

## Perceptions of preservice teachers on AI chatbots in English education

Jaeseok Yang

*Associate Professor, Department of English Education, Daegu National University of Education,  
Korea  
yangjs@dnue.ac.kr*

### **Abstract**

*With recent scientific advances and growing interest in AI technologies, AI-based chatbots have been viewed as a practical learning aid for English language development. The purpose of this study is to examine preservice teachers' perceptions on the potential benefits of employing AI chatbots in English instruction and its pedagogical aspects. 28 preservice teachers majoring in English education were asked to use Kuki chatbots for a week with a guidance of a researcher and then report on their perceptions of AI chatbots in terms of perceived usefulness after use, applicability, and educational benefits and drawbacks. Emerging codes and themes were identified and evaluated using Thematic Analysis(TA) based on qualitative data from surveys and interviews. The findings show that six emerging themes were identified, encompassing perspectives on teacher, learner, communication, linguistic, affective, and assessment. The overall findings of this study revealed that AI-based chatbots can play a significant role as learning tools for stimulating interactive communication in a target language. Most preservice primary teachers acknowledge that AI chatbots can be useful as teaching and learning aids for both teachers and students. Furthermore, when applying various learner data to chatbot technology, such as learner assessment and diagnosis, a guided approach is necessary to perform a conversation appropriate for the learner's level and characteristics. Finally, as chatbots have a variety of benefits in terms of affective aspects, they may improve EFL learners' confidence in speaking English and learning motivation.*

**Keywords:** *AI, Chatbot, Preservice Teacher, English Education, Primary English*

### **1. Introduction**

As artificial intelligence(AI) service has been combined with various IST technologies such as smart devices, big data, and voice recognition technology, the fields and types of application of AI technology has been diversifying, and its application scope has also been expanding. In particular, since the technology of voice recognition interface is advanced in terms of ease of use and accessibility, integrated AI technology is considered to be of high utilization and shows growth potential. Over a few decades, there has been a greater interest in Artificial Intelligence in Education (AIED). AIED is not only to adopt a cutting edge education

technology, but also to utilize AI technology as a powerful tool in order to understand the learning process and methods in a deeper and more defined way [1]. At higher educational institutions and even the primary level, there is a greater interest than ever in understanding and increasing the adoption of AI technology for educational objectives.

Countries, including US, UK, Japan, and China, have already developed national master plans, recognizing AI as a driving factor for future national growth. Even in Korea, the Ministry of Education also announced to support the active adoption of AI technology to minimize the educational gap due to the recent pandemic in South Korea. It makes a comprehensive AI education plan and suggests utilizing big data and AIED for teaching and learning [2].

With recent advances and increasing interest in artificial intelligence, AI-based chatbots, for example, have been regarded as a practical learning tool in educational technology. Specifically, for English language learning, AI-chatbots have a potential benefit to provide EFL learners with real-like opportunities to communicate with native English speakers [3]. In addition, one of the educational benefits of using chatbots is to offer the language learners numerous chances to have authentically interactive experiences with fewer burdens of affective domains, which might help increase learners' confidence and interest in language learning [4].

AI-based chatbot has been a topic of scientific research. However, there has been limited research on the perceptions of using chatbots for educational purposes in terms of primary English teaching. Specifically, this study investigated the pre-service primary teachers' perspectives on the potential value of using AI chatbots in English education and its pedagogical implications.

## **2. Literature Review**

### **2.1 Chatbots as a learning tool**

Since the early 1960s, when the program ELIZA debuted, chatbots have grown in tandem with technological advancements. ELIZA was a computer software that interacted with people who typed in English. The software offered the impression of comprehension and genuine interaction, but it relied on keywords and phrases for which it had pre-programmed responses. Many factors, including exponential growth and use of the internet and mobile devices, the diverse input interfaces between humans and computers, machine learning, AI-based translation, and NLP, have stimulated the development of many more chatbots and made it possible for anybody to communicate with them via the internet [5].

Moreover, the widespread use of smart devices provides English learners with a ubiquitous learning environment for self-directed learning, which, combined with AI technology, has created a more convenient and interactive language learning environment. When using AI-based voice chatbot, learners can get an opportunity to participate in interactive communication practices. The use of AI in speaking and listening skills can provide ubiquitous educational and learner-centered environments. It also has the advantage of providing individually tailored learning [6].

