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Collaborating with ChatGPT: An Exploratory Study of German Language Learning

ChatGPT ile İş Birliği Yapmak: Alman Dili Eğitimi Üzerine Keşfedici Bir Çalışma

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Öz

Yapay zekâ teknolojisindeki sürekli gelişmeler, yabancı dil öğrenimindeki değişimleri beraberinde getirmektedir. Yapay zekâ uygulamalarından biri olan ve OpenAI tarafından geliştirilen ChatGPT, yabancı dil eğitiminde uygulanabilir olması dikkat çekmektedir. Bu çalışmada ChatGPT'nin yabancı dil olarak Almanca öğreniminde dört temel becerisinin (dinleme, okuma, konuşma, yazma) öğrenimi için sunduğu olanaklar araştırılarak, yabancı dil eğitiminde ChatGPT'nin avantajları ve dezavantajları incelenmiştir. Yapay zekânın yabancı dil eğitiminde dört temel dil becerisinin öğrenilmesinde kullanılırken dikkat edilmesi gereken noktalar üzerine öneriler verilmiştir. Bununla birlikte, yapay zekânın dezavantajları ve sınırlılıkları da beraberinde tartışılmıştır. Sonuç olarak, yapay zekâ, yabancı dil eğitiminde yeni fırsatlar sunmaktadır. ChatGPT gibi yapay zekâ uygulamaları, öğrencilere yabancı dilde iletişim becerileri kazandırmada yardımcı olabilir. Özellikle okuma ve yazma becerilerinin geliştirilmesi üzerinde ChatGPT'nin önemli bir rolü olduğu düşünülmektedir. Fakat yapay zekânın dezavantajları ve sınırlılıkları da göz ardı edilmemesi gerekmektedir. Yabancı dil öğreniminde yapay zekânın dikkatli bir şekilde kullanılması, öğrencilerin dil becerilerini geliştirmelerinde ve iletişim yeteneklerini arttırmada önemli bir rol oynayacağı düşünülmektedir.

Anahtar sözcükler: Üretken Yapay Zekâ, ChatGPT, Yabancı Dil Olarak Almanca

Abstract

Continuous advancements in artificial intelligence technology have changed foreign language learning. One of the artificial intelligence applications, ChatGPT, developed by OpenAI, draws attention to its applicability in foreign language education. This study explores the opportunities provided by ChatGPT for the learning of four fundamental language skills (listening, reading, speaking and writing) in the context of German language education. The advantages and disadvantages of ChatGPT in foreign language education are examined. Recommendations are provided regarding the points to be considered when utilizing

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artificial intelligence to acquire the four language skills. Additionally, the disadvantages and limitations of artificial intelligence are discussed. In conclusion, artificial intelligence offers new opportunities in foreign language education. Artificial intelligence applications like ChatGPT can assist students in developing communication skills in a foreign language. ChatGPT is believed to have a significant role in enhancing reading and writing skills. However, the disadvantages and limitations of artificial intelligence should be considered. Careful utilization of artificial intelligence in foreign language learning can play a crucial role in students' skill development and improvement of their communication abilities.

Keywords: Generative Artificial Intelligence, ChatGPT, German as a Foreign Language

Introduction

In foreign language teaching pedagogy, although teachers use various technological tools, the use of chatbots is rare (Kohnke, 2022). Intelligent tutoring systems (Chatbots), which offer people the opportunity to use natural language, are considered one of the best alternatives as they enable individuals to interact with a virtual teacher through computer-mediated communication (Ashfaque et al., 2020). "Chatbots are AI-based applications developed to mimic human interactions and engage in real-time spontaneous conversations with humans" (Chiu et al., 2023).

ChatGPT, one of the popular chatbots that entered our lives in November 2022, is an artificial intelligence interface that "answers follow-up questions, admits its mistakes, challenges incorrect premises, and rejects inappropriate requests" (OpenAI, 2023b). Developed by AI research company OpenAI, ChatGPT is an AI-powered chatbot. "While ChatGPT was originally developed to mimic human conversation, its abilities go beyond that purpose; it can create entirely new things like poetry, stories, or novels or behave like anything within its capabilities" (Tlili, A., et al., 2023). Due to its ability to generate various texts and engage in realistic dialogues with users, ChatGPT can be particularly useful in the field of education. Nowadays, artificial intelligence tools, which are not limited to desktop computers but can also be used through devices such as smartphones and tablets, provide entertainment and usability for personal purposes, and many AI tools can be used for educational purposes as well (Aktay, 2022). For these reasons, AI has a significant contribution to the rapid digitalization of society.

