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Exploring Learning Processes: A Qualitative Diary Study of Digital VS. Print Flashcards in Japanese Vocabulary Acquisition

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Abstract---*This study explores learning processes and learner perceptions in the use of printed and digital flashcards for Japanese vocabulary acquisition. Employing a qualitative diary study, data were collected from daily learning logs completed by learners at LPJ Bali during an ongoing instructional intervention. The learning logs documented study time, learning strategies, and perceived challenges while using either printed or digital flashcards. The findings reveal distinct patterns between the two flashcard modes. Learners using digital flashcards tended to engage in shorter study sessions and frequently combined multiple learning modes within a single session, whereas learners using printed flashcards more often studied for moderate durations using sequential and repetitive strategies. Reported challenges also differed across modes. While challenges in the printed flashcard group were mainly related to sustained effort and kanji processing, challenges in the digital flashcard group were more commonly associated with technical issues and attentional lapses. These findings are discussed through the lens of Cognitive Load Theory and Multimedia Learning Theory. The study suggests that although digital flashcards offer multimodal and game-based learning affordances, they may introduce additional extraneous cognitive load if not optimally managed. Conversely, printed flashcards provide a more stable learning environment with lower instructional complexity. As an exploratory process-focused study, the findings provide insights into how different flashcard modes shape learning behavior before outcome-based evaluation.*
Keywords---*experimental study, flashcards, Japanese vocabulary, mobile-assisted language learning, Quizlet.*

Introduction

Learning Japanese as a foreign language presents significant challenges for Indonesian learners, particularly in mastering vocabulary that includes complex characters such as *kanji.* The mastery of *kanji* requires not only strong visual memory but also a deep understanding of semantic meaning, making it one of the most demanding aspects of Japanese language learning. According to Sato (2015), there are 1,945 *kanji* characters used in daily life in Japan, known as *jōyō kanji.* This challenge is not limited to formal education settings such as schools and universities but is also experienced by learners in non-formal institutions such as vocational training centers (*Lembaga Pelatihan Kerja* or LPK), where students study Japanese language learning is closely related to the expanding employment opportunities in Japan through programs such as *Gino Jisshusei* (Technical Intern Training) and *Tokutei Gino* (Specified Skilled Worker). According to the Ministry of Health, Labour and Welfare (MHLW, 2022), there were 45,919 Indonesian workers in Japan, representing 14.1% of foreign workers and ranking second after Vietnam. This

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number rose to 100,754 in 2024 (MHLW, 2025). To qualify for these programs, trainees must achieve Japanese language proficiency equivalent to JLPT N4 or N3 within a limited time frame. Therefore, LPKs are required to implement more effective, efficient, and engaging teaching methods to help learners achieve the expected competency standards.

At LPK LPJ Bali, Japanese vocabulary instructions have mainly relied on traditional methods such as teacher-centered lectures and paper-based flashcards. However, preliminary observations and interviews with learners indicated issues of learning fatigue, decreased motivation, and difficulties in retaining vocabulary over time. The institution requires learners to reach JLPT N3-level proficiency, which involves reading and understanding approximately 3,700 words (Kandráč, 2023). Nevertheless, internal data show that the annual passing rate for proficiency tests equivalent to JLPT N3, such as the NAT-Test Q3 and J-Test Level D, remains arround 33% as of 2024. These results suggest a need for innovative teaching approaches that not only enhance short-term performance but also support long-term retention. One potential innovation involves integrating digital learning tools into the classroom. The rapid advancement of Information and Communication Technology (ICT) has provided a range of digital learning media that can support language education. Among these, mobile devices play a central role in *Mobile-Assisted Language Learning* (MALL), which can be a dynamic, creative, and individualized learning environment when properly designed and implemented (Soleimani et al., 2014).

Quizlet, a digital flashcard platform accessible via smartphones, represents one of the most popular MALL-based tools in foreign language education. It combines features such as gamified learning, self-paced repetition, and test modes, which can help learners engage with vocabulary more actively. A growing number of studies have examined the pedagogical potential of Quizlet in vocabulary Acquisition. Research conducted by Ho & Kawaguchi (2021), Alhadiah (2020), and Baptist (2018) found that using Quizlet improved learners' vocabulary mastery and motivation. However, other studies, such as those by Perez (2021) and Matsuo (2024), reported no significant differences between technological application and traditional flashcards, particularly regarding long-term retention. Despite the increasing attention to digital learning tools, there is still limited empirical research investigating the effectiveness of Quizlet in the context of Japanese language learning in Indonesia, especially within non-formal education environments such as vocational training centres. This research gap highlights the need for further investigation comparing the potential of digital learning tools and conventional methods (Etzioni et al., 2005).

