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Enhancing Chinese Language Education Through AI-Assisted Project-Based Learning: A Qualitative Study on Learning Values and Multimedia Skills Development

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Abstract: The purpose of this study is to explore the value of AI-assisted project-based learning design in Chinese language education. Through instructional design that integrates foreign language, cross-cultural understanding, and multimedia expression, we aim to enhance learners' proactive attitudes and improve learning outcomes using AI and ICT. Conducted the tourism Chinese course at a Japanese university, the research employed mixed methods to assess the effectiveness of integrated PBL. The course utilized AI and ICT tools such as an online whiteboard, a pronunciation practice tool, generative AI for writing assistance, and a video editing application. Data from student surveys, feedback, and teacher observations indicated that approximately half of the students found the AI-supported PBL effective for their learning needs, especially in pronunciation practice and video editing, though it didn't fully address speaking skill inaccuracies. AI and ICT tools were effective in supporting cultural knowledge and intercultural communication skills, but student evaluation of AI's impact on learning were polarized. The value of the CFL approach using AI and ICT was discovered in creating immersive, adaptive learning environments—a value that had gone unnoticed in traditional teaching and learning methods—while also underscoring the need for proper support and training from teachers. Future challenges include integrating AI literacy into language courses and addressing varying technological proficiency levels among students.

Keywords: GenAI (generative artificial intelligence), PBL (Project-Based Learning), instructional design (ID), action research

1. Introduction

In Japanese universities, Chinese as a Foreign Language (CFL) courses for beginners continue to rely on traditional methods, despite challenges such as outdated materials and unclear standards (Sunaoka & Sugie, 2022), while researchers recommend updating resources and incorporating digital technologies to improve pedagogy (Nishi, 2021). Additionally, integrating more communicative approaches is emphasized to meet modern needs, particularly given the dominance of English in Japan's FLE (Furukawa et al., 2023). These studies underscore the necessity of pedagogical updates in CFL in the era of GenAI (generative artificial intelligence).

2. Literature review

Foreign language education (FLE) traditionally emphasizes vocabulary and grammar, but faces criticism for lacking real-life relevance. Gottlieb (2012) argues for evolving language policies with societal changes. A shift towards communicative syllabi is occurring, emphasizing practical language use. Technological advancements, particularly GenAI, have significantly

impacted FLE. The educational policy of Japan issued guidelines promoting AI in education (MEXT, 2023), advocating for learner-centered methods like Project/Problem-Based Learning. This convergence presents innovation opportunities (Mizumoto, 2024; Nonaka, 2024). EFL is beginning to be integrated with AI, but other languages such as Chinese are lagging behind. The 2024 International Conference on Technology and Chinese Language Teaching highlighted this focus, with presentations on AI tools (Coss, 2024; Shi et al., 2024), digital platforms (Feng & Tian, 2024), and blended learning (Ye, 2024). We aim to bridge the gap by exploring the new values of AI-supported PBL in CFL. It focuses on how this innovative approach can enhance the effectiveness of traditional pedagogical methods while harnessing the advantages of AI and ICT.

3. Research Questions

This study explores the role of multimodal communication in CFL, particularly how learners can leverage AI to enhance "augmentative communicative competence" (Holmes et al., 2020). By integrating AI and ICT, the study goes beyond traditional teaching paradigms focused on knowledge and skills acquisition. It examines how these technologies can support teaching and learning within PBL. Using qualitative action research and exploratory questions, we assess the perceived effectiveness and efficiency of AI and ICT in achieving broader educational objectives, particularly in enhancing language learning outcomes.

RQ1: How do learners perceive the effectiveness of AI-supported PBL in enhancing their Chinese writing and speaking skills?

RQ2: How effective are ICT tools in supporting learners acquire cultural knowledge and develop intercultural communication skills in PBL?

RQ3: How do learners evaluate the impact of AI and ICT on their learning experience, motivation, and self-directed learning in Chinese language and tourism studies?

4. Course Settings and Tools

During the fall 2023 semester at a Japanese university, a 15-week tourism Chinese course, with 24 students enrolled, focused on intercultural understanding, Chinese communication for tourists, and creating promotional videos. The course developed proficiency in basic Q&A, understanding tourists from Chinese-speaking regions, and using AI and ICT. Assessments included assignments, group work, presentations, and a final video submission. The syllabus covered self-introduction, Chinese culture, pronunciation, and customer service dialogues. Students created, revised, and presented videos, receiving feedback and engaging in peer evaluations, emphasizing practical application and intercultural communication skills.

