

A Pilot Study of Preservice Teachers Accepting and Using Chatbots to Enhance CFL Education

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Abstract. The aim of this study was to explore how preservice teachers of Chinese as a foreign language (CFL) perceive the integration of chatbots into CFL teaching. A group of 18 preservice CFL teachers participated in the study and were given two three-hour training sessions on chatbot editing. During the training, they had the opportunity to create their own chatbots to assist CFL learners in practicing conversation. Following the activities, the participants were asked to complete a questionnaire regarding their perceptions of the potential benefits of chatbots for CFL education. The findings indicate that the majority of preservice CFL teachers enjoyed the chatbot editing activity and agreed that chatbots should be incorporated into CFL teaching. Additionally, the CFL skills that they believed could be improved through the use of chatbots were identified and may be useful for future research and for educators.

Keywords: Chatbots · Chinese as a Foreign Language · Preservice Teacher

1 Introduction

Technology-enhanced language learning has been a research topic that has been widely valued for many years. With the development of advanced technologies, such as recognition technology [1, 2], virtual reality [3, 4], mobile computing [5], robotics, and artificial intelligence [6], various innovative language teaching and research topics have been inspired [7].

Given that language learning requires a lot of interpersonal practice to help students acquire the target language, how to provide students with such practice and provide real-time feedback at any time has always been a challenge for foreign language teachers [8]. In recent years, due to the advancement of artificial intelligence speech recognition technology, the above dilemma seems to have turned around [9]. More and more researchers and teachers hope to use chatbots to provide students with opportunities for practicing conversations and with instant feedback.

A chatbot is a software application designed for conversation that utilizes natural language to interact with users while processing their inputs [10]. Huang and colleagues [10] systematically reviewed 25 empirical studies that examined the use of chatbots in

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language learning. They identified three technological affordances that chatbots provide, i.e., timeliness, ease of use, and personalization. Regarding pedagogical uses, they suggested that chatbots can be used as simulations, for transmission, as helplines, and for recommendations. Additionally, students thought that chatbots encourage them to practice although some challenges were also experienced.

What has been described is mostly according to students' perspectives, but how about teachers' angles? Furthermore, most research on chatbots on language learning focuses on English as a foreign/second language (EFL/ESL), with very few results on CFL learning. The two research gaps mentioned above lead to the following questions: (1) After using chatbots, how do CFL teachers feel about this new technology? (2) What skills do CFL teachers hope their students will improve using chatbots? (3) From the perspective of CFL teachers, what functions of chatbots are needed?

With the aim to answer the above questions, a pilot study was conducted in a CFL teacher training course. The following sections briefly describe the research method, present results, and discuss research implications and conclusions.

2 Method

2.1 Participants

The participants were 18 graduate students at a university in northern Taiwan. Although they are pre-service CFL teachers, most of them already have CFL teaching experience, either full-time or part-time teaching job before enrolling in the master program. However, none of them had experience in computer programming or chatbot editing.

2.2 Instruments

The Chatbot Editing System. The chatbot editing system used in this study is Learning by Building Chatbot (https://vp.vipresearch.ca/), developed by Chan and colleagues [11]. As Fig. 1 shows, Learning by Building Chatbot is a block-based and visual editing environment that does not require users' knowledge of RiveScript. Users can follow visual and text cues to create, share, and review their chatbots on a single website in educational and training settings without the need to distribute a program. For educational usage, teachers can make a chatbot for students to practice communication, language speaking, and writing skills. Also, students can create chatbots based on the knowledge they acquired in a class for teachers to evaluate students' learning outcomes. For training usage, trainers can build chatbots for trainees to practice their communication skills with customers, patients in a hospital, and the elder in a healthcare facility. By typing into the chatbots used in this study, the participants applied the conversations they designed to develop chatbots with the grammar and words in Chinese.

Padlet. Padlet (www.padlet.com) is a multimedia-friendly wall allowing users to post text, pictures, audio, videos, documents, links, comments, etc., for real-time and full class participation [12]. The purpose of using Padlet in this study was to record the participants' collaboration and learning outcomes.