Despite teachers' efforts to create various opportunities in the classroom (such as partner or group work) to encourage students to speak in the target language in foreign language learning, various factors (such as time constraints, shyness, and lack of feedback) often hinder this situation. However, chatbots enable students to practice the foreign language anytime and almost anywhere, allowing them to engage in language practice. Students often feel more comfortable conversing with chatbots (Fryer and Carpenter, 2006). ChatGPT, which can respond to follow-up questions, accept and correct mistakes, reject inappropriate queries, and even challenge incorrect premises (Bhattacharya et al., 2023), can also be used in the field of foreign language learning.

This study is inspired by research conducted by Cooper (2023) on the use of ChatGPT in science education, Yiğit, Berşe & Dirgar's (2023) exploration of ChatGPT's application in healthcare services, Kohnke's investigation (2022) into how ChatGPT, defined as an additional learning tool, should be implemented in foreign language teaching processes, and the research conducted by Kohnke, Moorhouse, & Zou (2023) that explores the opportunities provided by ChatGPT in the foreign language education process.

This research examines the role of ChatGPT, one of the popular artificial intelligence platforms in recent years, in the acquisition of four fundamental language skills. The study elucidates how users who aim to utilize ChatGPT in the foreign language learning process can employ it for the development of these

skills, what considerations they should bear in mind while using it, and the key points that need to be taken into account to make this technology more useful.

Method

In this study, the qualitative research method of document analysis was employed to examine the role of ChatGPT in the acquisition of four fundamental skills in foreign language learning. The aim of the research is to provide ideas and recommendations on how to use ChatGPT effectively while learning a foreign language.

In this study, various sources found in the literature regarding ChatGPT have been examined through the method of document analysis. The data collection process started with a review of the existing literature on ChatGPT. Relevant sources in the literature, including international research, were identified. Documents obtained from these sources were collected and used for analysis purposes.

In the data analysis process, the collected documents were carefully examined and read. Important information related to the use of ChatGPT was identified. The purpose of content analysis was to uncover the fundamental features, advantages, disadvantages, implementation stages, and application areas of ChatGPT. Additionally, during the data analysis process, the results were interpreted, and the strengths and weaknesses of using ChatGPT in learning the four basic skills of a foreign language were identified.

In this study, the document analysis method was used, so no specific ethical approval was required. The sources used have been appropriately referenced, and quotations have been taken from existing studies in the literature, ensuring academic integrity and proper citation of sources.

ChatGPT

The integration of technology into foreign language teaching continues to offer various opportunities with the rapid advancements in Artificial Intelligence (AI). ChatGPT, which has become one of the most popular AI-based tools, reached one million users in just five days, surpassing popular social media applications (Beliūnas, L., 2023; Mollman, 2022). When asked to describe itself in 100 words (prompt-Describe ChatGPT in 100 Words), ChatGPT generated the following italicized text:

“ChatGPT is an artificial intelligence language model developed by OpenAI. Trained on a large amount of text data from the internet, it has the ability to generate responses similar to natural language conversations. It serves as a versatile conversational partner, capable of providing information, answering questions, offering suggestions, and assisting with various tasks. It excels at generating creative and coherent responses, writing stories, performing language translation, and providing general knowledge. However, it may occasionally produce errors and be sensitive to input phrasing. It's important to note that ChatGPT is constantly evolving as OpenAI continues to improve the underlying technology” (OpenAI, 2023a) (By ChatGPT May 25, 2023).

“Open AI builds its text-generating models by using machine-learning algorithms to process vast amounts of text data, including books, news articles, Wikipedia pages and millions of websites.” (Scharth, 2022). By leveraging this vast amount of data, the models learn the complex patterns and structures of language, enabling them to interpret user input and generate the desired output (Scharth, 2022). In other words, when given a prompt, ChatGPT retrieves information from various sources, utilizes a transformer model, and establishes connections between different pieces of information. It then predicts and organizes text that fits within specific contexts (Bhattacharya et al., 2023).

