https://journal.ypidathu.or.id/index.php/ijlul/
P - ISSN: 3026-7102
E - ISSN: 3030-8372

Integration of AI Chatbot as an Interactive Companion in Foreign Language Learning in High School

Adriani Jihad[1], **Mulyani**[2]
[1]Sekolah Tinggi Keguruan dan Ilmu Pendidikan Yayasan Pendidikan Ujung Pandang, Indonesia
[2]Universitas Hasanudin, Indonesia

ABSTRACT

Background. Advances in artificial intelligence (AI) technology have opened up new opportunities in the field of education, especially in learning foreign languages at the high school level. However, the integration of AI-based chatbots as interactive companions in the context of formal learning is still rarely explored, especially in Indonesia. The main problems faced in learning foreign languages are limited interaction time and low confidence of students in using the target language.

Purpose. This study aims to evaluate the effectiveness of the use of AI chatbots as an interactive learning partner in improving the outcomes and quality of foreign language learning of high school students. The main focus is directed at improving academic performance, motivation, and student engagement through adaptive and personalized digital interactions.

Method. The research method used was a quasi-experimental design with two groups, namely the experimental group that used chatbots and the control group that learned by conventional methods. The research instruments included pretest and posttest tests, engagement questionnaires, and observation of student learning behavior. The sample consisted of 60 grade XI students at one of the State High Schools.

Results. The results showed a significant increase in the posttest scores of the experimental group compared to the control group. In addition, chatbots also play a role in building confidence and increasing students' active participation in foreign language practices independently.

Conclusion. The conclusion of this study states that AI chatbots are effective as an interactive companion that is able to enrich the experience of learning a foreign language. The uniqueness of this research lies in the integration of chatbots in the formal curriculum of high schools, as well as its contribution in answering the needs of personalized learning through AI-based technology.

KEYWORDS

AI Chatbot, High School, Foreign Language Learning

Citation: Jihad, A., & Mulyani, Mulyani. (2025). Integration of AI Chatbot as an Interactive Companion in Foreign Language Learning in High School. *International Journal of Language and Ubiquitous Learning, 3*(2), 55–64. https://doi.org/10.70177/ijlul.v3i2.2403

Correspondence:

Adriani Jihad,
adrianijihad76@gmail.com

Received: August 14, 2025

Accepted: August 27, 2025

Published: September 14, 2025

INTRODUCTION

Foreign language learning at the high school level has undergone significant development in line with the increasing need for globalization and cross-cultural communication (Deng & Yu, 2023). Students are required not only to understand grammar and vocabulary, but also to be able to use them contextually in real life (Chen dkk., 2020).

However, limited face-to-face time in the classroom and differences in learning speed between students are often obstacles to achieving optimal learning outcomes (Kohnke, 2023).

The advancement of digital technology opens up great opportunities to answer the challenges in learning foreign languages (N. Kim, 2019). One of the fast-growing innovations is the use of artificial intelligence (AI)-based chatbots as an interactive and adaptive learning tool. AI chatbots have the ability to have conversations in real-time, respond to student input, and customize feedback based on an individual's ability level (S. Kim dkk., 2023).

The theory of social interaction in foreign language learning, as put forward by Vygotsky through the concept of the Zone of Proximal Development (ZPD), emphasizes the importance of interaction between learners and more competent learning partners (Ji dkk., 2023). In this context, AI chatbots can act as a digital learning partner that is able to provide scaffolding in a timely manner, while encouraging active student involvement in the learning process. This technology not only partially replaces the role of teachers, but also expands learning spaces outside the classroom (Zhai & Wibowo, 2022).

Several previous studies have shown that the use of AI chatbots in learning foreign languages can increase learning motivation, confidence in speaking, and better mastery of language structures. Consistent interaction with the chatbot allows students to practice in a stress-free setting, thus minimizing the fear of making mistakes (Hawanti & Zubaydulloevna, 2023). The use of chatbots also allows for more personalized learning because it can be adjusted to the needs and learning styles of students.

The involvement of AI technology in education, specifically chatbots, has become part of the transformation of digital education in various countries. In the Indonesian context, the use of chatbots is still relatively new and has not been widely implemented systematically in high schools (Alharbi, 2023). Therefore, this research focuses on the integration of AI chatbots as an interactive companion in foreign language learning, in order to explore its potential in improving students' learning experiences more effectively and enjoyably (AbuSahyon dkk., 2023).