Preservice Teacher Perception Questionnaire. The questionnaire includes ten questions using a four-point Likert scale and one open-ended question, belonging to three

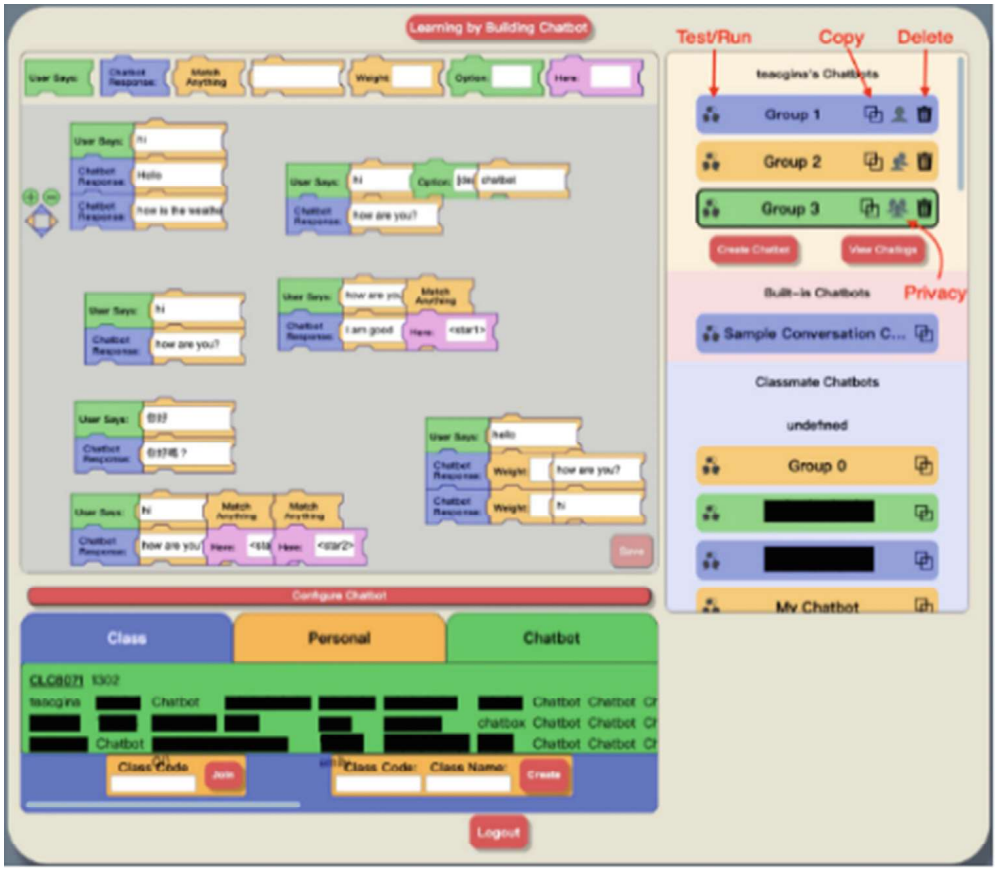


Fig. 1. The Visualized Editing Environment of Learning by Building Chatbot.

dimensions (satisfaction: items 1, 8, and 10; ease of use: items 2, 3, 4, and 6; usefulness: items 5, 7, and 9). The questionnaire is in Google Form and Appendix A shows the details of the questions.

2.3 Research Design and Procedure

A self-reported measure was adopted in this study through a questionnaire. The participants received two three-hour lessons in chatbot editing in two weeks (one lesson a week). The first three-hour lesson began with an introduction to speech recognition tools and chatbots, followed by an introduction of some speech recognition software, such as Google Assistant and Apple Siri. Finally, students tried to communicate with those tools by voice or typing.

The second three-hour lesson focused on learning to use the Chatbot Editing System by doing. Firstly, the participants were grouped into small groups of three people. They discussed the dialog context of their chatbots and shared their designs with the class through Padlet. Figure 2 shows one example of a concept map of the dialogue at a drink shop.

Secondly, the basic functions of the Chatbot Editing System were introduced and the participants practiced using the system by transforming their dialogue design into a

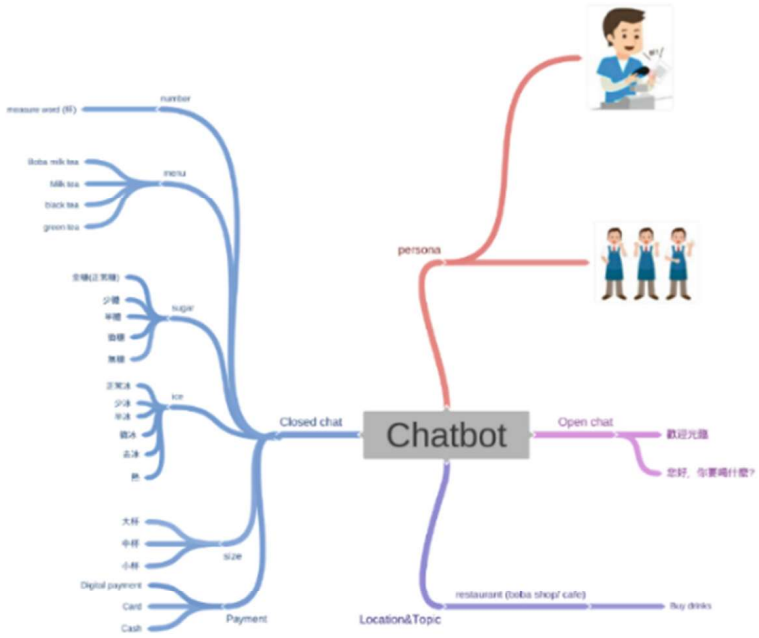


Fig. 2. The concept map of the dialogue at a drink shop.