Chatbots have a potential benefit in language learning in terms of learner and teacher perspectives. Language learners can feel more comfortable through conversations with chatbots than when talking with human counterparts. Learners can also have chances to have conversations with a chatbot less boringly. Additionally, chatbots can utilize texts or various utterances to enhance learners' communication skills in integrated language functions, including listening, reading, speaking, and writing [5]. They can use chatbots outside of class time to participate in free speaking practice on their own, thereby increasing speaking opportunities, reviewing what they have learned in class, and sharing information between learners and

chatbots. Through analyzing and reviewing voice or text conversations, learners can have opportunities for self-evaluation and monitoring their speech outputs. On the other hand, teachers can use chatbots for assessment. For example, they can review learners' conversations to monitor their learning progress to consider giving feedback necessary for learners or topics they want to learn in the future or provide opportunities to practice chatting conversations in the form of assignments outside of class time [7],[8].

Previous research on the use of chatbots for educational purposes is still in the early stages and in progress. However, a large body of research reports positive impact of using chatbots on language learning. The use of AI tools in English education has been reported to have a positive effect in terms of affective, linguistic, and cognitive perspectives [9]. For instance, it is reported that chatbot-based learning of English increased the interest of elementary learners and helped them comprehend English content [10]. According to a study conducted on adult college students, as a result of writing practice using voice-based and text-based chatting, learners' writing ability improved, and it was found that the use of chatbots increases their motivation and positive attitude to English learning [11]. The use of voice-based chatbot to practice speaking in English increases learners' motivation to output and provides multiple chances to communicate in English [12]. Moreover, the use of text-based chatbot shows the positive impact on building vocabulary, writing, and reading skills [13].

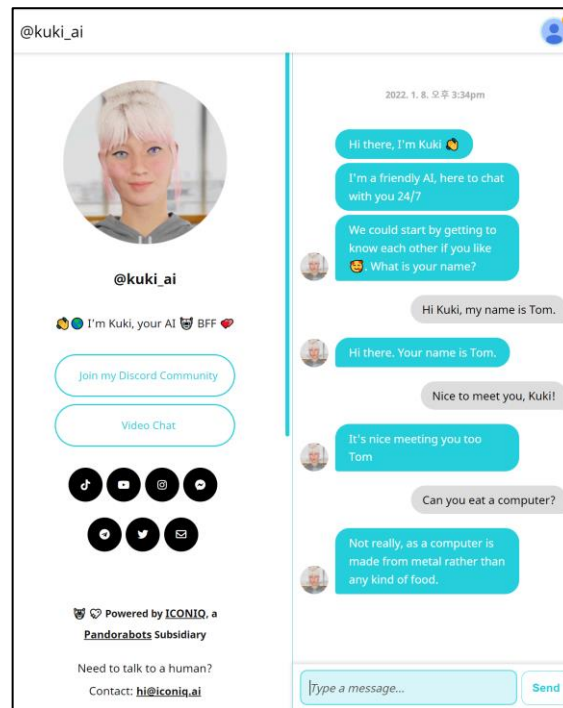
## **2.2 Types of Chatbots**

Nowadays, there are several chatbots available, which are designed to be educational or commercial. For example, Andy(<https://andychatbot.com>) is developed for the educational purpose, which is a text-based chatbot for English learning developed by ZTO Labs. It offers a range of references and instructional resources such as a vocabulary dictionary and grammar classes. One of the valuable functions is to provide corrective and linguistic feedback to language learners. For instance, if there is a mistake or error in the user's utterance, a correct example sentence or additional usage explanation is also provided [14].

On the other hand, commercially used chatbots include Google assistant (<https://assistant.google.com>), Kuki (<https://www.kuki.ai>), Replica (<https://replika.ai>), and Alexa (<https://www.alexa.com>). Among voice-based chatbots, 'Google assistant' is one of the well-known chatbots. Google assistant mounted on AI speakers or smart devices offers the function of having mutual conversations. Simple voice commands enable it to perform simple tasks such as searching the Internet, managing your calendar, and adjusting the setting of phones. Moreover, a more natural and human-like conversation is available with utterances closer to human voices than mechanical synthesized voices. It can perform simple tasks such as making restaurant reservations by phone [8].