Students mainly utilized four types of tools inside and outside of class:

(1) Online whiteboard "Miro": Students engaged in activities to enhance their Chinese language skills and cultural understanding, such as collaborative theme selection, research on Chinese cultural traits, individual research on foreign word expressions in Chinese, and group work on creating and presenting dialogues using Chinese hospitality phrases.

(2) Pronunciation practice tool "Ondoku Chinese": Students practiced Chinese pronunciation and semantics using textbook examples. Individual practice was supported by "Ondoku Chinese," with instructors providing personalized tutoring for pronunciation refinement.

(3) Writing using ChatGPT and Machine Translation: Students translated foreign words into Chinese, conducted comparative analyses, generated dialogues using Chinese hospitality phrases, and created self-introductions. AI tools like ChatGPT, Google Translate, and DeePL were used to assist in writing and speech practice.

(4) Smartphone video editing application "VLLO": Students learned basic video editing through on-demand materials and submitted sample videos. They also edited short clips using photos and videos planned by their teams.

5. Data Collection

The ID was evaluated through mutual assessments by learners and a teacher. Students watched the final video and provided mutual feedback. A comprehensive course survey using Google Forms assessed learners' perceptions of themes, objectives, activity usefulness, achievements, communication, and the significance of AI and ICT. A five-point Likert scale and open-ended questions explored task-based syllabus achievements and tool effectiveness. Data from 20 students (Four out of 24 students were absent) were analyzed, and concept maps was drawn using “MAXQDA2022”. A list of questionnaires is as follows.

Q1. To what extent do you believe you were able to achieve the goal 1 of this class: 'Being able to address people in Chinese and ask and answer simple questions in Chinese in tourism and hospitality situations'?	Likert Scale (5-point scale)
Q1-1. What activities or content do you think useful in achieving goal 1 of the class? Q1-2. What activities or content do you think should be increased to achieve goal 1 of the class?	Open-Ended
Q2. To what extent do you believe you were able to achieve the goal 2 of this class: 'Understanding the thoughts, actions, and customs of tourists visiting Japan from Greater China from the perspective of cross-cultural understanding'?	Likert Scale (5-point scale)
Q2-1. What activities or content do you think useful in achieving goal 2 of the class? Q2-2. What activities or content do you think should be increased to achieve goal 2 of the class?	Open-Ended
Q3. To what extent do you believe you were able to achieve the goal 3 of this class: 'Being able to use tools such as distance learning, automatic voice translators, video editing applications, etc. for utilizing the Chinese language'?	Likert Scale (5-point scale)
Q3-1. What activities and content do you think useful in achieving goal 3? Q3-2. What activities or content do you think should be increased to achieve goal 3 of the class?	Open-Ended
Q4. Were there sufficient opportunities to utilize AI, ICT, and other technologies in the class? Q5. Do you believe that the use of AI, ICT, and other technologies in your classes has enhanced the effectiveness and efficiency of learning and activities?	Likert Scale (5-point scale)
Q6. What is your opinion on the research and presentation group work using Miro? Q7. What is your opinion on Chinese pronunciation practice using Ondoku Chinese? Q8. What is your opinion on the group work on Chinese composition and translation using ChatGPT? Q9. What abilities do you believe you have acquired in Chinese through this course?	Open-Ended

Figure 1. List of Course Evaluation Questionnaires

6. Data Analysis and Results

The answers to Q1 reflect students' achievement in using Chinese for simple Q&A in tourism and hospitality contexts and identify beneficial activities. Responses were distributed as follows: *relatively agree* [7], *neither agree nor disagree* [3], *somewhat disagree* [2], and *agree* [2]. Helpful activities included *textbook study and application* [14], *conversation practice* [6], *CFL tools and pronunciation practice* [3], and *media use* [1]. Recommended increases were *conversation practice with native speakers and among students* [11], *maintaining current practices* [7], and *textbook application* [5]. The answers to Q2 reflect achievement in using Chinese for simple Q&A and understanding cross-cultural perspectives of Greater China visitors. Responses were *relatively agree* [10], *agree* [9], and *neither agree nor disagree* [1]. Useful activities included *group work about China* [14], *textbook learning* [3], *media use* [2], and *conversations with teachers* [1]. Recommended expansions were *practical conversation* [10], *maintaining current practices* [5], t*extbook application* [4], and *word memorization* [1]. The answers to Q3 reflect achievement in using Chinese with tools like distance learning, speech translators, and video editing. Responses were *relatively agree* [10], *agree* [8], and *neither agree nor disagree* [2]. Useful activities included *AI tools* [8], *group video editing* [7], and *on-demand video editing materials* [3]. Recommended increases were *maintaining current practices* [8], *tool proficiency* [3], *better video editing explanations* [3], *enhancing AI pronunciation practice* [1], and *expanding ChatGPT use* [1]. More learning and operation time, on-demand materials, and assignments using AI tools are necessary.

