

# Generative AI as a Scaffolding Tool in the Zone of Proximal Development for Beginning Japanese Course

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## Abstract

This study examines the use of generative AI as a scaffolding tool in the Zone of Proximal Development (Vygotsky, 1978) for Japanese language learning for beginner-level students. Consistent with existing research (Kanamaru, 2023), findings indicate that while generative AI can serve as an effective scaffolding tool, it requires careful educator supervision and intervention. The study reveals that beginning Japanese students often struggle to assess the appropriateness of AI-generated modifications, frequently requiring the lecturer's confirmation. Many instances were observed where AI was not used efficiently, with generative AI-suggested vocabulary, kanji, and grammar often confusing students. Mollick (2023) suggests that the optimal use of AI systems in language learning involves interactive engagement rather than crafting perfect prompts due to the rapidly evolving nature of AI technology. The study highlights the need for future research to explore the necessity of prompt engineering in Japanese language learning (Tohsaku, 2023) and to explore effective strategies for using generative AI as a scaffolding tool for beginner-level Japanese students. The study also suggests integrating critical content-based instruction (Sato et al., 2018) with generative AI to enhance language learning outcomes, promoting critical thinking, cultural awareness, and student agency.

**Keywords:** generative AI, beginning Japanese language learning, zone of proximal development, scaffolding, prompt engineering

## 1 Introduction

The Japanese Ministry of Education, Culture, Sports, Science, and Technology's 2023 guidelines on generative AI highlight a growing interest in learning methods that incorporate generative AI and promote autonomous learning (Ministry of Education, Culture, Sports, Science and Technology-Japan, 2023). This trend is widely recognized across various educational fields. The present study explores the appropriate use of generative AI in supporting beginning Japanese language learners and examines the role of teachers in this context. Based on practical reports of using generative AI as a scaffolding tool in an introductory Japanese course, this research is grounded in Vygotsky's (1978) theory of the zone of proximal development (ZPD) and incorporates learner reflections.

The ZPD theory refers to the gap between what a learner can achieve independently and what they can accomplish with guidance from a more knowledgeable individual, such as a teacher or peer. This concept emphasizes the importance of social interaction in learning, where tasks within the ZPD are neither too easy nor too difficult, allowing learners to develop skills with appropriate support (Vygotsky, 1978).

In the context of integrating generative AI into education, Mollick and Mollick (2023) proposed seven roles for AI: tutor, coach, mentor, teammate, tool, simulator, and student. These roles are designed to enhance learning while addressing challenges such as errors and biases inherent in AI systems. The discussion around these roles includes strategies for ensuring active oversight and student engagement with AI, aiming to support learning without replacing the essential role of teachers.

This study explores examining practical reports from a beginning Japanese course and learner reflections, the study aims to understand how generative AI can support autonomous learning while complementing traditional teaching methods. This approach seeks to generative AI's potential to enhance educational experiences without diminishing the critical role of teachers.

## **2 Method**

### **2.1 Participants and Course Description**

This study focused on a beginning Japanese language course offered during the 16-week fall semester of 2023 at a private university on the East Coast of the United States. The course aimed to develop proficiency at the Novice-Mid/High level according to the ACTFL proficiency guidelines (2012) by the end of the academic year. The course covered Lessons 1 to 7 from the required textbook, *Genki I* (Banno, Ikeda, Ohno, Shinagawa, & Tokashiki, 2020) introducing approximately 40 sentence structures and 72 kanji characters.

28 students, divided into four sections, participated in the course, which met in person four days each week. The project involved assignments beyond the textbook to help students acquire authentic knowledge and experiences of Japanese language and culture, foster interest in related Japanese topics, and motivate them to express themselves in Japanese.

