PAPAMAMA-TOMO: A Chatbot-Based Support System for Foreign Guardians to Navigate Japanese School Culture

Xiaoyan LI [1*], Atsushi SHIMADA[2],
[1] Center for the Promotion of Interdisciplinary Education and Innovation, Kyushu University, Japan
[2] Faculty of Information Science and Electrical Engineering, Kyushu University
[*] lixiaoyan@kyoso.kyushu-u.ac.jp

Abstract: *This study addresses the challenges faced by foreign guardians in Japan in understanding Japanese elementary school culture. Building on previous efforts using educational games, we introduce a chatbot system named PAPAMAMA-TOMO. This chatbot offers interactive, real-time support tailored to the linguistic and cultural needs of foreign guardians. Instead of passively reading school handouts, guardians can actively ask questions about school events, required items, and behavioral expectations. The chatbot integrates insights from educational prediction technologies and conversational AI, offering context-sensitive and inclusive assistance. The goal is to reduce misunderstandings and cognitive stress, thereby supporting smoother parental involvement in school life.*
Keywords: chatbot, parental support, Japanese school culture, hidden curriculum, natural language interface

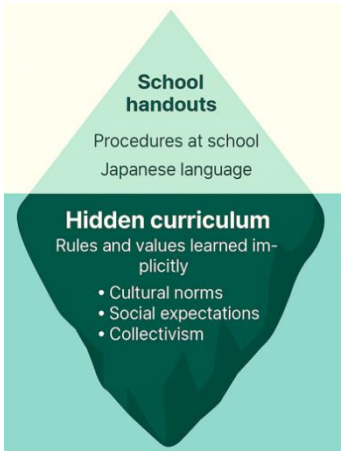
1. Introduction

The name “PAPAMAMA-TOMO” is derived from the Japanese term “mamotomo” (ママ友), which refers to friendships formed among mothers through their children’s schooling. By intentionally including both “papa” and “mama”, the name emphasizes inclusivity, encouraging all guardians—regardless of gender—to engage with the chatbot and school culture. This culturally embedded naming convention reinforces the system’s goal of providing friendly, accessible, and community-oriented support for navigating Japanese school life. To support foreign guardians in understanding the implicit norms and expectations in Japanese schools, we developed PAPAMAMA-TOMO, a chatbot that provides personalized and real-time assistance. Japanese elementary schools host culturally embedded events such as sports days and entrance ceremonies. While these events promote community ties, they often present barriers to non-native guardians due to unspoken cultural expectations and language complexities. Our approach builds on this foundation by offering a more accessible and conversational interface through a chatbot, enhancing immediacy and inclusiveness.

2. Background and Related Work

Japanese schools are known for their unique school culture, often described metaphorically as an iceberg (Figure 1), where the visible tip represents formal communication like school handouts, while a much larger portion—the implicit values, norms, and social expectations—remains hidden beneath the surface. In Japanese elementary schools, the primary mode of communication between schools and guardians is through printed handouts. These documents convey explicit information, representing the visible part of school culture. However, the so-called “hidden curriculum” (Jackson,

1968) lies beneath the surface, encompassing a range of unspoken rules and cultural values that students and guardians internalize through school life. These include egalitarianism, group orientation, motivation-driven instruction, and behavioral norms. In particular, the hidden curriculum plays a critical role in fostering students' implicit understanding of social behaviors, communication styles, and group dynamics within Japanese schools. These invisible norms, which are often unfamiliar to foreign guardians, are crucial for successful parental engagement and student adjustment.