Starting from November 2022, ChatGPT can be accessed by creating a free account at chat.openai.com. Additionally, there is a paid Premium version available to avoid delays while waiting for responses during interactions with ChatGPT.

ChatGPT and the Field of Language Learning

If ChatGPT is capable of writing stories and poems, providing life advice, and even coding computer programs (Scharth, 2022), in addition to its potential to offer a new and exciting approach in foreign language learning, ChatGPT can provide new opportunities for engaging and interactive language practice by simulating human conversation (Kohnke, Moorhouse, & Zou, 2023).

The anecdotal evidence already shows that ChatGPT, which has gone viral on social media, is familiar to many students, thus assuming that students use ChatGPT or a similar software would be accurate (Pavlik, J. V., 2023). Increased usage of ChatGPT among students can inadvertently reduce teachers' workload (Lee, H., 2023; Kohnke, 2022). Chatbots, by simulating real-life conversations, can create an interactive language learning experience that engages and motivates students to continue their language learning journey (Fryer et al., 2017). In foreign language education, ChatGPT can serve as a virtual teaching assistant, providing detailed answers to students' questions 24/7 (Lee, H., 2023). Interacting with a carefully designed chatbot that offers tasks such as providing feedback, distinguishing between correct and incorrect answers, allows foreign language learners to engage in meaningful interactions and discussions (Kohnke, 2022). Using chatbots for developing vocabulary in foreign languages is believed to be beneficial by researchers (Ruan et al., 2019). It is also believed that chatbots clarifying various differences in grammar rules between the native and target languages, such as distinguishing between active and passive voice or between simple and perfect tense, can be useful for foreign language learners (Kohnke, 2022). It is considered significant for students to receive support from chatbots while learning grammar rules in the classroom, as it can greatly enhance the efficiency of their foreign language learning process (Nghi et al., 2019).

The ability of ChatGPT to provide instant access to various information and its capacity to mimic human conversation are among the reasons why it is generally notable for its potential to offer students interactive language practice. The utilization of conversational robots like ChatGPT in language learning is believed to support students on their foreign language learning journeys while also reducing the workload of teachers. ChatGPT assists students in answering their questions, providing feedback, and improving their vocabulary. Additionally, it helps identify inconsistencies in interactive grammar and contributes to enhancing students' overall foreign language performance. This article will discuss the role of ChatGPT in the development of the four fundamental language skills in foreign language learning.

Findings

Exploring the Benefits and Educational Advantages of ChatGPT in Foreign Language Learning