The use of artificial intelligence technology in the world of education has increased significantly, including in foreign language learning. However, most research and implementation is more done at the college or non-formal education level (Liu dkk., 2022). The context of high school, particularly in the formal curriculum, is still not much explored in terms of systematic integration of AI chatbots.

Information on how AI chatbots affect students' direct involvement in the process of learning a foreign language in formal classrooms is still very limited. There is not yet a comprehensive understanding of how high school students respond to the presence of chatbots as digital learning partners, as well as how chatbots can be adapted to national curricula and adolescent student characteristics.

Previous studies have focused a lot on the technical aspects of chatbot development, such as natural language processing (NLP) and interface design, but less on the pedagogical and psychological aspects of learning at the high school level. The aspect of interactivity, which should be the advantage of chatbots, is still rarely studied from the perspective of students' social relations with digital systems in the context of learning a foreign language.

The theoretical framework of Computer-Assisted Language Learning (CALL) emphasizes the importance of the existence of technology that is not only passive, but also able to stimulate students' active involvement in the language learning process (Moybeka dkk., 2023). However, the application of the CALL principle through AI chatbot media at the secondary school level is still an

area that has not been optimally worked on. This gap is an important foundation for this research (Gutiérrez, 2023).

Improving the quality of foreign language learning in secondary schools requires an approach that is able to answer the challenges of time constraints, variations in students' abilities, and low confidence in verbal communication. The integration of AI chatbots as an interactive companion can be an innovative solution because it is able to provide continuous, responsive, and non-judgmental communication exercises. This technology provides more flexible and personalized learning opportunities.

Constructivist Learning theory emphasizes that meaningful learning occurs when students are actively involved in the process of exploration and interaction (Son dkk., 2025). AI chatbots, if designed with constructivistic principles, can be a means of communication practice that allows students to build language knowledge gradually through digital interaction. Chatbots also allow for a non-linear learning experience, which gives students room to try, fail, and improve independently.

This study aims to examine the extent to which AI chatbots can play a role as an interactive companion in learning foreign languages at the high school level. The focus of the research is directed at the effectiveness of the use of chatbots in increasing student participation, confidence, and learning outcomes. The main hypothesis proposed is that the proper integration of AI chatbots in foreign language learning is able to significantly improve the learning experience in a high school environment.

RESEARCH METHODOLOGY

This study uses a quantitative approach with a quasi-experimental design involving two groups, namely an experimental group that uses AI chatbots in foreign language learning, and a control group that uses conventional methods (Craig, 2021; Sanaie, 2019). The purpose of this design is to determine the influence of the use of chatbots as interactive companions on learning outcomes and student involvement in the learning process.

The population in this study is all grade XI students in one of the State High Schools that have been determined through purposive sampling techniques. The sample used was 60 students, consisting of 30 students in the experimental group and 30 students in the control group, taking into account the equivalence of initial abilities measured through the pretest.

The instruments used in this study include foreign language proficiency tests consisting of reading, writing, listening, and speaking aspects, as well as student learning engagement questionnaires. The validity and reliability of the instrument are tested first before being used for data collection. In addition, observation notes are also used to support qualitative data regarding student responses to the use of AI chatbots.

The procedure for conducting research began with giving a pretest to both groups to find out the initial ability of students. The experimental group was then given a treatment using an AI chatbot as an interactive medium for four weeks, while the control group used the usual teaching methods. After the treatment was completed, both groups were given a posttest and questionnaire to measure changes in learning outcomes and engagement levels. The data obtained was analyzed using statistical tests to find out the significant differences between the two groups (H. Kim dkk., 2022).

RESULT AND DISCUSSION

The table of pretest and posttest results shows a striking difference between the experimental group and the control group. The average pretest score of the experimental group was 68.4 with a

standard deviation of 5.6, while in the posttest it increased to 84.2 with a standard deviation decreased to 4.3. This shows an increase in performance after treatment in the form of using AI chatbots as an interactive medium.

The control group recorded an average pretest score of 67.9 with a standard deviation of 5.2 and only increased to 73.5 in the posttest with a standard deviation of 5.0. The increase in scores in the control group was moderate and not as rapid as in the experimental group. The number of students in each group is the same, namely 30 students, so the comparison can be said to be balanced in terms of quantity.