chatbot. The participants checked whether their chatbots worked properly by conversing with chatbots like CFL learners. Thirdly, a peer evaluation was conducted in which the participants evaluated others' chatbots by chatting with the chatbots created or checking the dialogues designed by the other groups and providing their feedback on Padlet. After editing and testing their chatbots, and completing peer evaluation, they answered the Preservice Teacher Perception Questionnaire to express their perspectives about their chatbot-usage experience.

3 Results

Table 1 shows the results of the self-reported survey for answering RQ1 through the Preservice Teacher Perception Questionnaire. The participating CFL teachers expressed interest in collaboratively designing dialogues and trying their or others' chatbots, and they appreciated the training. However, the survey results only showed slightly positive perceptions.

Table 1. The results of the Preservice Teacher Perception Questionnaire.

Dimensions	*Mean*	*SD*
Satisfaction	2.83	0.40
Ease of use	2.51	0.35
Usefulness	2.65	0.42

The dimension of perceived ease of use obtained the lowest evaluation. It might be due to two reasons. One is the background of the participants—They majored in literature and the Chinese language. None of them had experience in programming. Although using the system does not require programming skills, program logic is still required. It implies that language teachers will need training in computational thinking skills as suggested by Sabitzer et al. [13]. The other reason is that the interface of the system is not friendly enough. Sometimes several trials were needed even if the participants have operated correctly. This problem greatly frustrated the participants.

It's important to note that the CFL teachers participating in the study were quite fond of using chatbots as a tool for language practice. In response to the question, "How much do you like using chatbots to practice foreign language speaking or writing?", 83.3% of participants said they "like it" or "really like it", while only 16.7% expressed disliking it or not liking it at all. These teachers maintained that chatbots could be integrated into future Chinese teaching, as discussed by Ji et al. [14]. They also mentioned that the system needs improvement and expressed interest in exploring other chatbot editing tools.

The results answered RQ2 when asked the participants which Chinese language skills of chatbots they considered to be effective tools for enhancing or assisting students in their learning. The majority (55.6%) chose oral speaking and conversation skills. Reading (22.2%) and writing (16.7%) followed as areas where chatbots could be helpful. Furthermore, they suggested that chatbots could support CFL students in learning grammar (11.1%) and typing Chinese characters (11.1%). Only 5.6% of respondents believed chatbots were useful for Chinese Pinyin and lexical collocations.

The high percentage of participants agreeing that chatbots can help CFL students practice oral and speaking skills aligns with the general application of chatbots in foreign language education, as referenced in studies like [15]. It's worth noting that, besides speaking and oral skills, CFL teachers also believed that other skills such as reading, writing, and grammar could be enhanced through chatbot use. However, the question of how this can be achieved remains an emerging issue worthy of researchers' attention and efforts.

In terms of the features the chatbot editing system should have for CFL teaching, the participants' suggestions answered RQ3, participants recommended incorporating multimodal interactive capabilities to cater to students' varied learning requirements. Due to the emphasis on multimodality in FL education, this feature mentioned by the participants echoes current trends in FL research and is undoubtedly a question to be answered in future research.

4 Conclusion

Most existing research on chatbots and language education has focused on investigating the perception and experience of FL/L2 learners [8, 16]. Few studies have explored FL/L2 teachers' perspectives through chatbot editing. A systematic review study by Ji et al. [14] suggests that conversational AI should be integrated into future language education to facilitate intelligence amplification and reduce teachers' workload through collaboration between conversational AI and teachers. The study conducted by Ji and colleagues [14]

focused on using existing chatbots rather than having teachers edit chatbots themselves. Given the paucity of existing literature on this issue, the results of this study provide insights into the application of chatbots in FL/L2 education and offer recommendations for chatbot developers.

