

Development of “Kanji No Gakuen” as a Roblox-Based Learning Media for N5 Kanji

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ABSTRACT

This study aimed to develop and validate a Roblox-based learning media titled “Kanji No Gakuen” to help Japanese-language education students overcome persistent difficulty in memorizing N5 kanji, particularly kanji related to the theme of time. A Research and Development approach was applied using the Planning, Production, and Evaluation (PPE) model, involving a needs analysis of 107 students and expert validation by a media expert and a material expert using Likert-scaled questionnaires. The developed game integrates kanji vocabulary quizzes, on’yomi/kun’yomi drills, and stroke-order (kakikata) practice. Validation results showed feasibility scores of 90.00% for media and 91.67% for material, both categorized as Highly Feasible.

INTRODUCTION

The rapid advancement of digital technology has reshaped learning practices across disciplines, including foreign language education. Indonesian students learning Japanese frequently struggle with kanji, the most complex of the four Japanese writing systems, because of its large number of characters, intricate stroke patterns, and multiple readings. A study by Dirgandini et al., (2025) found that 77.6% of Japanese Literature students across three private universities experienced difficulty comprehending kanji, while a preliminary survey of 45 second- and fourth-semester students in the Japanese Language Education Study Program at Universitas Negeri Semarang (UNNES) revealed that 60% had trouble recalling previously learned kanji and 48.9% struggled to distinguish visually similar characters such as 未 (mi) and 末 (matsu), or 土 (do) and 土 (shi). These challenges are compounded by limited class time, low intensity of independent practice, and a scarcity of engaging learning media, conditions that call for an interactive digital alternative capable of supporting flexible, self-paced kanji study.

In response to these needs, the “Kanji No Gakuen” game was developed by adapting Roblox, a widely used User-Generated Content platform within the metaverse ecosystem, into a three-dimensional learning space. Preliminary data showed that 60% of surveyed students expected an interactive medium for kanji learning and more than 90% wanted media that could be accessed flexibly through personal devices, indicating strong demand for a Roblox-based solution; the theme of time was selected based on preliminary interviews indicating that time-related kanji vocabulary was perceived as particularly difficult to memorize. Accordingly, this study was conducted to analyze the developmental needs of students toward “Kanji No Gakuen” as a Roblox-based media and material for N5 kanji, and to determine the feasibility of the developed media and material based on expert validation.

LITERATURE REVIEW

Instructional Media and Game-Based Learning

Instructional media functions as an intermediary that conveys information from a source to a receiver, helping learners understand abstract concepts, increase retention, and stay motivated during the learning process (Kristanto, 2016). Digital game platforms have become an increasingly common educational medium because they combine graphics, audio, and interactive feedback mechanisms that make learning more immersive and participatory (Gazis & Katsiri, 2023). This has given rise to Game-Based Learning (GBL), an approach that integrates games as a vehicle for delivering instructional content so that learners engage actively rather than passively receive information; multiple studies confirm that GBL improves both engagement and conceptual understanding (Li et al., 2024).

Several prior studies support the use of Roblox and similar game-based platforms in language and general education. Meier et al., (2020) demonstrated that Roblox could be used as a virtual-tour medium for teaching sculptural heritage, allowing learners to access material without spatial or temporal restrictions. Rianto (2025) showed that a Roblox-based prototype created a more

dynamic learning experience in social studies instruction, while Faatin et al., (2026) reported that a Roblox-based edugame increased elementary students' engagement, with an interest level reaching 93%, although teacher guidance remained necessary to keep students focused on the learning content rather than entertainment alone.

In the specific context of Japanese-language learning, Suprapti et al., (2019) found that students using the Nihongo Benkyou educational game achieved a higher average learning outcome (87.71) than those taught without it, while Marcellio & Hermawan, (2023) developed a Japanese-script learning game using the Fisher-Yates Shuffle algorithm and reported that learners still struggled to distinguish visually similar hiragana and katakana characters.

Positioning of the Present Study

Taken together, these studies confirm that digital game-based media, including Roblox, can enhance motivation and learning outcomes across disciplines. However, none of the reviewed studies specifically develops Roblox as a learning medium for N5 kanji, particularly kanji associated with the theme of time.

This gap constitutes the novelty of the present research: the development of “Kanji No Gakuen,” a Roblox-based medium purpose-built around N5 kanji vocabulary for time, combining vocabulary quizzes, on’yomi/kun’yomi drills, and stroke-order practice within a single explorable virtual environment.

The overall flow of the developed game, which structures how users navigate the learning content, is presented in Figure 1.



Figure 1. Game Flow of “Kanji No Gakuen” Learning Media (adapted from the study’s development documentation)

METHODOLOGY

This study employed a Design and Development (D&D) approach following Richey and Klein's model, operationalized through the Planning, Production, and Evaluation (PPE) stages (Sugiyono, 2016, 2019). In the Planning stage, the researcher conducted a needs analysis through observation and a preliminary questionnaire and selected N5 kanji materials on the theme of time from Sudjianto et al., (2014). In the Production stage, the game map was built in Roblox Studio, integrating a guide character, an index of kanji, a stroke-writing feature, a shop, and a vocabulary-quiz mode. In the Evaluation stage, the product was validated by a media expert and a material expert and then trialed on a limited sample of students. The population consisted of 107 second- and fourth-semester Japanese Language Education students at UNNES, from which 50 students were selected as a homogeneous sample using purposive random sampling for the needs-analysis questionnaire, while product feasibility was validated by one media expert and one material expert using a four-point Likert scale (1 = Strongly Disagree to 4 = Strongly Agree). Data were analyzed using a feasibility-percentage formula and supported by Pearson correlation for item validity and Cronbach's Alpha for reliability, calculated with SPSS.