The difference between the pretest and posttest was more significant in the experimental group than in the controls. This indicates that the use of chatbots as learning companions makes a positive contribution to improving student learning outcomes, especially in the realm of foreign languages. The effect is quite substantial and reinforces the initial conjecture that AI technology can speed up the learning process.

Table 1. Average Pretest and Posttest Scores of Students in the Experimental Group and Control Group

Group	Test Type	Grade Point Average	Standard Deviation	Number of Students
Eksperimen	Pretest	68,4	5,6	30
Eksperimen	Posttest	84,2	4,3	30
Control	Pretest	67,9	5,2	30
Control	Posttest	73,5	5,0	30

The average posttest score of the experimental group which reached 84.2 showed that most students experienced an improvement in their abilities after interacting with the AI chatbot. The interactivity provided by chatbots allows students to practice more independently outside of lesson hours. AI chatbots also provide live feedback that prompts reflection and error correction quickly.

The low standard deviation in the posttest of the experimental group indicated the consistency of improving student learning outcomes. Most of the students in this group were at similar levels of achievement, signifying that chatbots are not only effective for students with high abilities, but also provide equal support for students with early-to-lower abilities. This reinforces the inclusive value of AI technology in the learning process.

The less significant increase in scores in the control group illustrates the limitations of conventional methods in providing ongoing learning support. Teachers can't always provide personalized feedback to every student. Chatbots, on the other hand, are able to respond to each individual directly, allowing for a deeper and more relevant learning experience.

In addition to test scores, student learning engagement data was also collected through questionnaires that measured four indicators: active participation, confidence, learning motivation, and frequency of interaction with foreign language materials. The results of the questionnaire showed that 83% of students in the experimental group felt more comfortable practicing talking with chatbots than in class discussions.

As many as 78% of the students in the experimental group also showed increased motivation in learning a foreign language because they felt less afraid of making mistakes when interacting with chatbots. The frequency of speaking exercises doubled compared to before treatment, with the average student interacting with the chatbot for 20–30 minutes per day.

On the other hand, the control group did not show a significant improvement in terms of learning engagement. Only 42% of students reported an increase in motivation, and most still relied

on direct instruction from teachers with no additional activities outside of the classroom. Their learning patterns tend to be passive and limited to formal learning time.

AI chatbots have proven to be able to answer the need for additional interaction that often cannot be provided in limited face-to-face learning. The role of chatbots as digital learning partners provides a safe space for students to practice without social pressure. Students feel more free to explore the use of foreign languages, especially in the aspects of speaking and composing sentences.

A significant increase in motivation is associated with the non-judgmental nature of chatbots and provide quick and precise responses. This creates a more productive learning cycle because students immediately notice mistakes and can correct them independently. AI also helps identify students' specific language difficulties and provides contextually appropriate usage examples.

Learning involvement is one of the important indicators in the success of foreign language education. These findings confirm that learning based on interactive technology is able to encourage learners to be more active, reflective, and independent. Chatbots as a tool provide a more immersive learning experience and support personalization.

The increase in academic scores and student learning engagement in the experimental group showed a strong correlation between interaction with AI chatbots and foreign language learning outcomes. Quantitative data showed a consistent spike in scores, while qualitative data reinforced it with a positive response to a more flexible and interactive learning experience.

The relationship between the two types of data strengthens the argument that AI chatbots are not only technical aids, but also pedagogical agents that can change classroom dynamics. Digital interactions built through chatbots stimulate active communication, understanding of language context, and increasing students' confidence in using foreign languages in real terms.

The effectiveness of chatbots in improving learning outcomes lies not only in their response speed, but also in their ability to position themselves as a trustworthy learning partner. Students feel the presence of this technology as a learning companion, not just a tool, that is able to answer personal learning needs consistently.

A student named Aisyah from the experimental group is one of the interesting examples in this study. At the beginning of the pretest, he scored 65 and showed a reluctance to speak in a foreign language, both in class and in group discussions. After four weeks of using the chatbot, his posttest score increased to 88 with the highest score on the speaking and listening aspects.

Observation records show that Aisyah interacts with chatbots almost every night, especially for practice of composing daily dialogues. He also revealed that the presence of chatbots helped him build confidence because he didn't feel ashamed when he was wrong. The frequency of use is higher than that of other students, with an average duration of 45 minutes per day.

