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The Impact of Artificial Intelligence Chatbots on Young Efl Learners' Willingness to Communicate

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Abstract: Technology, particularly artificial intelligence (AI), is well recognised for its potential to enhance English language acquisition. The influence of AI-mediated activities on learners' communication willingness is mostly unexamined. This research investigated the influence of an artificial intelligence (AI) chatbot on learners' willingness to communicate (WTC) in English as a foreign language. Forty students participated in the semester-long study. The class was randomly allocated to either an experimental group (n = 20) or a control group (n = 20). The experimental group participated in eight communication tasks with the AI chatbot during class, whereas the control group undertook traditional communication activities. The data collection process entailed the distribution of a WTC questionnaire. The experimental group willingly engaged in a semi-structured interview. An independent sample t-test indicated no statistically significant difference in WTC levels between the two groups at the semester's onset. Subsequent to the eight intervention sessions, the ANCOVA revealed a substantial enhancement in the WTC of students in the experimental group, alongside a reduction in anxiety levels and an improvement in communicative confidence. Analysis of the interviews indicated that students exhibited less fear and enhanced their willingness to communicate in English. The findings indicate that chatbot-mediated interaction fostered a learner-friendly environment, leading to increased engagement and enhanced English willingness to communicate (WTC).

1. Introduction

Verbal communication skills have a significant impact on learners' overall language proficiency. Researchers have recognized the utility of Artificial Intelligence (AI) chatbots in second and foreign language (L2) speaking. The educational community is increasingly using AI chatbots to improve learning in all areas, especially language acquisition (Yuan, 2023)[1]. These chatbots can simulate real-world language environments and enhance the authenticity of the learning experience. In addition, AI chatbots can serve as conversation partners for language learners, facilitating input exposure and output practice in a low-stress environment. These chatbots can personalize conversations based on learners' interests and proficiency levels, providing instant feedback on language use and comprehension (Hsuetal, 2023)[2].

Despite this positive evaluation, further empirical research is necessary to determine its

effectiveness in second language acquisition. An integrated approach that combines learner-chatbot and learner-learner interactions is necessary. Such an approach would allow learners to utilise chatbots to obtain timely feedback and targeted pronunciation practice, while also catering for their tendency to learn collaboratively with others. This phenomenon requires further research into the mechanisms of collaborative interaction between individuals and GAI chatbots in language learning. In addition, educational attainment can greatly influence the impact of AI chatbots on learning outcomes. Primary and secondary school students showed differences in learning outcomes compared to students who did not use an AI chatbot. It is unclear how to use GAI chatbots as they are more versatile than earlier AI chatbots and are not subject to any limitations. This requires more research.

The purpose of this study is to investigate the impact of a GAI-based chatbot on primary school students' English speaking ability. This study is needed because traditional AI chatbots often fail to adequately consider the dynamic and contextual factors of spoken language acquisition. Communication barriers still exist, especially for automatic speech recognition systems, such as maintaining a coherent dialogue, providing relevant responses, and resolving complex queries. The Talkpal:AI developed in this project is a chatbot that employs a generative artificial intelligence framework combined with OpenAI's high-level language model.Talkpal:AI utilises ChatGPT to augment its own communication capabilities, facilitating comprehension of different topics and enabling human-like responses. The blend of technologies is designed to immerse learners in real contextual interactions. In addition, the functional features of Talkpal:AI meet the developmental requirements and learning preferences of K-12 English learners. This study evaluates the efficacy of the GAI chatbot in improving elementary school students' spoken English by analysing their individual and two-person interactions with Talkpal:AI. The purpose of this project is to elucidate the efficacy of the GAI chatbot in helping elementary school students improve their spoken English and to lay the groundwork for subsequent research and practical applications to enhance the spoken English experience of these learners.

2. Literature review

AI chatbots, or conversational agents, are software applications engineered to participate in dialogues that mimic human conversations. They utilize diverse artificial intelligence techniques, including natural language processing, machine learning, neural networks, information retrieval, and deep learning. The interactionist approach says that learning a language progresses through understandable input, important interactions, language production, and feedback (Fathietal., 2024)[3]. Plethora of AI chatbots exists online, including Apple's Siri, Amazon's Alexa, Google Assistant, and OpenAI's ChatGPT.