### **2.2 Project Design**

The project theme was "My Favorite Japan," which students presented in a show-and-tell style to their classmates in Japanese for one minute without using scripts during the last class of the semester. The project was designed to be based on the "This is my Japan video project A" (Japan Foundation, Los Angeles, 2024), and incorporated critical content-based instruction (CCBI) (Sato, Takami, Kamiyoshi, and Kumagai, 2018), emphasizing the importance of learners critically evaluating and selecting AI-generated suggestions. By utilizing generative AI as scaffolding, the project aimed to enable students to engage in autonomous learning outside of class.

The project process included the following steps:

1. Brainstorming (Figure 1): Students and lecturers conducted one-on-one short meetings via Zoom in English.
2. Initial draft: Students wrote a 280–350-character draft in Japanese without using AI, relying on dictionaries and textbooks.
3. AI-assisted revision: Students used generative AI to check their drafts for word and grammar errors, adopting only the suggestions they understood and agreed with.
4. Lecturer feedback: The lecturer provided feedback using a correction key (Figure 2), offering hints about errors for students to investigate and correct themselves.
5. Final draft: Students incorporated the lecturer's feedback into their final drafts.
6. Presentation: Students delivered a one-minute speech in Japanese, followed by a one-minute Q&A session.
7. Reflection: Students completed a reflection questionnaire.

## ミニプロジェクト・ブレインストーミング・シート

セクション( ) なまえ( )

**Q1:** “私の好きな日本”はなんですか。3 つかいてください。(Type in Japanese)  
e.g., アニメ, まんが, すし, きもの

1-1 \_\_\_\_\_

1-2 \_\_\_\_\_

1-3 \_\_\_\_\_

**Q2:** Please explain the reason(s) you like each of the above. (Type in English) e.g., When I was a high school student, I enjoyed ‘Slam Dunk’, a Japanese manga. From ‘Slam Dunk’, I learned the importance of never giving up until the last minute and the value of teamwork.

Reason for 1-1 \_\_\_\_\_

Reason for 1-2 \_\_\_\_\_

Reason for 1-3 \_\_\_\_\_

**Q3:** What specific experiences from “私の好きな日本” will you be able to share in your presentation? (Write in English) e.g., I want to introduce some favorite lines in Japanese from ‘Slam Dunk’ that left a strong impression on me in the presentation.

1-1 \_\_\_\_\_

1-2 \_\_\_\_\_

1-3 \_\_\_\_\_

Figure 1: The brainstorming sheet

**Writing Code**

Refer to this chart when you revise your writing assignments.

Code	Description	Example
<b>C</b>	Conjugation	くらいいじありません (It is not fun.) コーヒーをのんで、あざごはんを食べます。 (I drink coffee and eat azagohan.)
<b>K</b>	Kanji	おい (It is delicious.) 本日 (It is today.) Incorrect number of strokes, with/without a dot, wrong character, etc.
<b>P</b>	Particles	あざごはん 食べます。 (I eat azagohan.) あざごはんが食べます。 (I eat azagohan.)
<b>T</b>	Tense	きのう、としよかんにいきました。 (I went to Toshiyokan yesterday.)
<b>SP</b>	Spelling, roman verbs ひらがな・カタカナ, punctuation	しゅうくたいをします。 (I study.) ひたりにあります。 (It is on the floor.) コーヒー (It is coffee.) コーヒーをのみます、でも、コーラをのみません。 (I drink coffee, but I don't drink cola.)
<b>W</b>	Word choice	コーヒーをのみます。 (I drink coffee.) お茶をのみます。それから、うんどうをします。 (I drink tea. Then, I exercise.)
<b>WD</b>	Word order	いただきますがくに。 (I am in Osaka.)
<b>S</b>	Writing style	わたしのアパートは大きいです。でも、古い。 (My apartment is big, but old.)
<b>CM</b>	Grammar	お友達をいじります。 (I play with my friend.) Grammar mistakes other than ones specifically listed above.
<b>?</b>	I am not sure what you want to say	ふしテレビをみます。 (I watch TV.)
<b>&lt;</b>	missing words	ビジネスがあります。 (I have business.)