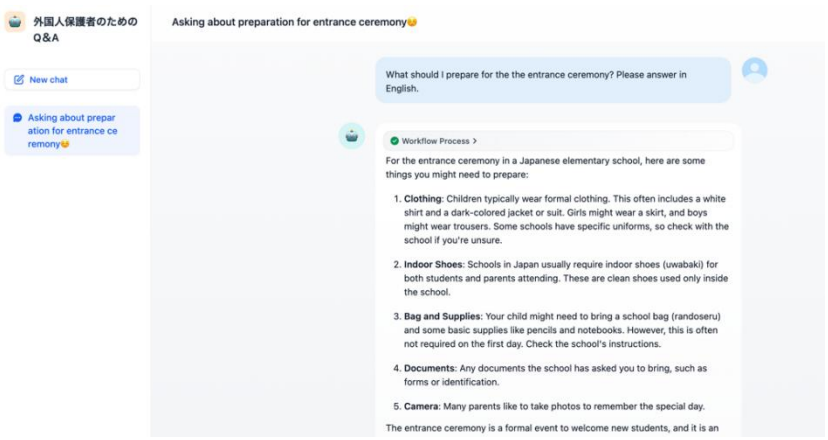


Fig. Iceberg model of Japanese school culture Fig.2 Screenshot of PAPAMAMATOMO Chatbot

For foreign guardians unfamiliar with Japanese schooling and with limited Japanese language skills, understanding school handouts is more than a linguistic task—it is an essential cultural skill (Li & Honda, 2015). Even guardians with conversational fluency in Japanese may struggle with these implicit norms, leading in some cases to disengagement or withdrawal from the school community. This study therefore addresses two central questions: (1) What cultural elements contribute to the difficulty in understanding the hidden curriculum? and (2) How can AI-based technologies support foreign guardians in comprehending these cultural dimensions? Japanese school events are key to student and parent integration but contain a "hidden curriculum" (Li, 2017; Li, 2023) that foreign guardians may find difficult to interpret. The lack of culturally adaptive educational tools exacerbates this challenge. Meanwhile, advances in conversational AI, including large language models, have shown potential for personalized support (Chen *et al*., 2024). In predictive learning, Murata *et al*. (2022) demonstrated how time-series analysis and personalization can anticipate learner needs. PAPAMAMA-TOMO incorporates these insights into a single, user-centered support system.

3. System Design: PAPAMAMA-TOMO

PAPAMAMA-TOMO is a chatbot developed to help foreign guardians navigate Japanese elementary school life. It serves as a virtual assistant that can respond to natural language questions about school events, expectations, and required items. Key design principles include accessibility, personalization, and cultural sensitivity.

Main Features include the following:

- Multilingual dialogue (Japanese, English)
- Cultural interpretation support (explains behavioral expectations)
- Visual and audio aids for key terms (planned)
- 24/7 accessibility via web interface

Furthermore, each system feature, such as real-time analytics and early dropout prediction, is designed to directly support the goal of timely intervention and personalized cultural navigation assistance for guardians unfamiliar with Japanese school systems. For example, we ask “What do I need to prepare for the sports day?”Chatbot: “For undoukai (sports day), please bring a lunch box, towel, hat, and indoor shoes. Would you like to hear how to say these items in Japanese?” (Figure 2). Murata *et al.* (2022) showed the importance of adaptive systems in predicting learning needs. Chen *et al.* (2024) found that strategic interaction with chat-based AI enhances comprehension. PAPAMAMA-TOMO adopts both approaches: personalization from behavioral input, and conversational scaffolding to aid understanding.

4. Database Construction and E-Learning Implementation

To support the chatbot system, we also focus on the development of a school culture database. This effort begins with an analysis of the “hidden curriculum” as embedded in school newsletters and documents. By utilizing an existing corpus (www.lixiaoyan.jp), we conduct both quantitative and qualitative analyses to uncover cultural elements such as egalitarianism, motivation-oriented education, learning attitudes, and group dynamics. These elements, along with all major school events (table 1), are systematically organized into a database that supports gamified and chatbot-based learning.

