388-393.

Kumar, S. S., Muthukumaran, V., Devi, A., Geetha, V., & Yadav, P. N. (2023). A Quantitative Approach of Purposive Sampling Techniques for Security and Privacy Issues in IoT Healthcare Applications. In *Handbook of Research on Advancements in AI and IoT Convergence Technologies* (pp. 281-299). IGI Global.

Kurnia, K. R. (2022). ANALISIS PART OF SPEECH TAGGING DALAM BAHASA LAMPUNG DIALEK A DENGAN METODE HMM (HIDDEN MARKOV MODEL). *Jurnal Teknologi Pintar*, *2*(10).

Kurniawan, S., & Nufus, Y. H. (2020). PERGESERAN MAKNA KATA SIFAT GAIRAIGO BAHASA JEPANG YANG BERASAL DARI BAHASA INGGRIS (KAJIAN SEMANTIK). *Jurnal Sastra-Studi Ilmiah Sastra*, *10*(1), 19-29.

Kusumastuti, A., Khoiron, A. M., & Achmadi, T. A. (2020). *Metode penelitian kuantitatif*. Deepublish.

Lianna, L. (2021). *ANALISIS KONTRASTIF KALIMAT INVERSI BAHASA INDONESIA DAN BAHASA JEPANG* (Doctoral dissertation, Universitas Pendidikan Indonesia).

Lin, D. (2024). Revolutionizing Retrieval-Augmented Generation with Enhanced PDF Structure Recognition. *arXiv preprint arXiv:2401.12599*.

Liu, Y., Zhang, J., Xiong, H., Zhou, L., He, Z., Wu, H., ... & Zong, C. (2020, April). Synchronous speech recognition and speech-to-text translation with interactive decoding. In Proceedings of the AAAI Conference on Artificial Intelligence (Vol. 34, No. 05, pp. 8417-8424).

Lumenta, R. P., Said, A., & Noor, I. (2023). The Correlation Between the Bureaucratic Reform and Performance Achievement: A Case Study at the Statistics Indonesia. *Jurnal Borneo Administrator*, *19*(3), 253-268.

Memon, J., Sami, M., Khan, R. A., & Uddin, M. (2020). Handwritten optical character recognition (OCR): A comprehensive systematic literature review (SLR). *IEEE access*, *8*, 142642-142668.

Meng, B. G. F., & Ghena, B. (2023). Research on text recognition methods based on artificial intelligence and machine learning. preprint under review.

Mufidah, U. (2022). PERANCANGAN APLIKASI PERBANNDINGAN HARGA PRODUK (HISTORICAL DATA) MENGGUNAKAN TEKNIK SCRAPING WEB. Jurnal Pusdansi, 1(9).

Muhartini, A. A., Sahroni, O., Rahmawati, S. D., Febrianti, T., & Mahuda, I. (2021). Analisis Peramalan Jumlah Penerimaan Mahasiswa Baru Dengan Menggunakan Metode Regresi Linear Sederhana. *Jurnal Bayesian: Jurnal Ilmiah Statistika dan Ekonometrika*, *1*(1), 17-23.

Muhlisian, A. A. (2018). Analisis Kesalahan Penggunaan Kata Hasil Terjemahan Indonesia-Jepang dalam Karya Ilmiah Mahasiswa. *Journal of Japanese Language Education and Linguistics*, *2*(2), 258-274.

Muzaki, H., Khusna, N., Putri, E. A., Putri, R. A., Melinda, S., Kanugrahan, A. C., & Larasati, A. P. (2023). Analisis Kesalahan Berbahasa Indonesia Youtuber Eropa pada Tataran Linguistik. *Deiksis: Jurnal Pendidikan Bahasa dan Sastra Indonesia*, *9*(2), 1-14.

Nasution, A., Siddik, M., & Manurung, N. (2021). Efektivitas Mobile Learning Dalam Pembelajaran Bahasa Inggris Pada Sekolah Menengah Kejuruan (SMK). *Journal Of Science And Social Research*, *4*(1), 1-5.