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Figure 2: Correction key

## 2.3 Generative AI Usage Guidelines

The project included specific instructions regarding generative AI usage:

1. Any generative AI tool could be used.
2. The prompts used to query generative AI had to be included in generative AI-assisted draft.
3. Students were limited to one query of generative AI.
4. Students were instructed to inform the AI that they were beginner Japanese learners to avoid overly complex suggestions and corrections.

The decision not to restrict generative AI tools was made to accommodate students who might not have access to subscription versions. A one-query limit was implemented to ensure fairness, regardless of the version used, based on observed differences between the free and subscription versions of ChatGPT. At that time, the differences between the free and subscription versions primarily revolved around access, features, and performance, especially when users queried generative AI repeatedly according to the author's experience. Therefore, to minimize disparities between students who could access the subscription version and those who could not, the instructions included a limitation to one query of generative AI in this project.

## 3 Results

### 3.1 Comparison of generative AI-assisted and Non- generative AI Essays

The study compared essays submitted by students: those written without generative AI and those revised after using generative AI. The effective and ineffective cases of generative AI utilization by students were categorized into patterns. Two contrasting cases are presented to illustrate these patterns.

### 3.2 Case Study: Student A

Student A used ChatGPT-4 (subscription version) with a specific prompt: "Identify places of this elementary-level Japanese writing that sound unnatural and suggest a correction for each. Stick with only the kanji used in the essay and do not convert anything else to kanji." Student A accepted three suggestions from ChatGPT-4 but needed lecturer guidance to decide which suggestions to implement (Figure 3). For example:

- The phrase "出身は日本の東京都です" was refined to "出身は東京都です" by ChatGPT-4, but student A was unsure about omitting "日本の" for clarity.
- ChatGPT-4 suggested changing "私の好きな日本" to "私の好きな日本のおんがく" but student A recognized this conflicted with the project's template phrase.

1.	Original: 私の好きな日本は、てんもんのおんがくです。	Correction: 私の好きな日本のおんがくは、てんもんさんのものです。†
2.	Original: てんもんさんは日本のさつきよくかです。	No correction needed. It's natural.†
3.	Original: しゅっしんは日本のとうきょうとです。	Correction: しゅっしんはとうきょうとです。 (No need to repeat "日本の")†
4.	Original: わたしはインストゥルメンタルをきくのが好きです。	No correction needed. It's natural.†
5.	Original: ちゅうがくせいとき、インストゥルメンタルをたくさんききました。	Correction: ちゅうがくせいとき、インストゥルメンタルのおんがくをたくさんききました。 (Clarifying that it's instrumental music)†
6.	Original: いまは、ペンキょうのときによくてんもんさんのおんがくもききます。	Correction: いまも、ペンキょうのときにてんもんさんのおんがくをよくききます。†
7.	Original: わたしのおきにいのさくひんはびょうそく5センチメートルとじこうだいにんのおんがくです。	No correction needed. It's natural.†
8.	Original: これが、私の好きな日本です。	Correction: これが、私の好きな日本のおんがくです。†

**Figure3:** Student A's ChatGPT4 suggestions

Student A ultimately accepted particle corrections and added clarifying words based on personal knowledge and lecturer guidance. This case demonstrates the potential of generative AI as a scaffolding tool when used critically and with appropriate support (Figure 4 & 5).

こんにちは。[REDACTED]です。私の好きな日本は、てんもんのおんがくです。

てんもんさんは日本のさっきょくかです。ほんみょうはしらかわ あつしです。

しゅっしんは日本のとうきょうとです。よくコンピュータゲームとアニメーションのおんがくをつくりま

私はインストゥルメンタルをきくのが好きです。ちゅうがくせい

のとき、インストゥルメンタルをたくさんききました。だから、てんもんさんのおんがくをききました。いまは、ぺんきょうのときによくてんもんさんのおんがくもききます。私のおきに