Given this gap, the present study explores learners' learning processes and perceptions when using digital and print flashcards for Japanese vocabulary acquisition at LPK LPJ Bali. Focusing on daily learning logs, this study examines how learners allocate study time, employ learning strategies, and perceive challenges during the learning process.

This qualitative study forms part of a larger experimental project employing a pretest-posttest-delayed post-test control group design. The present article reports only the qualitative findings from the treatment period. Accordingly, this study addresses the following research questions: How do learning processes and learner perceptions differ between digital and print flashcard use in Japanese vocabulary learning?

Method

Broader Research Design

This qualitative study constitutes a part of a larger quasi-experimental research project employing a pretest - post-test - delayed post-test control group design. The main design aims to measure the immediate effectiveness and short-term retention of two flashcard media. Procedurally, all participants first completed a pretest to assess their prior vocabulary knowledge. They were then randomly assigned to two groups: one group used print flashcards, while the other used digital flashcards, both containing identical vocabulary materials (102 vocabulary items at JLPT N2 levels, with a learning target of 5-6 vocabulary items per day). The intervention or flashcard-based learning period lasted for one month. At the end of the intervention, a post-test was administered to measure immediate learning outcomes. Following this, participants' access to the flashcards was withdrawn. Two weeks after the post-test, a delayed post-test was conducted to assess vocabulary retention. This preliminary study focuses on learning process data collected during the one-month intervention period, before the analysis of post-test and delayed post-test results (Creswell & Creswell, 2017).

Research Setting and Participants

This study was conducted at LPK LPJ Bali, a vocational training institution. The participants were students preparing for departure to Japan with an intermediate level of Japanese language proficiency, as determined by the institution's official placement test. The data source for this qualitative study consisted of 50 participants selected purposively based on the completeness and consistency of their learning log submissions. These participants were drawn from a larger experimental study in which participants had been randomly assigned to two groups. The composition of the participants in this study included 26 users of print flashcards and 24 users of digital flashcards. Before the study, all participants had signed an Informed Consent Form that explained the research objectives, procedures, data confidentiality, and their right to withdraw from the study at any time without any consequences.

Instruments and Treatment

Two sets of flashcards with identical content were used as the treatment. The flashcard content consisted of 102 Japanese vocabulary items at the JLPT N2 level, organized into 5-6 items per day. The distinction between the two sets lay in the medium used. Digital flashcards were developed using the Quizlet application, which provides six interactive learning modes: Flashcard, Learn, Test, Match, Blast, and Blocks. Print flashcards were printed on 190-gram art paper (10 x 4.5 cm, landscape orientation) and bound using a ring binder.

Participants' learning processes were documented through a learning log administered via Google Forms, which was completed after each learning session. The learning log recorded (1) study duration (categorized by time range), (2) learning strategies/activities (using fixed-choice options with an open-ended description field), and (3) challenges encountered (open-ended descriptive responses). This instrument served as the primary source of qualitative data for the study.

Data Collection Procedure

Participants were instructed to complete a learning log administered via Google Forms after each independent learning session throughout the one-month intervention period. Periodic reminders were provided by the researcher to encourage consistent completion. As a result, 50 complete learning logs were collected from 26 print flashcard users and 24 digital flashcard users, which served as the primary data for this qualitative study.

Data Analysis

Data from the learning logs were analyzed using an interactive qualitative analysis model proposed by Miles et al. (2014), consisting of data reduction, data display, and conclusion drawing/verification. During the data reduction stage, responses related to study duration, learning strategies, and reported challenges were organized and simplified. Frequencies of study time categories (<10 minutes, 10-30 minutes, and >30 minutes) and learning strategy selections were summarized to identify dominant patterns within the digital and print flashcard groups.

In the data display stage, the reduced data were presented in tables and figures to facilitate comparison between groups and to highlight observable trends in study behaviors. Finally, conclusions were drawn by interpreting recurring patterns and relationships across the display data. Open-ended responses in the "Other" and Challenges" sections were thematically grouped to support and refine the emerging interpretations. These conclusions were continuously verified through comparison of data across analysis stages (Nikoopour & Kazemi, 2014).