RESEARCH RESULT

Needs Analysis and Expert Validation Results

The needs-analysis questionnaire distributed to 107 students indicated a high to very high need for an interactive, game-based N5 kanji learning medium: eleven of thirteen indicators fell into the Very High category, including stroke-order color cues (92.5%), simple animation (91.6%), matching exercises (94.4%), and on'yomi/kun'yomi drills (92.5%), while the remaining two indicators (instructional video and roleplay features) fell into the High category. All thirteen items were confirmed valid through Pearson correlation (Sig. < 0.05), supporting their use as the basis for product development. Expert validation of the resulting product, summarized in Table 1, showed that both the media/design aspect and the material aspect were rated in the Very Feasible category.

Table 1. Feasibility Validation Results of "Kanji No Gakuen" Learning Media (scores based on a four-point Likert scale)

Aspect	Result
Media and Design Expert (Yanuar Lutfi Rohman, S.Pd., M.Pd.)	90.00% – Very Feasible
Material Expert (Dyah Prasertiani, S.S., M.Pd.)	91.67% – Very Feasible
Average	90.83% – Very Feasible

The feasibility percentage for each aspect was calculated using the following formula (Sugiyono, 2015):

$$\text{Feasibility (\%)} = (\text{Total Respondent Score} \div \text{Maximum Score}) \times 100\% \dots\dots (1)$$

The media/design expert, Yanuar Lutfi Rohman, S.Pd., M.Pd., rated the interface appeal, navigation clarity, technical performance, and learning experience most highly, while recommending nine revisions covering quiz mechanics, health-bar addition, and reward placement. The material expert, Dyah Prasetyani, S.S., M.Pd., rated the alignment of kanji content with N5 competencies, systematic sequencing, and support for retention most highly, while recommending four revisions concerning guide-character narration, terminology consistency (replacing “stroke” with “kakikata”), underlining of kun’yomi readings, and correction of three practice items. Following these revisions, the average feasibility score across both validators reached 90.83%, confirming that “Kanji No Gakuen” meets the feasibility standard for use as an N5 kanji learning medium.

DISCUSSION

The development of “Kanji No Gakuen” followed the PPE cycle in a manner that closely linked each stage to a concrete design decision. The Planning stage, grounded in the finding that conventional rote memorization poorly supports long-term retention of kanji strokes, motivated the transformation of an abstract concept time into explorable three-dimensional objects. In the Production stage, Roblox Studio was selected for its cross-platform accessibility on both computers and smartphones; rather than digitizing course material verbatim, the design embedded reading and meaning-guessing challenges into an exploration mechanic, using ProximityPrompt scripting to trigger direct interaction between the player’s avatar and kanji objects, which produced a considerably richer experience than static two-dimensional flashcards. The Evaluation stage confirmed this design logic empirically: feasibility scores of 90.00% for media and 91.67% for material indicate that the balance struck between entertainment and instructional content was appropriate, and the minor revisions requested by both validators were feasible to implement without altering the core game mechanics. Beyond feasibility scores, the media offers an immersive and contextual 3D learning experience, gamified motivation through coin rewards and progressive challenges, flexible cross-platform access that supports independent study outside class hours, and real-time feedback through ProximityPrompt-based interaction. At the same time, several limitations should be acknowledged: the game depends heavily on stable internet connectivity and adequate device specifications, its three-dimensional interface may divide new users’ attention between avatar navigation and reading quiz text, and the stroke-order (kakikata) feature currently relies on straight-line approximations rather than true curve detection, limiting its precision in replicating natural handwriting strokes.

CONCLUSIONS AND RECOMMENDATIONS

This study concludes that Japanese Language Education students at UNNES require an interactive, flexible, and motivating medium for learning N5 kanji, a need that formed the basis for developing “Kanji No Gakuen,” a Roblox-based three-dimensional learning environment focused on time-themed N5 kanji and equipped with a kanji index, stroke-writing practice, and interactive quizzes. Expert validation confirmed that the developed medium is highly feasible, with a media feasibility score of 90.00%, a material feasibility score of 91.67%, and an average of 90.83%, indicating that “Kanji No Gakuen” can serve as a viable alternative medium for interactive, flexible, and independent N5 kanji learning suited to the characteristics of students in the digital era. It is recommended that lecturers adopt this medium to support classroom instruction and independent learning, and that students make full use of its index, stroke-practice, and quiz features to strengthen their mastery of kanji form, meaning, and reading.

ADVANCED RESEARCH

This study is limited by its focus on a single kanji theme (time) at the N5 level and its reliance on a straight-line approximation for stroke-order detection rather than true handwriting-curve recognition. Future research is encouraged to refine the kakikata feature so that it can recognize handwriting strokes more accurately, add a score-history or learning-progress record, extend the material to N4 or N3 kanji, and adopt an experimental design with a control class so that the effectiveness of “Kanji No Gakuen” on learning outcomes can be measured more comprehensively.

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