Moreover, Kuki, formerly known as Mitsuku, is a virtual assistant developed by Steve Worswick based on Pandorabot's AI machine learning technology[Fig.1]. It supports both text- and speech-based interfaces. The conversation was possible through text, but recently, by applying speech recognition and speech synthesis technology, it has been expanded to chatbots capable of voice conversation [15]. It is developed based on an AI algorithm, and the responses of the chat are not extracted from a pre-programmed conversation, but rather, the conversations with real humans are learned and analyzed based on the keywords in the dialogues. It can make a logical decision or answer a question. According to the Kuki chatbot, it is characterized as an intelligent female adult who can think about particular objects and topics based on the characteristics associated with the word in the conversations. For example, when asked, "Can you eat a computer?" Kuki finds the properties associated with the word "computer," which is not edible because it is "made from metals" and "plastics," and answers "No"[16]. Kuki is rated as the best among existing chatbots, and it is found to have highly satisfied

users and shows adequate performance of given conversational tasks [17]. The current study used Kuki chatbot for the participants to experience the actual use of chatbot to survey their perception on the use of chatbot in the primary English education in Korea.



**Figure 1. Kuki chatbot**

### 3. Methods

#### 3.1 Participants

The participants of this study were fourth-year students enrolled at a university in Yeongnam area. The purposive sampling method was used to select 28 pre-service teachers, including 8 males and 20 females. They were in the final year of the teacher training program, majoring in English education. The rationale for selecting the participants is that those student teachers had student teaching experience and completed all required practicum hours in the research university. Most of these students also reported the experience of using a range of educational technology tools in their teaching practices.

Additionally, they were familiar with using various educational applications during their coursework. The research university has promoted the use of education technology in content areas and encouraged technology-mediated courses using a learning management system. The participants self-reported their proficiency in using IT tools in their everyday lives, such as Google assistant; however, they reported no prior experience with text-based chatbots. Their perceptions of AI chatbot in primary English education were examined based on their own experience of using AI chatbot as a part of the course requirement.

#### 3.2 Procedure and analysis

The current study collected qualitative data in order to investigate the perception of AI chatbot among primary English pre-service teachers. The participants were asked to use Kuki chatbots for a week with an

initial guidance from a researcher and then reported on their overall experience after using Kuki and how it can be applied to elementary English education. For this purpose, a survey and interview were conducted. The survey data were collected using an open-ended questionnaire, which included questions derived from prior research in order to extract features regarding the overall perception of the usage of AI chatbots for English instruction. Specifically, the questions were designed to elicit participants' perceived usefulness after use, applicability, and educational benefits and drawbacks. Based on the data collected by written and transcribed narrative responses, emerging codes and themes were classified and qualitatively analyzed according to thematic analysis (TA), which is a method for detecting, analyzing, and interpreting meaning patterns, or themes, in qualitative data. It is useful for analyzing qualitative data obtained from commonly used qualitative procedures such as interviews, focus groups, and qualitative surveys [19]. After identifying meaningful units of text from participants' mentions, as a unit of analysis, analytic categories of emerging themes were reviewed based on the frequency of mentions dealing with the same issue. Six emerging themes were identified, including perspectives on teacher, learner, communication, linguistic, affective, and assessment [Fig. 2]. To validate the findings from the data, member check interviews were conducted for the reliability of the results to compare and confirm the findings from the written and narrative responses.