Findings

Learning Time Distribution Across Flashcard Modes

Data on study time were collected from learning logs completed by the participants during the treatment period. The learning logs recorded the duration of time participants spent independently studying Japanese vocabulary using either printed flashcards or digital flashcards. These data were used to describe patterns of time-on-task engagement associated with each flashcard mode. During each study session, participants were instructed to memorize at least five Japanese vocabulary items. Table 1 presents the findings related to study time across the two flashcard conditions.

Table 1
Time Distribution Data

No	Group	Time Distribution		
		<10 minutes	10-30 minutes	>30 minutes
1	Print	24%	61%	15%
2	Digital	45%	48%	8%

Based on Table 1, an overall difference in study time patterns can be observed between the printed flashcard group and the digital flashcard group. The printed flashcard group tended to engage in learning sessions of moderate duration, namely between 10 and 30 minutes. In contrast, the digital flashcard group more frequently engaged in shorter learning sessions of less than 10 minutes. In both groups, study durations exceeding 30 minutes were relatively rare.

In the printed flashcard group, 61% of participants reported studying for 10 to 30 minutes, while 24% reported study durations of less than 10 minutes, and 15% reported studying for more than 30 minutes. This pattern suggests that the use of printed flashcards tended to encourage relatively stable and moderately timed study sessions. By contrast, the digital flashcard group showed a distribution of study time that was more concentrated in shorter durations. A total of 45% of participants reported studying for less than 10 minutes, while 48% reported a study duration of 10 to 30 minutes. Only a small proportion of participants (8%) reported studying for more than 30 minutes. These findings indicate that learning with digital flashcards was more frequently conducted in shorter study sessions.

When compared directly, participants in the digital flashcard group generally spent less time studying than those in the printed flashcard group. While the printed flashcard group was predominantly associated with moderate study durations, the digital flashcard group was dominated by short-duration learning sessions. Nevertheless, in both groups, the proportion of participants reporting long study duration was relatively small. This difference in patterns suggests variation in how learner allocated their study time depending on the flashcard mode used.

Learning Strategies Across Flashcard Modes

This section presents findings on the learning strategies employed by participants while studying Japanese vocabulary using printed and digital flashcards. The data were obtained from both open-ended and closed-ended entries in the learning logs, which allowed participants to report one or more learning strategies used within a single study session. Overall, differences in learning strategy patterns were observed between the printed flashcard group and the digital flashcard group. Participants in the printed flashcard group tended to rely on a single dominant strategy during learning sessions. In contrast, participants in the digital flashcard group more frequently combined multiple learning modes within a single session, indicating greater variability in the strategies used (Arroyo-Cedeño et al., 2024).

Learning Strategies in the Printed Flashcard Group

In the printed flashcard group, the most dominant strategy was reading the flashcards one by one. A total of 76% of the reports indicated the use of this strategy as the sole learning method. This finding suggests that most participants relied on a sequential and individual learning approach when using printed flashcards. Other strategies were rarely reported as standalone methods. Rewriting vocabulary items in a notebook was reported by only one participant (2%), and pair or group study was also reported by one participant (2%). No participants reported using games with peers as their only learning strategy. These results indicate that learning strategies other than individual card reading were infrequently used independently in the printed flashcard group.

While the use of a single strategy was most common, some printed flashcard group participants described that they applied two or more strategies simultaneously. The most frequent composite intervention type was reading flashcards one by one plus pair/group study, reported in three studies (7%). Other pairings were reading flashcards and writing vocabulary words in a notebook, along with reading flashcards and playing games with peers, respectively. Only a few respondents indicated that they utilized three strategies at once (i.e., reading flashcards individually, learning with partners and peers, and playing games with teammates). These results suggest that strategic variation does exist, but is only applicable to a relatively small number of cases.

Learning Strategies in the Digital Flashcard Group

In contrast to the participants in the printed flashcard condition, those in the digital flashcard condition were more likely to mix and match multiple learning modes in one study episode. The participants also did not use only one function, but several available in the digital flashcards app, such as flashcards, learn, test, match, blast, and blocks.

The most common strategy combination was flashcards, learn and test, which occurred in 13 reports. Moreover, flashcards, learn, test, and match were the combination used by 8 users. A few said they used more complex permutations involving five or six learning modes in a single session. Our results imply that learning with digital flashcards encourages learners to actively switch among different learning modes. In line with the combined strategies being predominant, a couple of users mentioned their only use of one single learning mode; and that was it. Six people said that they used the flashcards mode alone, and one person said that she used the test mode alone. However, the participants who used a single strategy were far outnumbered by those who used multiple learning modes.