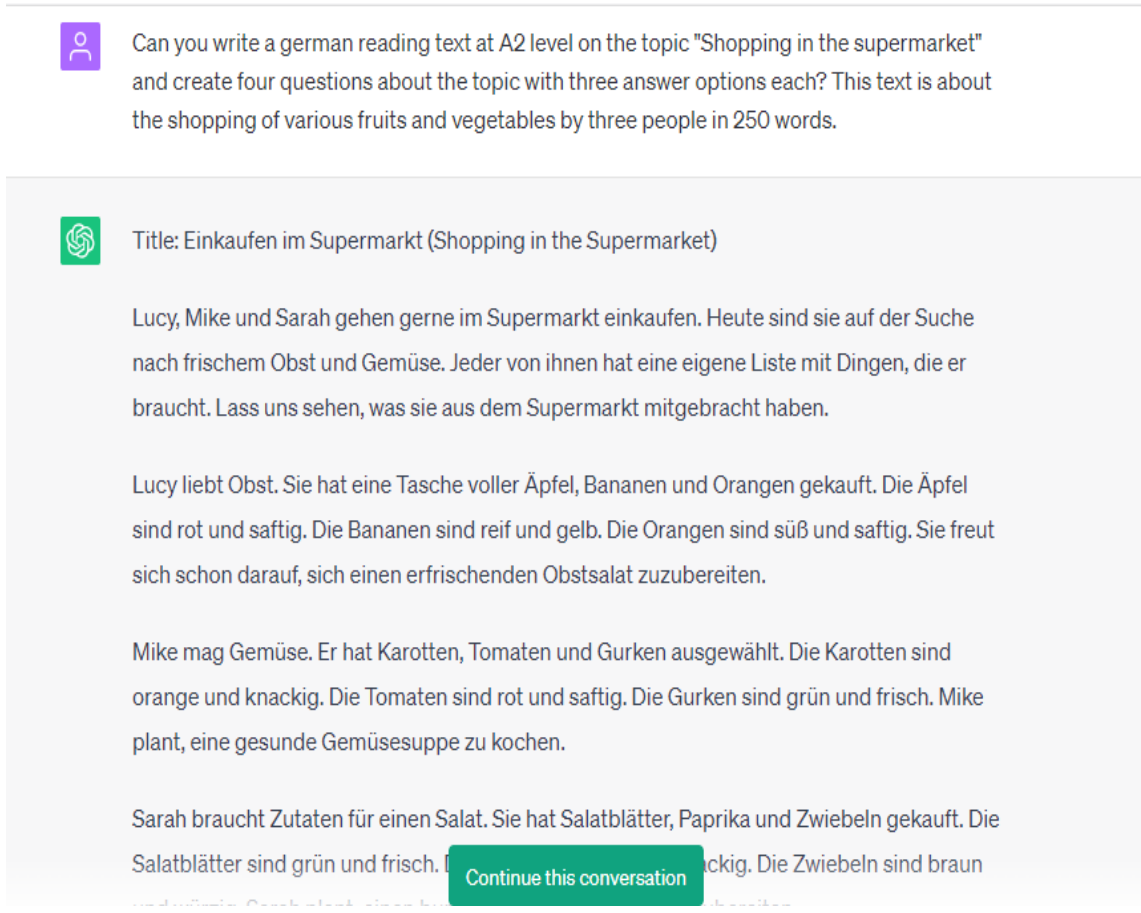
In this study, various suggestions have been provided on how students can use ChatGPT to develop the four fundamental skills in learning German as a foreign language. The following text directly quoted from ChatGPT is presented in italics. It should be noted that the responses obtained directly from ChatGPT are instantaneous and may vary when the same questions are asked again. The following responses were collected by the researcher using ChatGPT-4 (paid version) in June 2023.

ChatGPT supports foreign language learning by generating various authentic reading texts. Additionally, it can help students improve their reading comprehension skills in a foreign language by preparing questions related to the given texts. For instance, an A2-level text on the topic of "Einkaufen im Supermarkt"(Shopping at the Supermarket) was requested from ChatGPT. The text should include three

people, various fruit and vegetable names, and be 250 words long. ChatGPT instantly provides the relevant text in German (Figure 1).

Figure 1

Chatgpt Can Generate Authentic Reading Texts in the Desired Foreign Language.



Moreover, ChatGPT can be used to generate various questions related to the given text. ChatGPT has created multiple-choice questions about the text generated in Figure 1, and the questions are provided in Figure 2. When users answer the questions and provide their responses to ChatGPT, it can determine whether the answers are correct or incorrect and provide detailed explanations for the correct answers along with their reasons.

Figure 2

Chatgpt Can Generate Multiple-Choice Questions.



ChatGPT can explain the meaning of unknown words to users in their native language and/or the target language and can also provide various example sentences related to the unknown words. In Figure 3, ChatGPT has defined the word "knackig," provided example sentences, and presented alternative meanings of the word. Additionally, users were asked to provide an A2 level definition of the explained word by ChatGPT in order to better understand its meaning (Figure 3).

Figure 3

Chatgpt Can Define Unfamiliar Words.

Was bedeutet "knackig"? Kannst du es bitte auf A2-Niveau erklären? Gibt es auch andere Bedeutungen? Kannst du mir Beispielsätze auf A2-Niveau geben?

Ja, natürlich! Das Wort "knackig" hat verschiedene Bedeutungen im Deutschen. Auf A2-Niveau kann man es am besten als Adjektiv beschreiben, das eine gewisse Festigkeit oder Konsistenz von etwas beschreibt. Es wird oft verwendet, um auszudrücken, dass etwas frisch, hart oder knackend ist.