Natalia, S., & Darwis, M. (2022). Interferensi Gramatika Bahasa Indonesia Ke Dalam Tuturan Bahasa Jepang Mahasiswa Program Studi Bahasa Jepang. In *Prosiding Seminar Nasional Sasindo* (Vol. 2, No. 2).

Philiyanti, F., Rasyid, Y., & Emzir, E. (2019). Reflection on Learning to Read Japanese Language Through Contextual Approach for Indonesian Students. *Aksis: Jurnal Pendidikan Bahasa dan Sastra Indonesia*, *3*(1), 45-52.

Prabowo, W. S. (2020). Organizational Citizenship Behavior, Organizational Climate, and Employee Performance. *Journal of Economics and Business*, *3*(4).

Prilano, K., Sudarso, A., & Fajrillah, F. (2020). Pengaruh harga, keamanan dan promosi terhadap keputusan pembelian toko online lazada. *Journal of Business and Economics Research (JBE)*, *1*(1), 1-10.

Pujiono, M., Gapur, A., & Taulia, T. (2023). Elipsis Posposisi Bahasa Jepang dalam Komik Akira Karya Hiromasa Okushima. *Ranah: Jurnal Kajian Bahasa*, *12*(1), 51-60.

Putri, A. C., Priandita, R. P., Jauhariy, A. J., Aulia, D., Sananta, A. O., Nida, R., ... & Putrandha, E. C. (2023). Strategi Bimbingan Konseling dalam Pengaruh AI terhadap Kinerja Pembelajaran Mahasiswa FBS Jurusan Bahasa Jepang Universitas Negeri Semarang. *Journal of Education and Technology*, *3*(2), 143-151.

Rakian, S., & Lensun, S. (2021). YOUGEN TEIDO NO FUKUSHI DALAM KALIMAT BAHASA JEPANG. *Prosiding MINASAN*, *2*, 88-102.

Rapar, P. V., & Rorimpandey, G. C. (2023). Penerapan Teknologi Optical Character Recognition Pada Layanan Pendataan Pengunjung Di PT. Pertamina Geothermal

Energy Area Lahendong. Innovative: Journal Of Social Science Research, 3(6), 6484-6496.

Ray, S. A. (2019). Analisis Jenis-Jenis Metafora dalam Surat Kabar: Kajian Semantik. Bahastra: Jurnal Pendidikan Bahasa dan Sastra Indonesia, 3(2), 146-150.

Reswari, G. P. A., Pd, S., & Sc, M. (2020). Bahasa Jepang vs Bahasa Inggris sebagai Bahasa Asing dalam Persepsi Mahasiswa Indonesia. KIRYOKU, 4(2), 130-136.

Reza Pradhana, F., Harmini, T., Allen, F. V., & Virgantara Putra, O. (2020). Media Pembelajaran Bahasa Jepang Berbasis Mobile. *Fountain of Informatics Journal*, *5*(3), 25.

Riono, S. B., & Kharisma, A. S. (2023). Influence of accounting information systems and budget towards service quality (case study on BPJS patients at Sidamulya Health Center, Brebes). *Journal of Management Science (JMAS)*, *6*(4), 659-672.

Sahudi, K. (2020). Analisis Pemakaian Partikel Ni Dalam Kalimat Bahasa Jepang Pada Buku Minna No Nihongo I Dan II. *Syntax Literate; Jurnal Ilmiah Indonesia*, *5*(8), 588-594.

Sari, D. E., & Juariyah, J. (2023). Hambatan Komunikasi Antarbudaya Perantau Banyuwangi di Jepang. *Jurnal Bisnis dan Komunikasi Digital*, *1*(1), 11-11.

Setiana, S. M. (2023). Analisis Kebutuhan Pembelajaran Bahasa Jepang Mahasiswa Program Studi Ilmu Komunikasi Universitas Komputer Indonesia. *Janaru Saja: Jurnal Program Studi Sastra Jepang (Edisi Elektronik)*, *12*(2), 131-144.

Sinaga, M. A., & Berlianti, B. (2023). Pengembangan Literasi melalui Pembelajaran Part of Speech (Kelas Kata) dan Merangkum Buku pada Anak Panti Asuhan Puteri Aisyiyah Kota Medan. *JUDIKA: Jurnal Pendidikan dan Bahasa*, *1*(4), 130-138.