A close inspection of the two groups reveals a notable contrast in the pattern of learning strategies between the two. The printed flashcard group seemed to apply more straightforward and repetitive learning strategies, focusing primarily on reading cards in sequence. In contrast, the digital flashcard group showed a different pattern of learning strategies at the study session level, transferring between several modes of learning in one session. The distinction seems to represent different ways in which participants took advantage of the affordances of the learning media they used.

Learning Challenges Across Flashcard Modes

This section describes the challenges reported by participants while using printed and digital flashcards in learning Japanese vocabulary. The data were obtained from open-ended responses in the learning logs.

Challenges in the Use of Printed Flashcards

Most participants in the printed flashcard group reported experiencing no major challenges during the learning process. This was reflected in frequent statements such as “no problems,” “everything was fine,” or “no challenges so far.” These responses indicate that, in general, participants perceived printed flashcards as not causing technical difficulties or significant obstacles in vocabulary learning.

Despite the absence of reported challenges for most participants, several participants mentioned difficulties related to time management and memorization speed. One participant reported difficulty managing study time effectively, while another indicated that the material could not be memorized quickly. These findings suggest that the challenges associated with printed flashcard use were primarily individual in nature and related to learners’ cognitive processes and study habits.

In addition, some participants reported challenges in understanding certain kanji in example sentences, including unfamiliarity with their readings. A few participants also mentioned feeling tired during memorization, although they continued with the learning process. These challenges indicate that, in the use of printed flashcards, the difficulties encountered were more closely related to the complexity of the learning material and the learners’ physical condition.

Challenges in the Use of Digital Flashcards

In the digital flashcard group, most participants similarly reported experiencing no major challenges when using the learning media. Some participants even expressed positive perceptions of digital flashcards, noting their ease of use and game-like features that supported vocabulary memorization. These findings suggest that digital flashcards were generally accessible and user-friendly for participants.

However, unlike the printed flashcard group, the challenges reported in the digital flashcard group were largely related to technical issues. Several participants mentioned internet connectivity problems, such as unstable signals or intermittent dormitory Wi-Fi connections. These issues occasionally disrupted the learning process or limited participants’ ability to study optimally at certain times. In addition to technical challenges, some participants reported cognitive difficulties, such as forgetting to study, falling asleep while using the flashcards, or difficulty remembering certain vocabulary items and kanji. A few participants also indicated that they had not yet fully understood the material because the application was still unfamiliar to them. These findings suggest that challenges in digital

flashcard use were not limited to technical factors but also involved issues of concentration and learners' adaptation to the digital learning environment.

When comparing the two groups, challenges in the printed flashcard group tended to be associated with internal factors, such as time management, fatigue, and kanji comprehension. In contrast, challenges in the digital flashcard group were more frequently related to external factors, particularly internet connectivity issues, as well as cognitive challenges such as forgetfulness and difficulty retaining vocabulary. This contrast indicates that the types of challenges experienced by participants were influenced by the characteristics of the flashcard media employed.

Discussions

Study Time Patterns and Cognitive Load from the Perspective of Cognitive Load Theory

The results suggest that participants in the digital flashcard condition studied in briefer bursts relative to participants in the printed flashcard condition, who studied in moderate-length sessions more often. This shift in study time distribution can be explained based on Cognitive Load Theory (Sweller et al., 2011), where working memory load is affected by intrinsic and extraneous cognitive load.

Sweller et al. (2011), state that intrinsic cognitive load is the cognitive load associated with the complexity of the information that the learner is to learn, and extraneous cognitive load is the cognitive load imposed by the way in which information is presented to the learner or by the activities in which they have to engage. Within this research, technical difficulties (e.g. unstable internet connection and having to switch between different modes in digital flashcards) can be considered as sources of extraneous cognitive load, although not always directly related to the objective of learning vocabulary. When total cognitive load (including both intrinsic and extraneous cognitive load) surpasses working memory capacity, information processing might be impaired (Sweller et al., 2011). Hence, the participants' preference for shorter study intervals while using digital flashcards can be interpreted as an adjustment to cognitive load demands and to a load that fits the working memory constraints.

On the other hand, studying with traditional flashcards, which is associated with less exogenous distraction, gave the participants the opportunity to concentrate for more cohesive and less erratic durations of studying.

Learning Strategies and the Complexity of Information Processing

Differences in learning strategies between the two groups reflect differences in the level of information-processing complexity. In the printed flashcard group, the dominant learning strategy was sequentially reading flashcards one by one. This approach reflects information processing with relatively low element interactivity, making it easier to manage within working memory (Sweller et al., 2011).