Hier sind einige Beispielsätze, die das verdeutlichen:

1. Die Äpfel sind knackig. (Die Äpfel sind frisch und haben eine feste Konsistenz.)
2. Das Brot ist knackig. (Das Brot ist knusprig und hat eine feste Kruste.)
3. Die Gurke ist knackig. (Die Gurke ist fest und knackt beim Reinbeißen.)

Es gibt auch eine umgangssprachliche Verwendung des Wortes "knackig", die auf attraktive Menschen bezogen ist. In diesem Kontext wird "knackig" verwendet, um eine Person zu beschreiben, die jugendlich, fit und zwei Beispielsätze:

ChatGPT can define unknown words in any desired language and provide example sentences. In Figure 4, ChatGPT has defined unknown words in English and provided example sentences.

Figure 4

It Can Define Unfamiliar Words in The Desired Language.

Can you explain "knackig" in English?

Certainly! The word "knackig" in German can be translated into English as "crisp" or "crunchy." It is typically used to describe something that is firm and makes a cracking or snapping sound when bitten or broken.

Here are some example sentences to illustrate its meaning:

1. The apples are crisp. (Die Äpfel sind knackig.)
2. The bread is crunchy. (Das Brot ist knackig.)
3. The cucumber is crisp. (Die Gurke ist knackig.)

In colloquial language, "knackig" can also be used to describe an attractive person, particularly in the sense of someone looking youthful, fit, and appealing. However, this usage is not as common in English.

It's important to note that the primary meaning of "knackig" refers to the firmness or crispness of food items, such as fruits, vegetables, or baked goods.

When it comes to improving writing skills in a foreign language, support can be sought from ChatGPT. Users can submit their written texts in the foreign language to ChatGPT and request the correction of any existing language errors. In Figure 5, ChatGPT has performed a grammatical check of the text on the topic of "birthday party invitation." As shown in Figure 6, ChatGPT has also provided explanations for the reasons behind the grammatical errors found in the text. Furthermore, ChatGPT can explain relevant grammar topics to foreign language learners in a detailed manner.

Figure 5

Chatgpt Can Perform a Grammatical Check of a Text Written in a Foreign Language.

