HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

THE ROLE OF VISUALIZATION TECHNOLOGY IN TEACHING JAPANESE KANJI

Pulotoy Najmieva
SamSIFL

Yuta Ujiie
JICA volunteer
DOI:https://doi.org/10.5281/zenodo.20973598

Abstract. This article examines Japanese writing as a complex object of foreign-language instruction and analyzes the role of kanji in the linguistic system of Japanese. The study focuses on the psycholinguistic and pedagogical difficulties that learners face when mastering kanji, including the simultaneous acquisition of graphic form, meaning, readings, stroke order, and contextual usage. The article argues that visualization technology is an effective methodological tool for reducing cognitive load, strengthening visual memory, and developing conscious strategies for learning hieroglyphic writing. Special attention is paid to radicals, associative models, graphic schemes, digital tools, and interactive visual resources. The article concludes that systematic visualization should not be treated as a supplementary element, but as an integral component of Japanese language teaching.

Keywords: Japanese language, kanji, hieroglyphic writing, visualization technology, foreign-language teaching, cognitive load, visual memory, radicals.

Annotatsiya. Ushbu maqolada yapon yozuvi chet tilini o‘qitishning murakkab obyekti sifatida tahlil qilinadi hamda kanjilarning yapon tili tizimidagi o‘rni yoritiladi. Tadqiqotda o‘rganuvchilar iyerogliflarni o‘zlashtirish jarayonida duch keladigan psixolingvistik va pedagogik qiyinchiliklar, xususan grafik shakl, ma’no, o‘qilish, chiziqlar tartibi va kontekstual qo‘llanishni bir vaqtda egallash zarurati ko‘rib chiqiladi. Maqolada vizualizatsiya texnologiyasi kognitiv yuklamani kamaytirish, ko‘rish xotirasini mustahkamlash va iyeroglif yozuvini ongli o‘zlashtirish strategiyalarini rivojlantirishda samarali metodik vosita ekanligi asoslanadi.

Kalit so‘zlar: yapon tili, kanji, iyeroglif yozuvi, vizualizatsiya texnologiyasi, chet tilini o‘qitish, kognitiv yuklama, ko‘rish xotirasi, radikallar.

Аннотация. В статье рассматривается японская письменность как сложный объект обучения иностранному языку и раскрывается роль кандзи в системе японского языка. Основное внимание уделяется психолого-педагогическим трудностям усвоения иероглифов, связанным с одновременным запоминанием графической формы, значения, чтений, порядка черт и контекстуального употребления. Обосновывается, что технология визуализации является эффективным методическим средством снижения когнитивной нагрузки, развития зрительной памяти и формирования осознанных стратегий изучения иероглифической письменности.

Ключевые слова: японский язык, кандзи, иероглифическая письменность, технология визуализации, обучение иностранному языку, когнитивная нагрузка, зрительная память, радикалы.

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

Introduction

Japanese writing is one of the most complex and distinctive writing systems in the world. Unlike languages that rely mainly on a single alphabetic script, modern Japanese uses several graphic systems simultaneously: kanji, hiragana, and katakana. Each of these systems performs a specific function, but kanji occupy a central position because they carry the main lexical and semantic load of written texts. For this reason, kanji learning is not merely a technical skill of writing signs; it is a necessary condition for understanding vocabulary, grammar, style, and cultural meaning in Japanese.

The relevance of this topic is determined by the fact that Japanese language learners, especially those whose native languages use alphabetic writing, often perceive kanji as the most difficult and demotivating part of study. The difficulty is caused not only by the large number of characters, but also by their internal complexity. A single kanji may combine several readings, different meanings, graphic elements, and contextual functions. Therefore, effective kanji instruction requires methods that correspond to the visual, semantic, and cognitive nature of the writing system.

The purpose of this article is to describe the role of kanji in the Japanese language system, identify the main psycholinguistic and pedagogical difficulties of their acquisition, and justify the importance of visualization technology in teaching kanji. The article is based on the view that visualization enables learners to see kanji not as isolated graphic symbols, but as structured units with internal form, semantic motivation, and functional connections.

Japanese writing as an object of instruction and the role of kanji

Japanese writing is characterized by the parallel use of logographic and syllabic systems. Hiragana is mainly used for grammatical elements, native words, and phonetic support, while katakana is commonly used for foreign borrowings, emphasis, and special stylistic purposes. Kanji, however, are used to represent roots, lexical units, abstract concepts, and semantic contrasts. This distribution gives Japanese writing a multi-layered structure that makes it compact, meaningful, and visually differentiated.

The central role of kanji is especially visible in reading. Because the Japanese language has a relatively limited number of syllables, homonymy is widespread. Written kanji help distinguish between words that sound identical but differ in meaning. For example, words that have the same pronunciation may be immediately differentiated through their graphic form. Thus, kanji contribute to semantic precision and reduce ambiguity in scientific, journalistic, literary, and official texts.