Sweller et al. (2011), emphasize that information becomes difficult to understand when it consists of many interacting elements that must be processed simultaneously in working memory. In this regard, the reliance on a single dominant strategy in the printed flashcard group allowed learners to limit the number of elements processed at any given time. By contrast, participants in the digital flashcard group tended to combine multiple learning modes, such as flashcards, learn, test, and game-based features. While this strategy increased the variety of learning activities, it also increased the number of elements that needed to be processed concurrently. Thus, although multimodal use has the potential to enrich the learning experience, the simultaneous use of multiple modes may also increase cognitive load if not managed optimally.

Learning Challenges as Indicators of Intrinsic and Extraneous Cognitive Load

The learning challenges reported by participants provide insights into how cognitive load was experienced across the two flashcard modes. As both groups learned identical vocabulary materials, differences in reported challenges cannot be attributed to variations in intrinsic cognitive load. In the printed flashcard group, challenges such as kanji comprehension difficulties, slower memorization, and fatigue reflect individual learner factors, including prior knowledge and sustained cognitive effort, rather than properties of the learning material or instructional design. The relatively stable learning environment of printed flashcards may have supported longer study durations, which in turn increased perceived effort. In contrast, challenges in the digital flashcard group were mainly related to technical issues and attentional lapses, such as internet instability and forgetfulness. These challenges are more appropriately interpreted as sources of extraneous cognitive load arising from the learning environment and mode of delivery

(Sweller et al., 2011). Overall, while intrinsic cognitive load remained constant across groups due to identical content, the nature of extraneous cognitive load differed depending on the characteristics of the flashcard mode.

Digital Flashcards, Game Features, and Multimedia Learning Principles

The use of game-based modes in digital flashcards is closely related to Multimedia Learning Theory (Mayer). Mayer (2022) argues that effective educational games should incorporate focus, practice, feedback, challenge, variation, and enjoyment. Participants' positive perceptions of game features in digital flashcards suggest that several of these principles were present. Furthermore, Mayer et al. (2022) explain that information processing in working memory involves two subsystems: a descriptive subsystem and a depictive subsystem. In digital flashcards, the integration of text, images, and interactive elements allows for the activation of both subsystems, potentially enriching the semantic processing of vocabulary.

However, Mayer also emphasizes that text and picture comprehension are active processes of coherence formation. When variations in modes and stimuli are not optimally integrated, learning may instead increase extraneous cognitive load. This interpretation aligns with the findings that some participants experienced forgetfulness, fatigue, or concentration difficulties when using digital flashcards.

Previous Research and the Position of the Present Study

The findings of this study are consistent with Ho & Kawaguchi (2021), who reported that multimodal learning environments such as Quizlet provide more input, learning activities, output opportunities, and feedback than printed flashcards. However, the present study highlights that increased activity variation should also be examined from the perspective of learners' cognitive load.

Similarly, Babtist (2018), found that the majority of students improved their vocabulary mastery after using Quizlet, although not all students benefited equally. This suggests that the effectiveness of digital flashcards is strongly influenced by how learners interact with available features. The observed variation in study time patterns is also relevant to Matsuo (2024), who reported that learning time significantly predicts vocabulary breadth and depth. In the context of the present study, differences in time allocation between printed and digital flashcards indicate that learning media can influence how learners invest time and cognitive effort.

Preliminary Implications and Directions for Future Research

Based on the findings and discussion, it can be concluded that printed and digital flashcards offer distinct learning experiences in terms of cognitive load management, learning strategies, and challenges encountered by learners. Digital flashcards provide variety and multimodal learning potential but also carry the risk of increasing extraneous cognitive load. In contrast, printed flashcards offer a simpler and more stable learning environment, albeit with more limited strategic variation.

As this study is conducted during the learning process, the findings should be regarded as exploratory. Therefore, the results of the post-test and delayed post-test in subsequent stages are expected to provide a more comprehensive understanding of the relationship between learning processes, cognitive load, and Japanese vocabulary learning outcomes.

Conclusions

This qualitative diary study explored learning processes and learner perceptions in the use of printed and digital flashcards for Japanese vocabulary acquisition, with particular attention to study time patterns, learning strategies, and reported challenges. The findings indicate that the two flashcard modes afford distinct learning experiences that shape how learners allocate time, manage cognitive load, and engage with learning strategies.