6.1 Data analysis 2: Assessment of the Use of Technologies

The answers to Q4 provide an evaluation of the opportunities to use AI and ICT, categorized as *sufficient* [15], *relatively sufficient* [4], and *insufficient* [1]. These responses suggest that learners generally considered the opportunities to be adequate. Answers to Q5 showed split evaluations of learning effectiveness and efficiency using AI and ICT, with categories ranging such as *not improved* [9], *relatively improved* [6], *improved* [4], and *neither agree nor disagree* [1]. The reasons for negative feedback were unclear, as only requests to maintain current practices were provided. Several students found AI and ICT less effective than traditional methods, facing delays in sentence production. Hands-on instruction and on-demand materials are needed for learning improvement.

Group work using Miro was positively evaluated for its ease of learning, work smoothness (sharing, summarizing, deep-thinking), convenience in both remote and face-to-face classes, and being enjoyable and rewarding (Figure 5). However, there were negative evaluations as the difficulty of using the application without training, operational differences between PCs and smartphones, and insufficient presentation time due to class-hours.

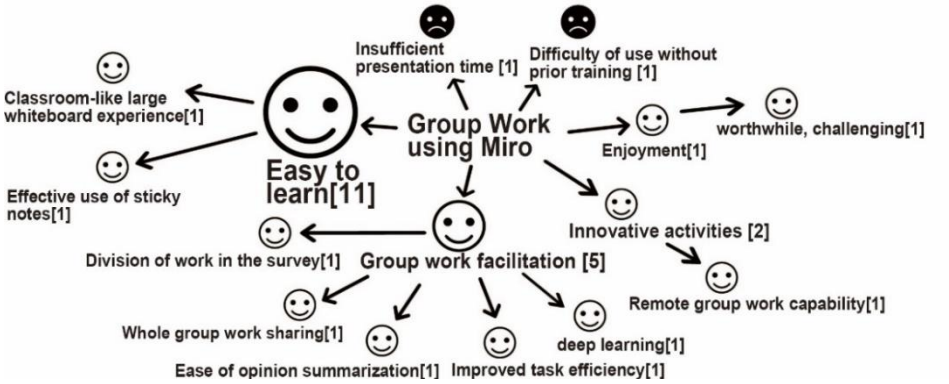

Figure 5. Qualitative Assessment for Group Work using Miro.

Regarding the Chinese pronunciation practice using Ondoku Chinese, students evaluated the convenience as a benefit. However, some students pointed out the system's complex operation, the difficulty of pronunciation, and the need for natural conversational variations with native speakers (Figure 6).

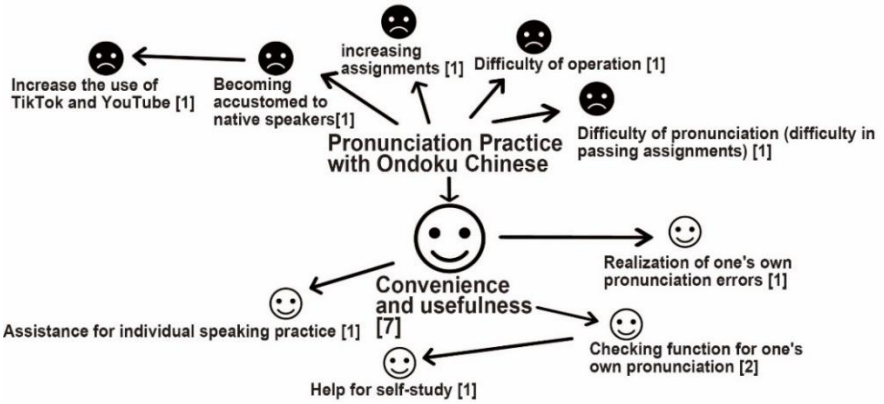

Figure 6. Qualitative Assessment for Pronunciation Practice using Ondoku Chinese.

Learners assessed group work on Chinese writing and translation using ChatGPT and machine translation (Figure 7). They evaluated the system's advantages as enjoyable, understanding how to operate it, and useful for learning (reviewing and learning new language expressions, achieving presentations, and mastering the operation). They found it easy to use and suitable for the current information era. However, some noted difficulties in getting accustomed to the system and working in groups.