Kanji also play an important role in the formation of vocabulary. Many lexical units, especially those belonging to academic, professional, and formal registers, are written with kanji. Knowledge of the structure and meaning of individual characters allows learners to guess the meaning of new compounds. In this sense, kanji are not only objects of memorization, but also instruments for expanding vocabulary and developing independent reading competence.

Another specific feature of kanji is their graphic organization. Each character consists of a certain number of strokes that must be written in an established order. Stroke order is not a formal detail; it helps learners develop stable motor habits, recognize characters more quickly, and reproduce them correctly. When stroke order is ignored, the visual image of the character may be distorted, which can negatively influence both writing and recognition.

Radicals are another important component of kanji structure. They perform classifying and semantic functions, helping learners systematize characters according to common graphic or semantic features. Understanding radicals makes it possible to group kanji, notice recurring elements, and build meaningful associations. However, learners often have difficulty recognizing radicals or interpreting their function, which means that radical-based instruction must be organized consciously and consistently.

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

The role of kanji extends beyond linguistic communication. Many characters preserve cultural and historical meanings, reflecting the worldview, traditions, and imagery of East Asian written culture. The study of kanji etymology may strengthen intercultural competence because it shows how visual signs can be connected with objects, natural phenomena, social relations, and abstract ideas. Consequently, kanji instruction should combine linguistic, cognitive, and cultural aspects.

Psycholinguistic and pedagogical difficulties in kanji acquisition

The acquisition of kanji is a complex psycholinguistic process. In alphabetic writing systems, a graphic sign is usually associated with a sound or a small group of sounds. Kanji, by contrast, represent complex visual units that connect graphic form, meaning, and pronunciation. Learners must simultaneously remember the shape of the character, its semantic value, possible on-readings and kun-readings, stroke order, and contextual usage. This multi-component structure increases cognitive load.

Visual memory plays a leading role in kanji learning. The learner must recognize and reproduce a large number of visually complex signs, many of which contain similar elements. Individual differences in visual memory strongly influence the success of learning. Students with weaker visual memory may confuse characters that are graphically close or share the same radical. This produces errors in reading, writing, and vocabulary recognition.

Another important difficulty is character interference. Learners often mix kanji that are visually similar, semantically related, or used in similar lexical contexts. Such interference is especially frequent at the beginning and intermediate stages of learning, but it may continue at advanced levels as the number of characters increases. Without systematic classification and comparison, the learner's knowledge remains fragmented.

Pedagogical difficulties are also connected with traditional methods of teaching kanji. Mechanical copying and repetition may help short-term memorization, but they do not always lead to deep understanding. When students memorize kanji as isolated signs, they quickly forget them or fail to recognize them in compounds and texts. For this reason, effective teaching must combine repetition with structural analysis, radical awareness, associative thinking, and contextual use.

A further difficulty is the limitation of classroom time. Learners need to master a large number of characters, but the number of instructional hours is usually limited. As a result, teachers may be forced to move quickly through the material, and students may develop only superficial knowledge. This problem requires an optimized methodology that selects essential information, organizes it visually, and helps students transfer knowledge from one character to another.

The emotional side of learning must also be considered. Kanji are frequently perceived as an inaccessible and overwhelming component of Japanese. When learners do not see progress, their motivation decreases, anxiety grows, and the fear of making mistakes becomes stronger. A supportive classroom atmosphere and visually clear tasks can reduce psychological tension and help students gain confidence in their own learning abilities.

Visualization technology in modern pedagogy and foreign-language teaching

Visualization technology is a set of methods and techniques for presenting information in a clear, structured, and visually accessible form. It is closely related to the didactic principle of visibility, but modern visualization is broader than the use of illustrations. It does not simply show an object; it reveals its internal structure, relations, functions, and patterns. Therefore, visualization becomes a means of cognitive processing rather than a decorative element of instruction.

In foreign-language teaching, visualization is especially valuable because language learning requires the acquisition of large amounts of new information: vocabulary, grammar, phonetics, writing, and cultural knowledge. Tables, schemes, diagrams, mind maps, infographics, pictograms, multimedia presentations, and digital applications help structure language material and make it easier to remember.

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

Visualization transforms abstract information into a form that learners can observe, compare, and organize.

When applied to kanji instruction, visualization corresponds directly to the nature of the material. Kanji are visual signs, and their acquisition depends on the ability to see internal components, identify radicals, follow stroke order, and connect graphic form with meaning. Visual models allow the teacher to demonstrate how a complex character is built from simpler elements. This helps learners understand the character as a system rather than as an arbitrary drawing.