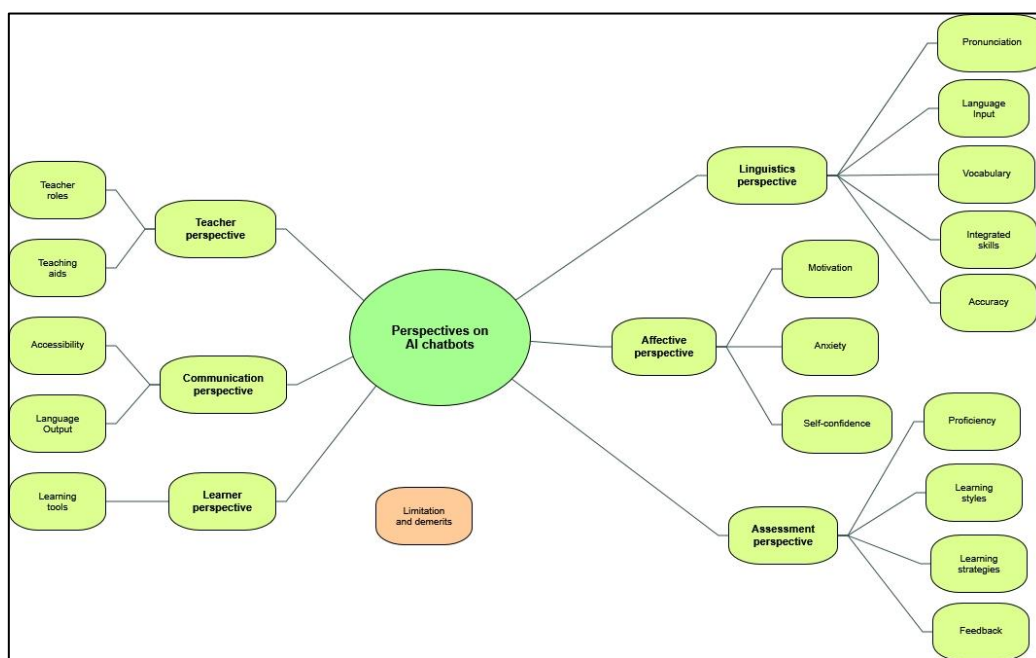


Figure 2. Emerging themes on AI chatbots

## 4. Results and Discussion

### 4.1 Teacher perspective

Several participants expressed teacher perspectives, concerning that AI chatbots could be used to replace teachers and change their roles in the classroom. Teacher perspectives received nine mentions, with subcategories relating to the changing teacher's role, such as replacing the teacher's simple and mechanical tasks, including grading, classroom management, and preparation for the class. For example, it is reported that the AI chatbot can help teachers grade the students' writing or recorded voice. Additionally, AI chatbots can

have a potential benefit to help human teachers by instantly coming up with various learning materials in accordance with learners' interests and levels based on learners' data. These findings showed that the participants perceive that the changing roles of teachers due to the adoption of chatbot are positive aspects in that the teachers can focus more on the other meaningful and important tasks in classroom than on those regarding simple and less meaningful works.

#### **4.2 Learner perspective**

With regard to learner perspectives, the views were identified with two mentions, relating to the learning aids. It is reported that AI can play a role as a learning tool for language learners. AI chatbots, for instance, can help learners work with data collection, basic analysis, and visualization, helping learners to spend more time on higher-order thinking activities, real and virtual experiences, and interactions between instructors and learners. When students need basic knowledge about a new word or topic while having conversation with an AI chatbot, they might ask the chatbot directly about the meaning of the unknown words or new concepts. Because a large amount of factual information is kept as big data, artificial intelligence technology can efficiently provide students with the knowledge they require at any moment. The chatbot can be used to supplement English textbooks.

#### **4.3 Communication perspective**

Nearly all of the participants expressed the expectation of AI chatbot to facilitate the communicative interactions of EFL learners. Communicative perspectives received 26 mentions, with subcategories relating to the accessibility and the increase of output. The widespread use of mobile devices can lead to the easy access to the chatbots, which offer the learners more chances to engage in the communication in English out of the classroom. The conditions in which students can communicate in English in EFL settings are limited. On the other hand, educational tools and chatbots allow students to use English whenever they want. Because the use of AI chatbot is not constrained by time or place, it can be utilized to complement learning whenever the learners want to practice in speaking English. It thus has the potential to expand learners' opportunities to use English. Moreover, the participants reported that the use of AI chatbot will be helpful to minimize the learning gap. By incorporating AI technology into English teaching, teachers will not only be able to create an atmosphere conducive to natural English learning, but they will also be able to help all students learn English readily and effortlessly.