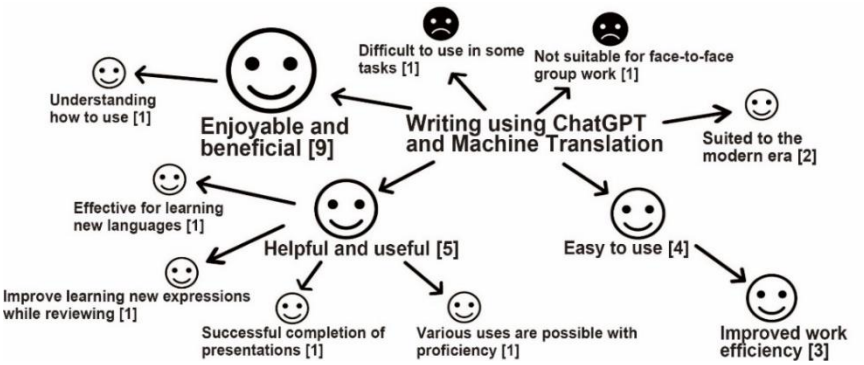

Figure 7. Qualitative Assessment for Writing using ChatGPT and Machine Translation.

Students reflected on their achievements in a CFL course focused on practical use, noting improvements in basic communication (self-introductions, discussing Hokkaido), specialized tourism language (customer service, promoting Japan), and skills in video editing and promotional content planning. The course also enhanced their understanding of Chinese culture and boosted their confidence in using Chinese. It incorporated learning about Chinese-style hospitality, the diverse cultures of Greater China, and the use of AI and ICT in creating tourism videos. Further analysis is required to fully assess the impact of these tools.

We summarize the analysis results as follows:

RQ1: About half of the students found the AI-supported PBL course effective for their Chinese language proficiency, especially in pronunciation practice and video editing, though challenges remained in spoken Chinese, particularly in narrations and presentations.

RQ2: The teacher observed success in cross-cultural understanding and writing on Chinese hospitality, with ICT tools aiding complex cognitive skills and promoting collaborative learning.

RQ3: the analysis of student feedback revealed divergent perceptions regarding the enhancement of learning effectiveness and efficiency through the application of AI and ICT. However, the teacher observed enhanced efficiency in independent learning, group activities, and reduced revision workload.

7. Discussion

The findings of this study contribute to the discourse on communicative approaches in CFL, emphasizing practical language use. Focusing on Chinese hospitality and tourism conversations effectively simulates real-world scenarios. This PBL design integrating AI and ICT, aligns with MEXT guidelines, demonstrating AI's effectiveness in pronunciation practice and video editing, supporting language learning goals. A key achievement was transitioning from traditional lectures to inquiry-based learning, addressing the need for active learning in CFL. Our practice demonstrated ID elements that promote collaborative learning and creativity. While differences in students' technology skills affected outcomes, learner-centered PBL and collaboration helped overcome deficiencies, enabling successful project completion. The study underscores the value of purpose-specific language learning, especially in tourism and hospitality, addressing the limitations of traditional methods. It contributes to the qualitative analysis of CFL in Japanese higher education (Chan et al., 2022). However, further research is needed for international learners from diverse linguistic and cultural backgrounds. The study revealed challenges in mastering AI and ICT tools, highlighting the need for task design to consider learners' familiarity. Inexperienced users may struggle, leading to inefficiencies. In the process of providing learning support through hands-on, in-person instruction and on-demand materials, AI can be positioned as a cooperative assistant. Based on these insights, we propose four core concepts for AI/ICT-supported ID: (1) Immersive Technologies for Realistic Practice, (2) Interactive and Adaptive Learning Materials, (3) Support and Training for Technology Use, and (4) Engagement and Collaboration through AI and ICT. These strategies are expected to enhance participation, interactivity, and effectiveness in classroom activities, enriching the overall learning experience and equipping students with the skills needed for specialized Chinese language use.

8. Conclusion

In this study, AI and ICT were treated as "augmented intelligence," integrated into PBL for CFL and tourism education. While outcomes improved, student evaluations of AI and ICT effectiveness were mixed, highlighting challenges in integrating AI literacy into courses. In Japanese higher education, AI and ICT are underutilized in PBL, except in information-related subjects, and the shift from traditional educational paradigms is incomplete (Horita, 2024). Continued exploration of ID with PBL and AI integration is necessary to optimize educational environments and practices, following the ADDIE model for ongoing improvement. It is essential to clearly design the activities and elements where teacher-led instruction and support are most effective, alongside tasks and assistance where AI excels, in order to create an environment that provides optimal learning support.

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