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Appendix A

Your Opinion on Using Chatbots for Language Teaching or Learning

1. How much do you like using chatbots to practice foreign language speaking or writing?
   - Don't like it at all
   - Dislike it
   - Like it
   - Really like it
2. How would you rate the usability of using chatbots for language learning?
   - Poor
   - Fair
   - Good
   - Excellent
3. In your experience, how challenging is it to use chatbots for language learning?
   - Very challenging
   - Somewhat challenging
   - Somewhat easy
   - Very easy
4. How important is ease of use when using chatbots for language learning?
   - Not important
   - Somewhat important
   - Important
   - Very important
5. In comparison to other language learning resources, how helpful do you find chatbots?
   - Not helpful
   - Somewhat helpful
   - Helpful
   - Very helpful

6. How often do you feel frustrated or confused while using chatbots to practice a foreign language?
   - Very often
   - Sometimes
   - Rarely
   - Never
7. How effective do you think chatbots are for language learning?
   - Not effective
   - Somewhat effective
   - Effective
   - Very effective
8. How would you rate the design of chatbots you have used for language learning?
   - Poor
   - Fair
   - Good
   - Excellent
9. In your opinion, do chatbots help with specific language skills more than others?
   - Strongly Disagree
   - Disagree
   - Agree
   - Strongly Agree
10. How important is it for chatbot technology to evolve to better support language learners' needs and expectations?
    - Not important
    - Somewhat important
    - Important
    - Very important
11. If you wanted to incorporate chatbots into Chinese teaching, what language skills would you use chatbot to teach or what skills would you have students use chatbot to practice/learn?

References

1. Ahn, T.Y., Lee, S.M.: User experience of a mobile speaking application with automatic speech recognition for EFL learning. Br. J. Edu. Technol. **47**(4), 778–786 (2016)
2. Shadiev, R., Zhang, Z.H., Wu, T.-T., Huang, Y.M.: Review of studies on recognition technologies and their applications used to assist learning and instruction. Educ. Technol. Soc. **23**(4), 59–74 (2020)
3. Lan, Y.J.: Immersion into virtual reality for language learning. Psychol. Learn. Motiv. **72**, 1–26 (2020)

4. Wang, C.P., Lan, Y.J., Tseng, W.T., Lin, Y.T., Kao, C.L.: On the effects of 3D virtual worlds in language learning—a meta–analysis. Comput. Assist. Lang. Learn. **33**(8), 891–915 (2020). https://doi.org/10.1080/09588221.2019.1598444
5. Shadiev, R., Liu, T., Hwang, W.Y.: Review of research on mobile–assisted language learning in familiar, authentic environments. Br. J. Edu. Technol. **51**(3), 709–720 (2020)
6. Godwin-Jones, R.: In a world of SMART technology, why learn another language? Educ. Technol. Soc. **22**(2), 4–13 (2019)
7. Chun, D.M.: Current and future directions in TELL. Educ. Technol. Soc. **22**(2), 14–25 (2019)
8. Fryer, L.K., Nakao, K., Thompson, A.: Chatbot learning partners: Connecting learning experiences, interest and competence. Comput. Hum. Behav. **93**, 279–289 (2019)
9. Fryer, L.K., Coniam, D., Carpenter, R., Lăpușneanu, D.: Bots for language learning now: current and future directions. Lang. Learn. Technol. **24**(2), 8–22 (2020)
10. Huang, W., Hew, K.F., Fryer, L.K.: Chatbots for language learning—are they really useful? A systematic review of chatbot-supported language learning. J. Comput. Assist. Learn. **38**(1), 237–257 (2022)
11. Chan, T.-W., Chang, M., Hwang, G.-J., Ogata, H., Kong, S.-C.: Visualized environment to build chatbot for learning and training. In: Proceedings of the 1st International Workshop on Metaverse and Artificial Companions in Education and Society (MetaACES 2022), pp. 37–38. Centre for Learning, Teaching and Technology, The Education University of Hong Kong, Hong Kong (2022)
12. Sætra, H.S.: Using padlet to enable online collaborative mediation and scaffolding in a statistics course. Educ. Sci. **11**(5), 219 (2021)
13. Sabitzer, B., Demarle-Meusel, H., Jarnig, M.: Computational thinking through modeling in language lessons. In: 2018 IEEE Global Engineering Education Conference (EDUCON), pp. 1913–1919. IEEE (2018)
14. Ji, H., Han, I., Ko, Y.: A systematic review of conversational AI in language education: focusing on the collaboration with human teachers. J. Res. Technol. Educ. **55**(1), 48–63 (2023)
15. Hapsari, I.P., Wu, T.T.: AI Chatbots learning model in English speaking skill: alleviating speaking anxiety, boosting enjoyment, and fostering critical thinking. In: Huang, Y.M., Cheng, SC., Barroso, J., Sandnes, F.E. (eds.) Innovative Technologies and Learning. ICITL 2022. LNCS, vol. 13449, pp. 444–453. Springer, Cham (2022). https://doi.org/10.1007/978-3-031-15273-3_49
16. Jeon, J.: Exploring AI chatbot affordances in the EFL classroom: young learners' experiences and perspectives. Comput. Assist. Lang. Learn. 1–26 (2021)