#### **4.4 Linguistic perspective**

The data showed that there are 2 mentions regarding linguistic perspectives, with subcategories relating to the pronunciation, the provision of language input, vocabulary learning, integrated language skills, enhancement accuracy. For example, AI chatbots can be used to accurately analyze learners' pronunciation and intonation and teach them how to improve and practice. Learners can correct their pronunciation directly from AI with individualized guidance. As AI chatbots produce natural interactive language conversations, they can offer learners numerous opportunities to provide comprehensible language input. Although EFL students have few opportunities to speak English in everyday lives, the use of chatbot can help them engage in input-rich environments by conversing with chatbots in English. As a result, the usage of chatbots can be a very effective learning tool in achieving the purpose of English education, which is to improve communicative

competence.

In addition to the target words and expressions in textbooks, the chatbot can use new vocabulary in conversation. The employment of synonyms, similar words, and antonyms in dialogue allows for more active participation in mutual meaning negotiation. As a result of this collaborative process, the range and depth of vocabulary knowledge can be expanded. In addition to the development of separate linguistic skills, learners can engage in conversation by using both text and speech. As students engage in text-based dialogues with chatbots, they will be attentive to the accuracy of their written expressions.

#### **4.5 Affective perspective**

Affective perspectives received 14 mentions, with subcategories specifying the reduction of language anxiety, the increase of learner interest and motivation. Specifically, chatbots can provide a wealth of communication practice opportunities by lowering the affective filter for students. While students may feel tense and uncomfortable when conversing with teachers or friends, they feel comfortable and can practice more in conversations with chatbots. Typically, EFL students tend to be afraid of making errors and avoid losing face in conversation because they feel uncomfortable when the teacher corrects them. However, error corrections made by chatbots can be less burdensome than those made by teachers. In addition to the learner anxiety, they can also demonstrate attention, concentration, and participation in English conversations by engaging in ordinary and natural activities such as social media communication with friends or phone calls.

#### **4.6 Assessment perspective**

Finally, assessment perspectives received 11 mentions, with subcategories relating to the differentiated instruction and the provision of feedback. By assessing the characteristics and needs of students prior to performing a conversation, the AI chatbot can help make the conversation more customized and individualized according to learners. For example, an initial conversation with a chatbot can be conducted to diagnose learners. In addition, it may be able to collect and evaluate student language performance data to assess the student's level and reconstruct or individualize conversation practice accordingly. Furthermore, the findings of assessing pupils across the entire class and school level can be used to improve the curriculum on a macro level. Furthermore, using numerous preliminary questionnaires, each students' English language skills and their learning styles and learning methodologies may be analyzed, and appropriate personalized conversation topics can be provided.

### **5. Conclusion**

Further research is suggested in that the current study is limited concerning the constrained data gathered from a small number of participants and a limited amount of time to use the chatbot tool. Nevertheless, it might be meaningful and promising to review the actual voices from pre-service teachers having both learner and teacher perspectives on the pedagogical applicability of AI chatbots into the primary English education. The current study identified six emerging themes, including perspectives on teacher, learner, communication, linguistic, affective, and assessment. Also, the overall results of this study suggested that AI-based chatbots can play a significant role as learning tools for stimulating interactive communication in a target language. Based on the findings, the following is a discussion and considerations for using artificial intelligence chatbots in primary English instruction.

Most preservice primary teachers recognize that AI chatbots are useful as teaching and learning aids for both teachers and students. As the roles of teachers and students change in the future, it is essential to investigate various approaches to using chatbots in English lessons. In this regard, it is vital to concentrate on approaches for AI chatbots to aid existing English teachers in class planning and preparation and supplement the teachers' lack of English education competency.

Furthermore, when using various learner data to chatbot technology, such as learner assessment and diagnosis, a specific approach is required to perform a conversation appropriate for the learner's level and characteristics. Finally, as chatbots have a variety of benefits in terms of affective aspects, they can possibly enhance EFL learners' confidence in speaking English and learning motivation. Thus, teachers need to note that chatbots offer their students multiple chances to create language output and enhance communication skills. Given these strengths, it is required not only to actively and widely apply AI chatbots in primary English classes in elementary schools, but also to develop diverse models and strategies for teaching and learning English using AI chatbots.

## Acknowledgement

'This research was supported by Research Grant of Daegu National University of Education, 2019'.