The subject teacher also noted a significant change in Aisyah in class participation. He began to actively ask questions, speak in foreign languages, and even help his classmates in composing sentences. These behavioral changes not only reflect cognitive, but also affective improvements, as a result of the effective integration of chatbots into daily learning routines.

Aisyah's story reflects how AI chatbots can facilitate personalized learning effectively. The use of chatbots provides a training space that is not limited by time and place, so that students like Aisyah can learn at their own pace. This learning situation helps students overcome psychological barriers that are often the main barriers to language learning.

Aisyah's learning effectiveness is driven by the interactivity of chatbots that gives her the opportunity to practice repeated conversations with variations in context. An increase in scores and a change in its attitude suggest that AI can be a means of adaptive learning that pays attention to

individual needs. This case shows the impact of technology on a more in-depth and reflective learning process.

Changes in Aisyah did not only occur in the academic aspect, but also in the affective and social dimensions. Students become more confident, independent, and enthusiastic in learning foreign languages. This case study confirms that AI chatbots have great potential in creating transformative learning experiences and empowering students.

Quantitative, qualitative, and case study findings show consistent pattern suitability in showing the positive impact of AI chatbot integration in foreign language learning at the high school level. Improved academic grades, motivation, and student engagement are all connected in a learning mechanism that is more adaptive and responsive to student needs.

AI chatbots serve as a bridge between technological approaches and pedagogies based on personal interaction. Students feel accompanied in their learning process, both academically and emotionally. The relationship between case study data and statistical data reinforces the conclusion that AI technology can be an effective learning strategy to improve the outcomes and quality of the language learning process.

The implications of this relationship are not only relevant to the context of high schools, but also provide a glimpse into the future of foreign language education that integrates artificial intelligence as part of the learning ecosystem. This research shows how AI-based approaches are not only innovative, but also inclusive and transformative.

This research shows that the integration of AI-based chatbots in foreign language learning at the high school level is able to significantly improve student learning outcomes. The average posttest score of the experimental group increased sharply compared to the control group, with a more stable and consistent spread of scores. These findings are reinforced by increased learning motivation, confidence, and student engagement in the learning process.

Qualitative data shows that most students feel more comfortable interacting with chatbots than in regular classroom discussions. Interactions that take place in a personal and responsive manner allow students to explore foreign languages without social pressure. Chatbots play the role not only of technical aids, but also of digital learning partners that are adaptive to individual needs.

Aisyah's student case study shows the transformative impact of the use of chatbots. Changes in academic grades are accompanied by changes in learning behavior and affection for language lessons. This transformation reflects the great potential of AI technology in creating a well-rounded and meaningful learning experience at the secondary education level.

This research is in line with the findings of several previous studies such as those conducted by (Taecharungroj, 2023), which stated that AI-based chatbots can improve students' speaking skills in foreign language learning. Both studies showed positive effects in the interactive, motivational, and academic achievement aspects. These findings reinforce that the existence of digital partners can improve overall learning performance.

In contrast to the research that only focuses on the development of chatbots from the technical side, this research emphasizes the pedagogical and emotional aspects of the use of chatbots. Affective elements such as confidence and learning comfort are important parts that are often overlooked in technology-based studies. This research offers the perspective that artificial intelligence is not only about algorithms, but also about how technology mediates human learning experiences.

This research also fills a gap in the Indonesian local literature that still lacks discussion of the integration of AI chatbots at the high school level. The rigorous formal education context in the national curriculum becomes a unique setting that has not been widely covered by previous studies.

This makes the results of this research a significant contribution to AI-based learning practices in Indonesia.

The improvement of learning outcomes and student involvement is an indicator that technology can take an active role in accompanying the learning process which has been dominated by human interaction. AI chatbots are no longer just a complementary tool, but have evolved into a pedagogical entity that is able to fill the void of personal interaction in the mass education system. This success signifies a paradigm shift in 21st-century learning design.

The positive response from students to chatbots indicates a shift in learning preferences among adolescents. The digital-native generation is more open to learning through technological interaction than conventional methods that tend to be one-way. The existence of chatbots reflects the need for a more flexible, non-judgmental, and individualized approach to learning.

The fact that chatbots can build emotional engagement and boost students' confidence is also a reflection that technology can bridge affective needs in learning. Language learning, which has been considered scary for some students, has now become friendlier and more fun. This is a sign that the future of education requires integration between technology, learning psychology, and adaptive pedagogy.