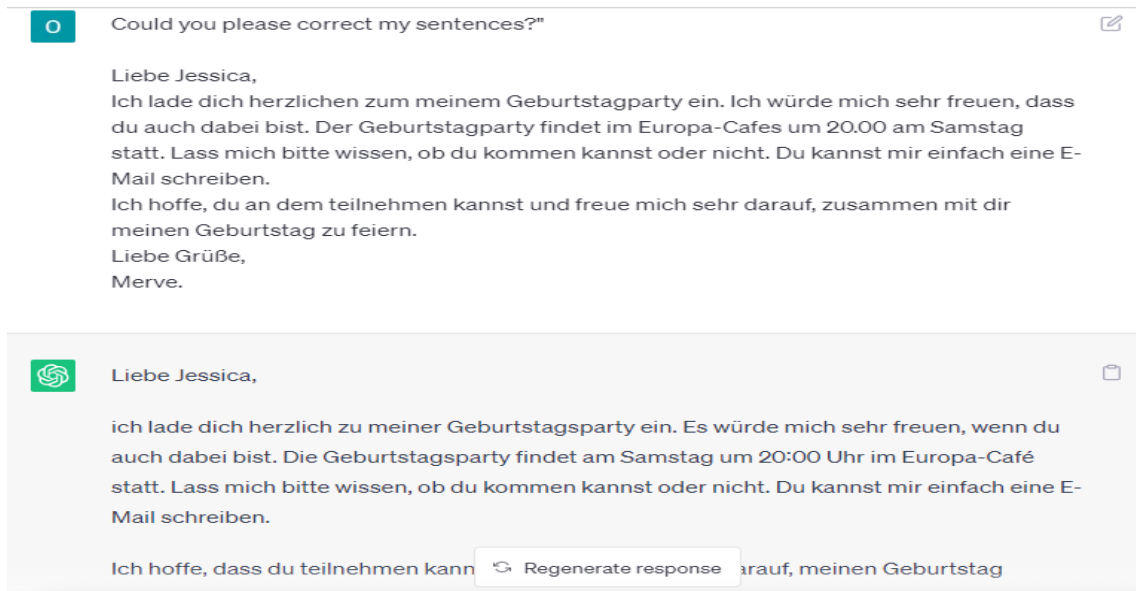
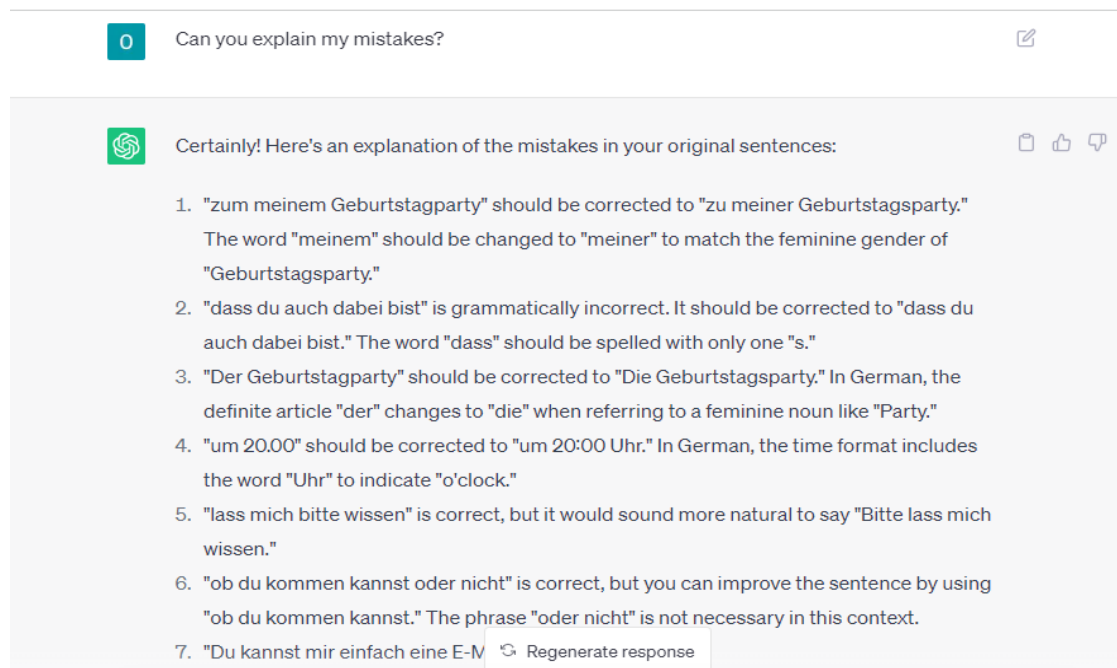


Figure 6

Chatgpt Can Explain the Language Errors Made.



Students can ask ChatGPT to generate an original sentence by encoding formulaic expressions (Redemittel, Chunks) related to the sentence they want to construct. They can also request ChatGPT to form sentences using different structures such as passive voice, active voice, present tense, past tense, etc., enabling students to learn and reinforce grammar rules. For instance, it can provide students with the necessary words and sentence patterns to write an email on the topic of "birthday party invitation" (Figure 7-8).

Figure 7

The Words Provided by Chatgpt for Writing an Email on the Topic of "Birthday Party Invitation."