Substantial distinctions exist between conventional and AI chatbots. Conventional chatbots depend on predetermined patterns and templates, with interactions constrained by developer-defined rules, resulting in reduced flexibility and responsiveness to varied user inputs. Conversely, AI chatbots possess the capability to retain user inputs and assimilate knowledge from previous dialogues, thereby augmenting their engagement and interactivity (Jeon, 2024)[4]. Numerous educational theories endorse the implementation of AI chatbots in language acquisition. The real-time engagement of AI chatbots enhances the authenticity of conversation. Human-AI chatbot interaction, akin to collaborative discourse among individuals, promotes problem-solving and knowledge production through interactive and cooperative learning, thereby facilitating second language acquisition (Zhai & Wibo, 2023)[5]. People often perceive AI chatbots as kind and patient aides, providing support and guidance within learners' zones of proximal development. They serve as both interlocutors and facilitators, promoting peer collaboration and role-playing activities. These

interactions correspond with social constructivist ideas, wherein learners cooperatively develop knowledge through interaction and cooperation. Interlocutors adjust their language to achieve mutual comprehension during communication failures, often involving explanation requests, error corrections, and repetitions (Ebadi & Amini, 2024)[6]. AI chatbots simulate genuine linguistic environments, facilitating learning contexts that reflect real-life scenarios, allowing learners to implement gained abilities in practical applications (Kim, 2019)[7]. This approach aligns with situated and contextualized learning theories, suggesting that integrating learning into real-world contexts strengthens the retention of knowledge in long-term memory and facilitates its retrieval.Moreover, AI chatbots facilitate personalized learning by providing customized exercises, feedback, and information, enabling learners to assume control over their advancement and adjust their education according to their language competence, learning preferences, and objectives. The theory of self-regulated learning posits that optimal learning transpires when learners proactively oversee their content and methodology during educational events. AI chatbots empower learners to regulate their learning pace, universally access language acquisition resources, and choose content tailored to their specific requirements and preferences. This interaction is defined as "AI as coach," aiding learners in efficiently overseeing their educational processes (El Shazly, 2021)[8]. AI chatbots offer emotional support to language learners, alleviating anxiety and enhancing enjoyment. Their artificial nature mitigates learners' apprehensions regarding errors, promoting a sense of ease in contrast to human interactions. This decrease in fear facilitates language acquisition by diminishing learners' emotive filters. Furthermore, interaction with AI chatbots might elicit a flow state in learners that is marked by increased learning efficiency and favorable emotional conditions. The distinctive characteristics of AI chatbots possess significant potential for enhancing second language acquisition, underpinned by many theoretical frameworks.

This study examined three research questions.

Does Talkpal: AI Bot significantly improve the speaking abilities of elementary school EFL students?

What are the perspectives of elementary school EFL learners concerning the effects of Talkpal: AI Bot-assisted EFL speaking?

3. Methodology

3.1. Participants and context

40 students participated in the study. A primary school in Heilongjiang Province, China registered the students in an elementary-level English language option. Per the corporate requirements, each language class accommodates 20 pupils. The schedule led to the allocation of sixty participants into two distinct sessions. We then randomly assigned participants to either the experimental group (one session, n = 20) or the control group (one session, n = 20). We provided a detailed explanation of the study to the participants in the experimental group, emphasising their voluntary participation and giving them the option to withdraw from the experiment (English language classes using AI chatbots) and switch to conventional classes (English language classes without AI chatbots). All participants were native speakers of Chinese. The participants, who ranged in age from 10 to 11 years, engaged in 3 hours of weekly lessons over a 14-week semester.The participants primarily used English within the confines of English classes. Their instructor, a scholar with over a decade of experience teaching English in China, observed that some Chinese students were hesitant to engage in English communication, attributing their reluctance to the cultural concept of "loss of face" prevalent in Chinese society. Additional factors were inadequate English ability, diminished self-assurance, insufficient experience interacting with native speakers, limited exposure to English in their daily life, and personality-related variables. Consequently, the

instructors designed learning activities to remedy the students' deficiencies in oral and written practice by utilizing an AI chatbot and promoting its use for extracurricular learning both within and outside the classroom.