いりのさくひんはびょうそく5センチメートルとじこうだいにんのおんがくです。

これが、私の好きな日本です。

**Figure 4:** Student A's essay not using generative AI

**Your revised essay:**

こんにちは。[REDACTED]です。私の好きな日本は、てんもんのおんがくです。

てんもんさんは日本のさっきょくかです。ほんみょうはしらかわ あつしです。

しゅっしんは日本のとうきょうとです。よくコンピュータゲームとアニメーションのおんがくをつくりま

私はインストゥルメンタルをきくのが好きです。ちゅうがくせい

のとき、インストゥルメンタルのおんがくをたくさんききました。だから、てんもんさんのおんがくをききました。いまも、ぺんきょうのときにてんもんさんのおんがくをよくききます。私のおきに

いりのさくひんはびょうそく5センチメートルとじこうだいにんのおんがくです。

これが、私の好きな日本です。

**Figure 5:** Student A's essay using generative AI

### 3.3 Case Study: Student B

Student B used Google Bard AI (free version) with a vague prompt: "Please correct the mistakes." The generative AI-assisted revision introduced many unfamiliar kanji, which confused student B despite correcting most errors. Due to limited personal knowledge and experience of the Japanese language and culture, student B required additional assistance from a language partner to convert the kanji into hiragana (Figure 6 & 7).

First Draft (Word Count: 284 Characters)

おはようございます！[REDACTED]です。私の好きな日本は、のみものです。わたしは まっちゃん と むぎちゃん と ほうじ茶 が すきです。こどものとき、まいあさおかあさんも まっちゃん を のみました。おかあさんと まっちゃん を まで。おとうさんも かんこくの むじちゃん を まで。私のかぞくの あさごはん は まっちゃん と むじちゃん です。おいしいですよ！でも、私のおとうとは チャすき ではありません。おとうとは みずか が すき ですね。じゃあ、おかあさんと むりか みはるき を よみます。それから、おかあさんと まっちゃん を のみます。こんばん かぞくと ほじちゃん まで。たんじょうび で ほじちゃん たくさん おのみます。これが、私の好きな日本です。

**Figure 6: Student B's essay not using generative AI**

Second Draft (Google Bard AI Edits)

おはようございます！[REDACTED]です。私の好きな日本は、飲み物です。私は抹茶と麦茶とほうじ茶が好きです。子供の頃、毎日お母さんも抹茶を飲みました。お母さんと抹茶を飲みました。お父さんも甘い麦茶を飲みました。私の家族の朝ごはんは抹茶と麦茶です。おいしいですよ！でも、私のお父さんは茶が好きではありません。お父さんは水が好きですね。それから、お母さんと村上春樹を読みます。それから、お母さんと抹茶を飲みます。こんばんは、家族とほうじ茶を飲みます。誕生日でほうじ茶をたくさん飲みます。これが、私の好きな日本です。

**Figure 7: Student B's essay using generative AI**

## 4 Findings

In comparing the essays of student A and student B, both written without generative AI assistance, it was observed that student A's essay contained fewer errors, while student B's essay had many. This initial quality of the essays might influence how each student interacted with generative AI. Although student A used a specific prompt when engaging with generative AI, and student B's prompt was vague and simplistic, the impact of prompt specificity was not entirely clear. This is because the quality of the initial essay without generative AI might play a significant role, as suggested by the reflective questionnaire.

Analysis of the reflective questionnaire revealed:

- 5 out of 18 respondents found generative AI helpful.
- 9 out of 18 respondents found generative AI unhelpful.
- Both groups used a mix of simple and detailed prompts.
- 6 students used subscription version of ChatGPT, while 12 used free versions of ChatGPT or Google Bard AI.
- Of those using subscription versions, 3 out of 6 found generative AI helpful.
- Of those using free versions, 7 out of 12 found generative AI unhelpful.

The reflective questionnaire found no significant difference in essay quality based on whether a subscription or free generative AI service was used. The initial quality of non-

generative AI essays appeared to be a better predictor of successful generative AI utilization than prompt specificity or generative AI version. Upon examining the prompts written by the students, it appears that both groups included a mix of simple and detailed, specific prompts (Table 1).