Associative visualization is particularly useful. A character may be connected with an image, a story, an etymological explanation, or a semantic network. Such associations activate visual and semantic memory at the same time. For example, if learners understand how a radical contributes to meaning, they are more likely to recognize related characters and remember them for a longer time. Color coding may also help distinguish radicals, phonetic elements, stroke groups, or semantic components.

Digital tools expand the possibilities of visualization. Interactive boards, animated stroke-order programs, online platforms, and mobile applications can show the dynamic process of writing kanji. Animation is important because kanji writing is not only a static visual image but also a sequence of movements. When learners see the order and direction of strokes, they can develop more accurate motor memory and reproduce the character more confidently.

However, visualization must be methodologically justified. If visual materials are used randomly or excessively, they may overload attention and reduce learning efficiency. The teacher must select visual tools according to the goal of the lesson, the level of students, the complexity of the character, and the expected learning outcome. Proper visualization should simplify the material, not make it more complicated.

Methodological implications for teaching Japanese kanji

The use of visualization technology in kanji instruction should be systematic. At the introductory stage, the teacher can present the character through its general shape, meaning, and basic visual association. At the next stage, the character should be divided into components: radicals, recurring graphic elements, and stroke sequence. Then the character should be connected with words and short contexts so that learners understand its real linguistic function.

A productive lesson may include several visual steps. First, the teacher introduces the kanji in a large and clear form. Second, the components are marked or separated. Third, the stroke order is shown through arrows or animation. Fourth, the meaning is explained through an image, semantic association, or etymological comment. Finally, learners use the kanji in compounds, sentences, or short texts. This sequence combines perception, understanding, memory, and use.

Visualization can also support independent learning. Students may create their own kanji cards, mind maps, radical charts, or associative drawings. Such tasks increase active participation and develop metacognitive skills, because learners become aware of how they remember, classify, and review information. When students build their own visual models, they do not only receive knowledge; they construct it.

The method is also useful for differentiated teaching. Some students remember better through images, others through movement, color, or spatial organization. A variety of visual tools makes it possible to address different cognitive styles. This is especially important in groups where students differ in language level, memory capacity, motivation, and previous experience with non-alphabetic writing systems.

Visualization contributes to long-term retention. Information presented in a structured visual form is easier to store and retrieve because it is connected with associations and patterns. In kanji

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

learning this means more stable recognition during reading and more accurate reproduction during writing. The learner gradually moves from mechanical memorization to analytical and conscious mastery of the writing system.

Conclusion

Japanese kanji are a central component of the Japanese writing system and an essential condition for full language competence. They carry lexical meaning, reduce homonymy, support vocabulary development, and preserve cultural information. At the same time, kanji are one of the most difficult elements of Japanese for foreign learners because they require the simultaneous acquisition of graphic form, meaning, readings, stroke order, radicals, and contextual functions.

The main psycholinguistic difficulties of kanji acquisition are connected with high cognitive load, the limits of working memory, visual similarity between characters, interference, and the need to coordinate visual, motor, auditory, and semantic memory. Pedagogical difficulties arise from limited classroom time, mechanical memorization, insufficient systematization, and lack of individualized strategies. These factors may reduce motivation and create anxiety among learners.

Visualization technology offers an effective way to overcome these difficulties. Schemes, tables, radical maps, associative images, animated stroke order, color coding, and digital tools help learners perceive kanji as structured and meaningful units. Visualization reduces cognitive load, strengthens memory, supports motivation, and encourages conscious learning strategies. Therefore, in Japanese language teaching, visualization should be regarded not as an auxiliary technique, but as an integral methodological component of kanji instruction.

References

1. Banno, E., Ikeda, Y., Ohno, Y., Shinagawa, C., & Tokashiki, K. (2020). Genki: An Integrated Course in Elementary Japanese. Tokyo: The Japan Times Publishing.
2. Hadamitzky, W., & Spahn, M. (2012). Kanji & Kana: A Handbook of the Japanese Writing System. Tokyo: Tuttle Publishing.
3. Heisig, J. W. (2011). Remembering the Kanji 1: A Complete Course on How Not to Forget the Meaning and Writing of Japanese Characters. Honolulu: University of Hawaii Press.
4. Kess, J. F., & Miyamoto, T. (1999). The Japanese Mental Lexicon: Psycholinguistic Studies of Kana and Kanji Processing. Amsterdam: John Benjamins.
5. Mayer, R. E. (2009). Multimedia Learning. Cambridge: Cambridge University Press.
6. Paivio, A. (1986). Mental Representations: A Dual Coding Approach. Oxford: Oxford University Press.
7. Seeley, C. (1991). A History of Writing in Japan. Leiden: Brill.
8. Sweller, J., Ayres, P., & Kalyuga, S. (2011). Cognitive Load Theory. New York: Springer.