3.2. Instruments

The study instruments included Talkpal AI, WTC surveys, and semi-structured interviews.

3.2.1. WTC in English questionnaire

Two sets of WTC in English questionnaires (see Appendices A and B) were adapted from Reinders and Wattana's (2014)[9]. WTC scales to survey the participants' WTC in the conventional classroom and during engagement in chatbot activities. The two sets of WTC questionnaires were composed of two parts: WTC in English and communicative self-confidence, which covered anxiety and self-perceived communicative competence. These two factors of communicative self-confidence are considered to have the ability to predict L2 WTC. The participants were required to answer 10questions and rate each item on a 5-point Likert scale.

4. Results

4.1. Statistical analysis of group differences in WTC

Participants rated their perceptions of WTC on a scale of 1 ("very unwilling") to 5 ("very willing") for various communication activities they performed in traditional classrooms in the first set (T1) of WTC surveys. That the experimental group (M=2.46, SD=0.78) and the control group (M=2.6, SD=0.77) showed neutral attitudes toward using English to communicate in class. Participants showed low levels of WTC in English when they talked with classmates about homework (EG=2.25, CG=2.3) and exchanged ideas, feelings, and opinions (EG=2.05, CG=2.15).

The WTC survey also assessed participants' anxiety levels and self-perceived communicative competence when using English in traditional classroom settings. The low mean ratings of anxiety (EG=2.3, CG=2.08) indicated that they felt anxious when talking in English in class. Specifically, they were afraid of making mistakes (EG=2.35, CG=2.2) and unable to understand what their peers were communicating in English (EG=2.25, CG=1.95). In addition, the participants' average self-perceived communicative competence score was also low (EG=2.12, CG=1.97). They believed that the classroom activities failed to improve their English fluency (EG=2.10, CG=2.05).

We conducted the second (T2) WTC survey eight weeks after the first survey. Over the eight weeks, the experimental group participated in eight different tasks using the AI chatbot, while the control group participated in traditional classroom activities. The experimental group had significantly more positive perceptions of WTC in the UK than the control group (EG=4.02, CG=2.24). The former group reported that they were willing to talk about classwork with classmates or the chatbot (M=4, SD=2.3) and to communicate their thoughts, feelings, and opinions in English (M=3.90, SD=0.72). In addition to their perceptions of WTC, the experimental group also showed low levels of anxiety and high levels of self-perceived communicative competence. It was clear that the experimental group was not anxious when communicating during the chatbot activities (M=4.1, SD=0.83), indicating that they were not afraid of making mistakes (M=4.05, SD=0.89) and were not nervous about using English when conducting the chatbot activities (M=3.95, SD=0.94). Participants were confident in their communicative abilities (M=3.92, SD=0.81), indicating that they were confident in communicating in English (M=3.85, SD=0.88) and believed that participating in chatbot activities helped them improve their English fluency (M=3.80,

SD=0.83).

Unlike the experimental group, participants' WTC in the control group remained almost unchanged. The mean WTC of participants remained in the “somewhat reluctant” range. Therefore, these results suggest that the use of chatbots affected learners’ WTC in English. We conducted statistical analysis to confirm whether this was indeed the case.

4.1.1. Analysis of variance

We conducted an independent sample t-test to ensure the homogeneity of WTC at T1 between the two groups. The data for each group consisted of independent observations and met the assumptions of linearity and normal distribution (Shapiro-Wilk test, p = 0.27 for the experimental group and p = 0.227 for the control group). We detected no outliers in the data. There were no statistically significant differences (t(39)=0.661, p=0.512), indicating that the two groups were largely homogeneous and comparable.