Students thought generative AI was helpful for revising essays in Japanese.	Students thought generative AI was not helpful for revising essays in Japanese.
I am a Japanese beginner student who needs to give a presentation about my favorite food in Japan. Help me to improve my speech draft in terms of its grammar, structure, and vocabulary. Please do not add additional kanji.	Can you highlight the grammar errors without changing the hiragana to kanji. Fix the sentence about my brother and the marine corps.
Improve the grammar of the following paragraph.	Can you help me change grammatical mistakes with beginner level Japanese, in this paragraph about why I like the anime "Detective Conan"?
Pretend you are a Japanese teacher. Using only material from Lessons 1-7, make edits to the following excerpt from a student's assignment about "What I love about Japan". Focus on grammar, diction, and sentence structure. Do not add any new kanji that is not used in Lessons 1-7. At the end, note all changes and explain why those changes were made in English.	Help me create better transitions between my ideas. How do I say that ~Something~ Made my mother angry explain and help me fix the grammatical issues in the is essay.
Revise this essay without using kanji and give me recommendations.	Revise this essay.
Identify places of this elementary-level Japanese writing that sound unnatural, and suggest a correction for each. Stick with only the kanji used in the essay and do not convert anything else to Kanji.	Suggest improvements for this Japanese essay in grammar, vocabulary, and overall structure.
	Please revise the following paragraph in Japanese.

	Hello please fix my Japanese writing (and then I copied my first draft). Can you write it without any kanji that I didn't already use?
	Translate this very simply and make it as smooth as possible. use very limited kanji use first grade level Japanese.
	Please correct the mistakes.

**Table 1:** Prompts students wrote

## 5 Discussion

This study aligns with existing research indicating that generative AI can be a valuable scaffolding tool in language learning, particularly when combined with educator supervision and intervention (Kanamaru, 2023). However, as observed in this study, beginning level Japanese students often struggled to adequately assess the appropriateness of generative AI modifications, necessitating lecturer's confirmation. At this stage, generative AI was frequently used inefficiently, with suggested vocabulary, kanji, and grammar causing confusion and adding unnecessary effort for students.

Given the rapid evolution of AI technology, Mollick (2023) suggests that the optimal use of generative AI systems is not to create perfect prompts, but rather to use the technology interactively. Educators should collaborate with generative AI to guide students instead of relying on a single command to achieve desired outcomes. This highlights the need for further exploration of the role of prompt engineering in Japanese language learning (Tohsaku, 2023) and how best to utilize generative AI as a scaffolding tool for beginning Japanese language learning students.

Furthermore, this discussion can be enriched by incorporating the insights of CCBI into the curriculum. CCBI emphasizes cultural and academic content from a critical perspective and encourages students to engage deeply with complex topics. In the context of generative AI-enhanced language learning, CCBI can be particularly relevant in the following ways:

- Promoting critical thinking: CCBI encourages students to question and analyze generative AI content, fostering a deeper understanding and critical engagement with language materials. This approach aligns with Mollick's (2023) suggestion of using generative AI interactively rather than relying solely on perfect prompts.
- Increasing cultural awareness: Understanding cultural nuances is crucial in Japanese language learning. CCBI can help students critically evaluate the cultural context of generative AI content, with educators guiding this process to ensure meaningful learning.
- Encouraging student agency: CCBI empowers students to take an active role in the learning process by integrating social and community topics with cultural content. Generative AI tools can assist students in exploring topics of interest in depth.



However, teachers' supervision is essential for beginning Japanese language students to critically evaluate and effectively use generative AI content. Therefore, as a future research direction, further study expects to conduct on a curriculum that integrates CCBI and generative AI tools to enhance language learning outcomes. This approach has the potential not only to improve language skills but also to foster critical engagement and cultural awareness in students, preparing them to navigate the complexities of both language and society while using generative AI as a scaffolding tool in the ZPD.

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