Table 1 Major annual events in Japanese elementary schools

April–July	**September–December**	**January–March**
Opening ceremony	Opening ceremony	Opening ceremony
Entrance ceremony	Disaster drill	Calligraphy contest
Physical fitness test	Open class observation	Off-campus learning
Spring excursion	Autumn excursion	Open class observation
Open class observation	Learning presentation	Graduation ceremony
Sports day	Traffic safety class	Closing ceremony
Pool opening	General cleaning	
Closing ceremony	Closing ceremony	

Furthermore, the system includes the following E-learning implementation goals:

1) Integrating Generative AI into the Chatbot
   Generative AI capabilities enable foreign guardians to engage in self-directed learning through open-ended conversations. For example, when a user expresses curiosity about a cultural event, the chatbot dynamically generates context-sensitive explanations, encouraging deeper exploration based on user interests.
2) Employing Real-Time Analytics for Immediate Support
   To address RQ2 regarding AI-based support for cultural comprehension, PAPAMAMA-TOMO employs real-time analytics. The system continuously monitors user interactions to detect immediate challenges, such as confusion about event preparation (e.g., missing required items)

or frequent inquiries about behavioral expectations. Based on these detected patterns, the chatbot provides context-sensitive prompts, such as checklists for school event preparations or simplified explanations of social norms. This real-time feedback loop enables guardians to receive personalized guidance at the point of need, reducing cognitive stress and promoting active engagement.

3) Data Collection and Iterative Improvement
   Aggregated user interaction data are analyzed to identify common misunderstandings and recurring cultural challenges. Insights from these analyses are used to iteratively refine both the chatbot's scenario database and its interaction strategies, ensuring that the system evolves to better meet the needs of a diverse user base over time.
4) Applying Early Dropout Prediction for Sustained Engagement
   In addition, PAPAMAMA-TOMO applies early dropout prediction techniques to interaction logs to support timely interventions. Indicators such as abrupt cessation of dialogue, prolonged inactivity, and repeated linguistic expressions of confusion (e.g., frequent use of phrases like "I don't understand" or "I'm not sure what to do") are modeled as disengagement risks. When such signs are detected based solely on textual interaction patterns, the system proactively prompts users with encouragement messages, offers simplified re-engagement options, or suggests connecting with human support if needed. This approach, aligned with RQ2, aims to sustain guardians' motivation and prevent feelings of isolation during their cultural adaptation process.

5. Discussion and Conclusion

PAPAMAMA-TOMO offers an inclusive, practical solution for foreign guardians by transforming one-way information delivery into two-way communication. It empowers users to clarify uncertainties about school culture, supports multilingual understanding, and adapts to diverse learning styles. Although empirical testing is scheduled for future research, the current system design draws upon well-established theories in educational AI and cross-cultural communication. Nonetheless, certain limitations remain, including the current restriction to two languages and potential scalability issues when expanding to support a wider variety of cultural backgrounds and educational contexts.

Acknowledgements

This work was supported by the SENTAN-Q Program, Kyushu University, and JSPS KAKENHI Grant Number 25K04342 (PI: LI Xiaoyan).

References

Chen, L., Li, G., Ma, B., Tang, C., Okubo, F., & Shimada, A. (2024). How do strategies for using ChatGPT affect knowledge comprehension? In S. Smith & T. Johnson (Eds.), Proceedings of the 25th International Conference on Artificial Intelligence in Education (AIED 2024) (Vol. 1, pp. 151–162). Springer. https://doi.org/xxxxxxxxxxxx

Jackson, P. W. (1968). Life in classrooms. New York: Holt, Rinehart and Winston.

Li, X. (2017). Japanese language support for foreign parental guardians: An analysis of elementary school handouts and “school culture vocabularies.” Bulletin of the Graduate School of Integrated Sciences for Global Society, Kyushu University, 24(2), 1–12.

Li, X. (2023). Communication with foreign guardians: Completing school newsletters. Tokyo: Kuroshio Publishing.

Li, X., & Honda, H. (2015). Language barriers and cultural adaptation: A study of foreign guardians raising children in Japan. In Proceedings of the Japan Society of Multicultural Education, 19, 45–52.

Murata, R., Okubo, F., Minematsu, T., Taniguchi, Y., & Shimada, A. (2022). Recurrent neural network-FitNets: Improving early prediction of student performance by time-series knowledge distillation. Journal of Educational Computing Research. https://doi.org/10.1177/073563312211297

Plass, J. L., Homer, B. D., & Kinzer, C. K. (2015). Foundations of game-based learning. Educational Psychologist, 50(4), 258–283. https://doi.org/10.1080/00461520.2015.1122533