Before performing the ANCOVA on the WTC variable at T2, we checked and verified five basic assumptions. The data met the assumptions of linearity and normal distribution (Shapiro-Wilk test, EGp = .801, CGp = .173), and there were no outliers. The analysis of the regression homogeneity slope assumption (F(1,38)=0.437, p=.512) revealed no significant interaction between the pre-test score of WTC (covariate) and the group condition (independent variable), thereby supporting the assumption of regression homogeneity. The Levene test yielded a non-significant result (p =.411), confirming the fulfilment of the homogeneity of variance criteria. The ANCOVA test results (F(1, 37) = 483.067, p =.000) show that there was a significant difference in WTC between the experimental and control groups at T2 after taking into account the effects of group differences that were already present at Time 1. This means that the chatbot intervention greatly improved learners' WTC.

4.2. Participants’ interviews

The second part of the study investigated participants’ opinions on the use of AI chatbots in English learning, including their communication experiences, their WTC in English, their real feelings about using chatbots, and the pros and cons of using technology in language learning. Ten out of a total of 20 students volunteered to participate in semi-structured interviews, which were first recorded in Mandarin and then translated into English.

Most participants experienced reduced anxiety when engaging with the chatbot in class. One explanation is that participants felt less anxious around the chatbot, making them less nervous when communicating and encouraging interaction with the chatbot. For example, 02, who usually disliked speaking in language classes, shared some of the changes they experienced, including reduced concerns about making mistakes and increased participation.

"I don't like to talk too much. I'm afraid that I will make mistakes if I speak too much. I only speak when the teacher arranges activities for me. Unlike the chatbot, I feel different and it doesn't matter if I make mistakes because it's not a real person."

Another participant shared her experience "I was worried that if I spoke too much in class, everyone would think I was showing off. Even if I wanted to work hard on my spoken English, I was afraid that I would be different in the class. Everyone was interested in the robot and I didn't have this worry."

Participants mentioned that due to the nature of speaking, speaking is evaluated by speed and pronunciation, so speaking in public made them very reluctant and nervous, especially with native speakers or classmates with different levels. Therefore, participants felt relaxed when interacting with the chatbot, which allowed them to remain anonymous and reduced their anxiety, which were

the two biggest advantages of using chatbots for language learning.

Using chatbots enhanced participants' WTC in English. Participants who participated in the chatbot activity reported reduced communication anxiety and increased production in the second language, which were the main reasons for their higher WTC in English. When asked if the chatbot activity helped improve their WTC, one participant said:

"Using chatbots was helpful. It felt like the chatbot was always waiting for me to talk, and it treated me kindly and accurately no matter what I said. So, I started talking to the chatbot more, and now I have a little confidence to talk to people in English."

Another participant commented that chatbots motivate people to use English by providing a real communication environment.

"When I talk to the chatbot, I feel like I am communicating with a foreigner. I think that only chatbots, besides our English teacher, can provide such real expressions, appropriate speed, and clear pronunciation in class. I think I can't improve my English if I only practice with my classmates because they are also learning. So, I am willing to communicate with the chatbot in English, which gives me a lot of motivation. I hope I can learn more English through chatbots."

Using chatbots can improve language skills. According to the participants' answers, using chatbots is beneficial not only for practicing speaking and listening, but also for practicing the pronunciation of linked words.

"I learned many new words, and the robot helped me explain the meaning of the words with pictures. I felt that I learned more than in class"

"The English speaking class was interesting. I didn't feel sleepy in class because I loved watching English cartoons before so I knew more words, but many other students in the class didn't understand what I said. In addition to the teacher, the activity of talking with the chatbot. I felt that I really learned something. I could talk to the robot forever."

The participants could effectively use the chatbot for their academic purposes. However, as the participants admitted in the interview, there is a lack of objective data to prove whether the use of chatbots has improved their language skills.

Finally, most participants liked the technology-mediated learning environment and expressed a high interest in using it. They considered it a "newest", "interesting" and "colorful" learning method.

The use of chatbots had a positive impact on psychological aspects. Participants generally felt that the lack of an open public area made them feel more relaxed when participating in chatbot activities.