Softonic.com. (2024). *Oyomi Japanese Reader*. Diakses pada 20 Mei, 2024, dari https://oyomi-japanese-reader.en.softonic.com/android/

Sudipa, M. H. D. (2020). Interferensi Bahasa Indonesia pada Pembelajaran Bahasa Jepang: Indonesian Interference to Japanese Language Learning. *Kibas Cenderawasih*, *17*(2), 202-207.

Surya, M. A., Marnita, R., & Usman, F. (2022). HONORIFIK BAHASA JEPANG (KEIGO) DALAM SURAT ELEKTRONIK DI PERUSAHAAN JEPANG. *LINGUA: Jurnal Bahasa, Sastra, dan Pengajarannya*, *19*(1), 48-58.

Suryani, A. I. (2021). Japanese Language Learning Application Based On Android. JUSTIN (Jurnal Sistem dan Teknologi Informasi), 9(3), 348-354.

Syahrizal, H., & Jailani, M. S. (2023). Jenis-jenis penelitian dalam penelitian kuantitatif dan kualitatif. *QOSIM: Jurnal Pendidikan, Sosial & Humaniora*, *1*(1), 13-23.

Syam, S. (2020). Pengaruh Efektifitas Dan Efisiensi Kerja Terhadap Kinerja Pegawai Pada Kantor Kecamatan Banggae Timur. *Jurnal Ilmu Manajemen Profitability*, *4*(2), 128-152.

Trivedi, A., Pant, N., Shah, P., Sonik, S., & Agrawal, S. (2018). Speech to text and text to speech recognition systems-Areview. IOSR J. Comput. Eng, 20(2), 36-43.

Tombalisa, N. F., Fathurahmi, E., & Wirawan, R. (2022). Kerjasama Jepang Dan Indonesia Di Bidang Ketenagakerjaan Dalam Program Tokutei Ginou Tahun 2019. *Interdependence Journal of International Studies*, *3*(2), 76-81.

Ulfa, Rafika. "Variabel penelitian dalam penelitian pendidikan." Al-Fathonah 1, no. 1 (2021): 342-351.

Waruwu, Marinu. "Pendekatan penelitian pendidikan: metode penelitian kualitatif, metode penelitian kuantitatif dan metode penelitian kombinasi (Mixed Method)." *Jurnal Pendidikan Tambusai* 7, no. 1 (2023): 2896-2910

Widiastika, I. W. W. C., Meidariani, N. W., & Sari, N. P. L. (2024, June). Penggunaan Dan Perbandingan Makna Adjektiva 'Hidoi Dan Hageshii'Dalam Sinonim Bahasa Jepang. In *Prosiding Seminar Nasional Linguistik dan Sastra* (pp. 177-194).

Wijayadi, I. M. K., Sadyana, I. W., & Adnyani, K. E. K. (2018). Strategi Pengajaran Dalam Pembelajaran Dokkai Shochukyu Pada Mahasiswa Semester Iii Program Studi Pendidikan Bahasa Jepang Undiksha. *Jurnal Pendidikan Bahasa Jepang Undiksha*, *4*(2), 110-125.

Wijayanti, N. I., & Mustar, M. (2023). Tingkat Pengetahuan Pustakawan terhadap Brand Identity Perpustakaan. *Jurnal FPPTI*, 1-10.

WOLOK, A. (2018). PEMBAGIAN PEMAKAIAN KATA "DAKE DAN SHIKA" DALAM KALIMAT BAHASA JEPANG. *JURNAL ELEKTRONIK FAKULTAS SASTRA UNIVERSITAS SAM RATULANGI*, *2*(1).

Wulandari, A. S., Suardana, I. N., & Devi, N. P. L. (2019). Pengaruh model pembelajaran berbasis proyek terhadap kreativitas siswa SMP pada pembelajaran IPA. *Jurnal Pendidikan Dan Pembelajaran Sains Indonesia (JPPSI)*, *2*(1), 47-58.