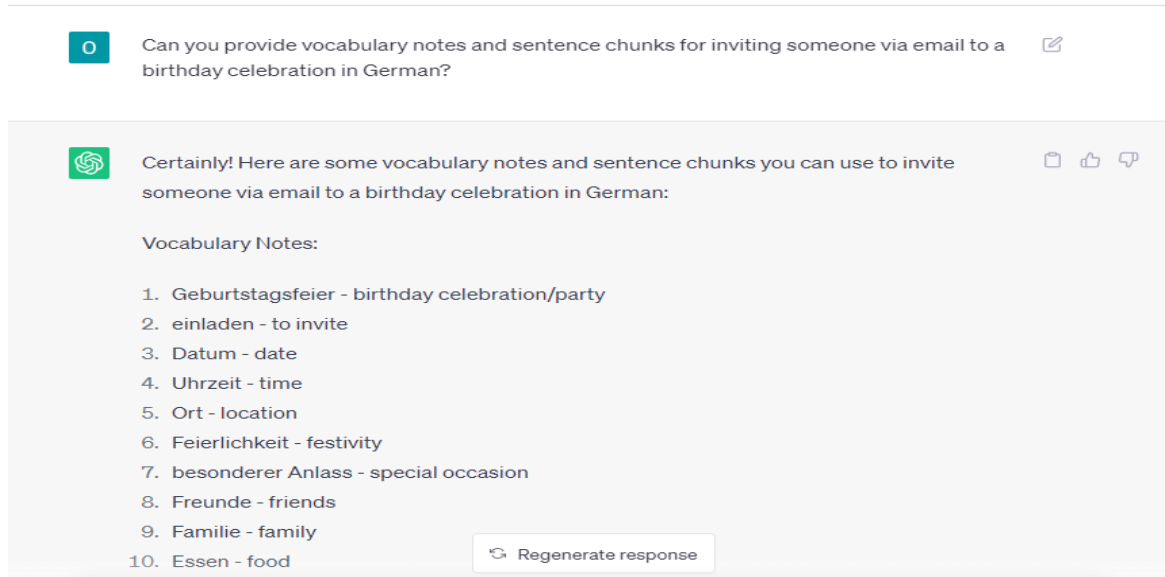
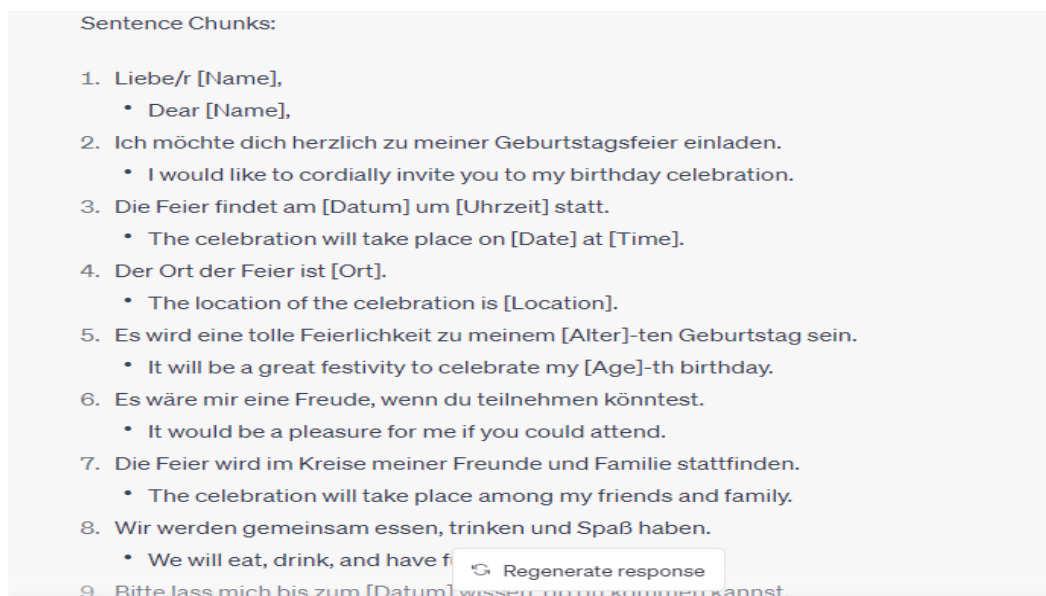


Figure 8

Example Sentence Patterns Provided by Chatgpt for Writing an Email on the Topic of "Birthday Party Invitation."



Limitations Associated with ChatGPT

Foreign language teaching involves four fundamental skills, including listening and speaking. It is not possible to enhance listening and speaking skills with ChatGPT alone. As a text-based AI model, ChatGPT can provide written listening exercises in the form of dialogues or interviews to users. However, it cannot directly deliver audio or video content to users. Therefore, improving listening and speaking skills with ChatGPT is not highly feasible.