5. Discussion

The purpose of this study was to investigate the effects of chatbots on English learners' willingness to communicate (WTC) in the target language using quantitative and qualitative methods. The initial research topic investigated the effects of chatbot interactions on learners' willingness to communicate (WTC). We conducted pre- and post-surveys to address this question. Preliminary results from the initial questionnaire showed that both groups of participants showed low willingness to communicate (WTC) in English during the class. Participants showed hesitation to converse in English because they were worried about making mistakes and had difficulty understanding their peers' language. They believed that their English proficiency was not enough. In contrast, the answers to the second questionnaire showed a change in the experimental group. These participants showed an increase in willingness to communicate (WTC) when interacting with the chatbot and felt more comfortable expressing their thoughts, feelings, and opinions to the chatbot or their peers. They had less anxiety about making mistakes and less concerns about language

limitations. However, the control group's willingness to communicate (WTC) showed little change between the two surveys. The data showed that chatbot interactions enhanced learners' willingness to communicate in English.

Statistical analysis validated a substantial disparity in WTC levels between the experimental and control groups. The experimental group exhibited a heightened propensity to engage in English, less fear, and enhanced confidence in their communicative efficacy during chatbot activities relative to conventional classroom activities. This underscores the potential of chatbot-mediated interactions in cultivating an engaging and encouraging language-learning atmosphere.

The second research topic examined participants' perceptions of the use of chatbots for language acquisition. Interviews with participants indicated that chatbots positively influenced learners' emotional and academic experiences. Numerous individuals saw that interactions with chatbots alleviated anxiety and enhanced confidence in speaking, resulting in a rise in their L2 output. The study did not directly assess enhancements in language ability; instead, participants indicated perceived increases in speaking and listening abilities, vocabulary enrichment, and pronunciation accuracy, attributed to the immediate and indirect feedback from chatbots.

The results possess multiple implications. English courses can efficiently integrate AI chatbots to enhance WTC and encourage active L2 conversation. Both individual personality qualities and situational conditions, such as group size, task types, and communication styles, influence WTC. Chatbots function as a contextual element that fosters a more pertinent, engaging, and less daunting atmosphere for English communication.

Additionally, because chatbot conversations are anonymous, learners can overcome emotional barriers such as the fear of “losing face.” This problem is particularly acute in cultural contexts where mistakes can trigger feelings of shame or humiliation. Chatbots provide a safer basis for discussion, alleviating the anxiety associated with negative evaluations. This initial simplicity can enhance learners’ enjoyment of the language acquisition process and promote more frequent and effective engagement in communication. The gap in educational resources in many remote towns and communities can have a significant impact on children’s academic performance and anxiety levels. AI chatbots are easy to use, cost-effective, and produce low error rates in spoken English. These will certainly help students and alleviate some of the disadvantages of learning spoken English.

Ultimately, AI chatbots furnish learners with precise, contextually relevant linguistic information. They exemplify articulate speaking, accurate grammar, and varied phrasing suited to different contexts. Students can assess and modify their language usage by analysing chatbot responses, thus enhancing their linguistic proficiency. These attributes render chatbots an invaluable asset for fostering engaging and supportive educational experiences, thereby facilitating language acquisition in a low-stress, collaborative environment.

6. Conclusions

This study has several limitations. First, it was conducted as a research content of the oral English class, which was an additional supplement to the basic English class. AI was not deeply integrated with the textbook. In fact, the use of this software in combination with the textbook requires further consideration. Second, this study did not study actual L2 acquisition. Therefore, no conclusions can be drawn about the academic advantages of AI chatbots in L2 learning. Participants reported positive effects; however, higher WTC may lead to more interactions, although we have not yet obtained real data to prove this. In future studies, this problem can be improved or solved by conducting language assessments to objectively measure students’ actual language skills.

Second, since previous studies have reported different conclusions about the effectiveness of

chatbots depending on student variables, future studies should adopt more rigorous empirical designs to improve the generalizability of the findings. Finally, the novelty factor may have affected the positive results of this study. When the experimental group learned that they could use mobile devices to practice English in class, they showed extremely high levels of enthusiasm. Long-term studies are needed to alleviate this problem.

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