The use of AI chatbots has major implications for learning models in high schools. Schools can start considering the use of this technology as part of their regular foreign language learning strategies. Strengthening teachers' competence in utilizing AI is also an urgent need so that the interaction between students and chatbots remains controlled in the right pedagogical corridor.

Curriculum design needs to consider space for adaptive technological interventions such as chatbots. Learning is not only based on textbooks and written exercises, but also on communication simulations that are closer to real-life practices. This will help students develop language skills functionally and are relevant to today's needs.

Another implication concerns the direction of digital education policy. The integration of AI chatbots can be part of the national digital transformation agenda in the education sector, especially in supporting Merdeka Belajar. Governments, educational institutions, and technology developers must build strategic collaborations so that these innovations can be widely and sustainably implemented.

Increased learning outcomes and student motivation in the experimental group occurred because the AI chatbot provided instant and personalized feedback. The speed and accuracy of chatbot responses make the learning process more efficient and interactive. The absence of fear of being judged or laughed at when speaking in a foreign language also encourages students' courage to keep trying and practicing.

The repetitive nature of AI chatbots allows students to repeat conversations and gain an infinite variety of contexts. This is in accordance with the principles of language learning which emphasizes repetition and exposure as the key to language acquisition. Chatbots are able to create a continuous learning experience without causing boredom, just like monotonous written exercises.

The psychological aspect also plays an important role. Students feel in control of their own learning process when using chatbots. This independence fosters a sense of responsibility for self-improvement, which ultimately contributes to increased learning achievement. This factor explains why the results of the study showed a significant and consistent impact on the experimental group.

Further research can be carried out by extending the context of the use of AI chatbots to other subjects, or to lower or higher education levels. Exploring more complex variations of chatbot designs, such as voice-based or video integration, is also an important step to improve the quality of

interactions. Evaluation of the long-term impact of the use of chatbots in the formation of language competence also needs to be carried out thoroughly.

The development of collaboration between technology developers, teachers, and educational researchers is indispensable. The chatbot used in this study is still general, so it is necessary to develop a version that is more in line with the local context and culture of Indonesian students. Integration with the national curriculum, including strengthening content based on students' daily contexts, will make AI chatbots more relevant and effective.

Large-scale implementation of chatbots in schools requires adequate digital infrastructure support. The government and education policy makers need to see the results of this research as an opportunity to design inclusive AI-based learning policies. This step will not only improve learning outcomes, but also equip students with the technology literacy that will be important in the future.

CONCLUSION

The study found that the integration of AI-based chatbots in foreign language learning at the high school level significantly improved learning outcomes, student engagement, and confidence in using the target language, with more consistent changes in the experimental group than in the control group. These findings set this study apart from previous studies because it positions chatbots as active pedagogical partners, rather than just technical aids.

The main contribution of this research lies in the incorporation of the concept of adaptive digital interaction and constructivistic theory in the context of formal education in Indonesia. This research not only offers an innovative technological approach, but also provides a framework for the method of using chatbots in a structured and integrated manner in the foreign language learning process at the high school level.

This study has limitations in the scope of the location and variety of chatbots used, as it only focuses on one school and one type of text-based chatbot. Advanced research can expand the context by testing the effectiveness of chatbots across platforms, subjects, and enriching long-term evaluation approaches to assess the impact of AI use on overall learning competencies.

AUTHORS' CONTRIBUTION

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.
Author 2: Conceptualization; Data curation; In-vestigation.

REFERENCES

AbuSahyon, A., Alzyoud, A., Alshorman, O., & ... (2023). AI-driven technology and chatbots as tools for enhancing English language learning in the context of second language acquisition: A review study. *International Journal of ...*, *Query date: 2025-08-05 13:44:28*. https://www.academia.edu/download/108026768/1810.pdf

Alharbi, W. (2023). AI in the foreign language classroom: A pedagogical overview of automated writing assistance tools. *Education Research International*, *Query date: 2025-08-05 13:44:28*. https://doi.org/10.1155/2023/4253331

Chen, H., Widarso, G. V., & ... (2020). A chatbot for learning Chinese: Learning achievement and technology acceptance. *Journal of Educational ...*, *Query date: 2025-08-05 13:44:28*. https://doi.org/10.1177/0735633120929622