## References

- [1] R. Luckin, W. Holmes, M. Griffiths, L. Forcier, *Intelligence unleashed: An argument for AI in education*. Open Ideas at Pearson, 2016.
- [2] S. Hong, I. Choi, *The concept and usage of AI in school education*, KICE Position Paper, pp. 1-36, 2020.
- [3] Na-Young Kim, *Effects of different types of chatbots on EFL learners' speaking competence and learner perception*. *Cross Cultural Studies*, Vol.48, pp.223-252, 2017, DOI: <https://doi.org/10.21049/ccs.2017.48..223>
- [4] Na-Young Kim, *Different chat modes of a chatbot and EFL students' writing skills development*. *Studies in Foreign Language Education*, Vol.32, No.1, pp.263-290, 2018, DOI: <https://doi.org/10.16933/sfle.2018.32.1.263>
- [5] L. Fryer, R. Carpenter, *Emerging technologies: Bots as learning tools*. *Language Learning & Technology*, Vol.10, No.3, pp.8-14. 2006, DOI: <https://doi.org/10125/44068>
- [6] R. Godwin-Jones, *Future directions in informal language learning*. In M. Dressman & R.W. Sadler (Eds.), *The Handbook of Informal Language Learning*, John Wiley & Sons, pp. 457-470. 2019, ISBN: 978-1-119-47244-5
- [7] Jaeseok Yang, *Implications of the fourth industrial revolution on the primary English education in Korea*, *Field-based Studies in Elementary Education*, Vol.1, pp.1-16. 2019, ISSN: 2713-6272
- [8] H. Kim, D. Shin, H. Yang, J. Lee, *A study of AI chatbot as an assistant tool for school English curriculum*. *Journal of Learner-Centered Curriculum and Instruction*, Vol.19, No.1, pp.89-110. 2019, DOI: <https://doi.org/10.22251/jlcci.2019.19.1.89>
- [9] H. Chun, S. Lee, I. Park, *A systematic review of AI technology use in English education*. *Multimedia-Assisted Language Learning*, Vol.24, No.1, pp.87-103, 2021, DOI: <https://doi.org/10.15702/mall.2021.24.1.87>
- [10] G. Kim, *An English learning mobile application using English fairytale based on chatbot*, *Proceedings of International Conference Fall 2017, Association of Korea Design*, pp.148-149, 2017, November 18, Seoul, Korea. <https://scholarworks.bwise.kr/hongik/handle/2020.sw.hongik/5004>
- [11] N. Kim, *A study on chatbots for developing Korean college students' English listening and reading skills*. *Journal of Digital Convergence*, Vol.16, No.8, pp.19-26. 2018, DOI: <https://doi.org/10.14400/JDC.2018.16.8.019>
- [12] G. Dizon, *Evaluating intelligent personal assistants for L2 listening and speaking development*. *Language Learning & Technology*, Vol.24, No.1, pp.16-26. 2020, DOI: <https://doi.org/10125/44705>
- [13] N. Kim, *Chatbots and Korean EFL students' English vocabulary learning*. *Journal of Digital Convergence*, Vol.16, No.2, pp.1-7. 2018, DOI: <https://doi.org/10.14400/JDC.2018.16.2.001>
- [14] S. Jung, *Introduction to popular mobile chatbot platforms for English learning: Trends and issues*. *STEM Journal*,



Vol.20, No.2, pp.67-90. 2019, DOI: <https://doi.org/10.16875/stem.2019.20.2.67>

- [15] H. Kim, D. Shin, J. Lee, Y. Kim, H. Yang, Utilization and production of artificial intelligence chatbot for English learning, *Kyoyookbook*, pp.43-70, 2019
- [16] M. Sepešiová, *Research in Non-native Speaking Teachers of English in Slovakia*. Nitra: SlovakEdu, pp. 99-117, 2021
- [17] D. Shin, Feasibility and constraints in applying an ai chatbot to English education. *Brain, Digital, & Learning*, Vol.9, No.2, pp. 29-40, 2019, DOI: <https://doi.org/10.31216/BDL.2019.9.2.029>
- [18] C. Victoria, B. Virginia, Thematic analysis, *The Journal of Positive Psychology*, Vol.12, No.3, pp.297-298, 2017, DOI: <https://doi.org/10.1080/17439760.2016.1262613>