Participants using digital flashcards tended to engage in shorter study sessions and to combine multiple learning modes within a single session. These patterns suggest an adaptive response to the higher variability and potential sources of extraneous cognitive load associated with digital learning environments, such as technical issues and frequent mode switching. In contrast, learners using printed flashcards more often engaged in moderately timed and sustained study sessions, relying on simpler and more sequential strategies that reduced element interactivity and supported focused processing of vocabulary content.

Although both groups studied identical learning materials, the nature of reported challenges differed according to the flashcard mode. Challenges in the printed flashcard group were largely related to individual learner factors, such

as sustained effort and kanji processing, whereas challenges in the digital flashcard group were more closely associated with environmental and attentional factors, reflecting differences in extraneous cognitive load. These findings highlight the importance of considering not only the affordances of learning media but also their cognitive demands.

This study shows that digital and printed flashcards influence learning processes in different ways, even when learning content is held constant. While digital flashcards offer multimodal and game-based features that can enhance engagement, they may also increase extraneous cognitive load if not carefully managed. Printed flashcards, on the other hand, provide a more stable learning environment, albeit with less strategic variation. As this study represents an exploratory phase within a larger experimental research project, future analyses incorporating post-test and delayed post-test data are expected to provide a more comprehensive understanding of how these process-level differences relate to vocabulary learning outcomes over time. Such findings will be essential for informing pedagogical decisions regarding the effective integration of digital and non-digital flashcards in Japanese language education.

References

Alhadiah, A. (2020). The effectiveness of Quizlet application in enhancing EFL students' vocabulary learning. *Arab World English Journal (AWEJ), 11*(1), 283–294.

Arroyo-Cedeño, C. G., Zambrano-Mera, D. Y., & Mendoza-Ponce, H. X. (2024). Technological tools in English language teaching activities to deaf students. *International Journal of Humanities, Literature and Arts*, *7*(1), 1-8. https://doi.org/10.21744/ijhla.v7n1.2235

Babtist, M. (2018). Using digital flashcards for vocabulary learning: A study on Quizlet use in foreign language classrooms. *Journal of Language Teaching and Research, 9*(2), 233–241.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Etzioni, O., Cafarella, M., Downey, D., Popescu, A. M., Shaked, T., Soderland, S., ... & Yates, A. (2005). Unsupervised named-entity extraction from the web: An experimental study. *Artificial intelligence*, *165*(1), 91-134. https://doi.org/10.1016/j.artint.2005.03.001

Ho, T. T. H., & Kawaguchi, S. (2021). The effectiveness of Quizlet in improving EFL learners' receptive vocabulary acquisition. *Asiatic: IIUM Journal of English Language and Literature*, *15*(1), 115-159.

Japan Ministry of Health, Labour and Welfare (MHLW). (2022). Status of foreign workers in Japan 2022. Tokyo: MHLW.

Japan Ministry of Health, Labour and Welfare (MHLW). (2025). Statistics on foreign workers 2025. Tokyo: MHLW.

Kandráč, P. (2023). How Many Jōyō Kanji Readings Are Rarely Used?. *Studia Orientalia Slovaca*, *22*(1).

Matsuo, Y. (2024). The effect of digital flashcards on long-term vocabulary retention in Japanese language learning. *Journal of Applied Linguistics and Language Education, 12*(1), 54–67.

Mayer, R. E. (2022). The future of multimedia learning. *The Journal of Applied Instructional Design*, *11*(4), 69-77.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). Qualitative data analysis: A methods sourcebook (3rd ed.). SAGE Publications.

Nikoopour, J., & Kazemi, A. (2014). Vocabulary learning through digitized & non-digitized flashcards delivery. *Procedia-Social and Behavioral Sciences*, *98*, 1366-1373. https://doi.org/10.1016/j.sbspro.2014.03.554

Perez, R. (2021). A comparative study of digital and traditional flashcards in vocabulary learning. *Language Education and Technology Journal, 5*(3), 89–102.

Sato, H. (2015). Kanji learning and recognition: Challenges for foreign learners of Japanese. *Japanese Language Education Review, 21*(2), 45–59.

Soleimani, E., Ismail, K., & Mustaffa, R. (2014). The acceptance of mobile assisted language learning (MALL) among post graduate ESL students in UKM. *Procedia-Social and Behavioral Sciences*, *118*, 457-462. https://doi.org/10.1016/j.sbspro.2014.02.062

Sweller, J., Ayres, P., & Kalyuga, S. (2011). Altering element interactivity and intrinsic cognitive load. In *Cognitive load theory* (pp. 203-218). New York, NY: Springer New York.