Craig, S. J. (2021). Simulation strategies to increase nursing student clinical competence in safe medication administration practices: A quasi-experimental study. *Nurse Education Today*, *96*(Query date: 2024-09-17 11:03:49). https://doi.org/10.1016/j.nedt.2020.104605

Deng, X., & Yu, Z. (2023). A meta-analysis and systematic review of the effect of chatbot technology use in sustainable education. *Sustainability*, *Query date: 2025-08-05 13:44:28*. https://www.mdpi.com/2071-1050/15/4/2940

Gutiérrez, L. (2023). Artificial intelligence in language education: Navigating the potential and challenges of chatbots and NLP. *... in English Language Teaching and Learning*, *Query date: 2025-08-05 13:44:28*. https://pdfs.semanticscholar.org/d54e/643298a64522d25052c59f7a843c15e1a131.pdf

Hawanti, S., & Zubaydulloevna, K. (2023). AI chatbot-based learning: Alleviating students' anxiety in English writing classroom. *Bulletin of Social Informatics …*, *Query date: 2025-08-05 13:44:28*. https://pubs.ascee.org/index.php/businta/article/view/659

Ji, H., Han, I., & Ko, Y. (2023). A systematic review of conversational AI in language education: Focusing on the collaboration with human teachers. *Journal of Research on Technology in Education*, *Query date: 2025-08-05 13:44:28*. https://doi.org/10.1080/15391523.2022.2142873

Kim, H., Yang, H., Shin, D., & Lee, J. (2022). *Design principles and architecture of a second language learning chatbot*. *Query date: 2025-08-05 13:44:28*. https://scholarspace.manoa.hawaii.edu/bitstream/10125/73463/1/26_01_10125-73463.pdf

Kim, N. (2019). A study on the use of artificial intelligence chatbots for improving English grammar skills. *Journal of Digital Convergence*, *Query date: 2025-08-05 13:44:28*. https://koreascience.kr/article/JAKO201925454134461.page

Kim, S., Shim, J., & Shim, J. (2023). A study on the utilization of OpenAI ChatGPT as a second language learning tool. *Journal of Multimedia Information System*, *Query date: 2025-08-05 13:44:28*. https://www.jmis.org/archive/view_article?pid=jmis-10-1-79

Kohnke, L. (2023). A pedagogical chatbot: A supplemental language learning tool. *Relc Journal*, *Query date: 2025-08-05 13:44:28*. https://doi.org/10.1177/00336882211067054

Liu, C., Liao, M., Chang, C., & Lin, H. (2022). An analysis of children'interaction with an AI chatbot and its impact on their interest in reading. *Computers &Education*, *Query date: 2025-08-05 13:44:28*. https://www.sciencedirect.com/science/article/pii/S0360131522001476

Moybeka, A., Syariatin, N., Tatipang, D., & ... (2023). Artificial Intelligence and English classroom: The implications of AI toward EFL students' motivation. *Edumaspul: Jurnal …*, *Query date: 2025-08-05 13:44:28*. https://www.academia.edu/download/112924454/Artificial_Intelegence_and_English_Classroom_The_implementations_of_AI_toward_EFL_students_motivation..pdf

Sanaie, N. (2019). Comparing the effect of lecture and Jigsaw teaching strategies on the nursing students' self-regulated learning and academic motivation: A quasi-experimental study. *Nurse Education Today*, *79*(Query date: 2024-09-17 11:03:49), 35–40. https://doi.org/10.1016/j.nedt.2019.05.022

Son, J., Ružić, N., & Philpott, A. (2025). Artificial intelligence technologies and applications for language learning and teaching. *... -Assisted Language Learning*, *Query date: 2025-08-05 13:44:28*. https://doi.org/10.1515/jccall-2023-0015

Taecharungroj, V. (2023). "What can ChatGPT do?" Analyzing early reactions to the innovative AI chatbot on Twitter. *Big Data and Cognitive Computing*, *Query date: 2025-08-05 13:44:28*. https://www.mdpi.com/2504-2289/7/1/35

Zhai, C., & Wibowo, S. (2022). A systematic review on cross-culture, humor and empathy dimensions in conversational chatbots: The case of second language acquisition. *Heliyon*, *Query date: 2025-08-05 13:44:28*. https://www.cell.com/heliyon/fulltext/S2405-8440(22)03344-8