To enhance the comprehensibility of responses provided by ChatGPT, it is important to ask precise and well-structured questions while avoiding complex sentence structures. When requesting specific information from ChatGPT, it is advisable to ask detailed questions as much as possible. The more accurately the questions are formulated, the better the responses from ChatGPT will be. Therefore, when preparing reading texts or questions related to reading texts, it is crucial to pay attention to these aspects. Otherwise, the text level may be below or above the student's proficiency level, and the necessary vocabulary and grammar rules related to the reading material may not be conveyed appropriately. When preparing questions related to the text, it is also important to create questions that are suitable for the student's level and relevant to the desired topic being taught.

It should be noted that if an unexpected or ambiguous response is received from ChatGPT, ChatGPT can ask for clarification or attempt to provide a more suitable response when given more detailed feedback. Additionally, it is possible that ChatGPT may not be aware of current events or recent developments. Therefore, it should be kept in mind that the responses are limited to previous information and data available.

Furthermore, it is recommended not to ask too many questions to ChatGPT at once. It would be more beneficial to separate them into distinct sections when asking. Instead of posing multiple questions simultaneously, allowing ChatGPT to respond to each question individually and comprehensively will increase the likelihood of obtaining thorough answers.

It is known that ChatGPT assists in generating grammatically correct sentences and avoiding spelling errors. However, it is important to always carefully review texts generated by ChatGPT or any text that has undergone grammatical checks. In other words, they should be read with a critical eye because errors may still occur in the texts.

Preparing a brand-new article for journal publication, projects, or theses using ChatGPT will only take a few minutes, which is why one of the disadvantages of ChatGPT includes the ease with which students can engage in academic dishonesty (Bhattacharya et al., 2023). Platforms like ChatGPT, among other new technologies, have the potential to generate fabricated content and contribute to plagiarism issues (Ventayen, R., 2023). In response to the growing concerns about the potential misuse of ChatGPT for academic fraud, New York City has decided to ban its use for homework and assignments in schools (The Guardian, 2023). While it is possible to restrict the use of ChatGPT within schools, it may be challenging to prevent students from using the application outside of school settings.

Additionally, despite being a powerful artificial intelligence application, ChatGPT may provide inaccurate or incomplete information, so the responses received should be critically questioned. While ChatGPT is a useful tool for language learning, it is recommended to use it in conjunction with other various resources such as textbooks, language courses, and real communication opportunities to enhance foreign language proficiency (Cooper, G. 2023). It is even advised to use it under appropriate instructor guidance (Fryer et al., 2019).

Results and Discussion

In this study, the role of ChatGPT, an artificial intelligence chatbot, in the development of the four fundamental language skills was examined while learning German as a foreign language. Since ChatGPT is a text-based AI model, it will primarily assist in the development of reading and writing skills, which are among the four fundamental language skills. Therefore, the study provides several examples of how reading and writing skills can be improved using ChatGPT. By following the commands given to ChatGPT, it generated various authentic texts, and it was found that it can contribute to the foreign language learning process. Authentic texts can be created in the desired topic, length, and language level, allowing ChatGPT to cater to the needs and requirements of both foreign language learners and teachers. In general, due to the nature of authentic texts, which encompass materials related to real-world situations, foreign language learners can improve their reading skills with the help of ChatGPT. Furthermore, it was also observed that as long as ChatGPT receives the correct command, it can generate reading texts at the same level as the foreign language proficiency of the learners. Students with different levels of proficiency in the foreign language and various needs and goals can access various learning materials through ChatGPT.

Developing foreign language learners' reading comprehension skills in the target language becomes significantly easier with the help of ChatGPT. Creating various questions related to the reading texts generated by ChatGPT according to the needs is very quick. For instance, it is possible to create different types of questions that aim to understand the content of the text, identify details, and determine the main idea. By solving these questions, students will enhance their reading comprehension skills, in other words, their ability to deeply understand the text. Students can present their answers to ChatGPT as commands, thus learning whether the answers are correct or incorrect. Through ChatGPT's evaluation of the answers, students have the opportunity to receive individual feedback in the foreign language learning process. Consequently, foreign language learners can greatly improve their reading skills by identifying their weak points and obtaining the opportunity to enhance them.

Additionally, ChatGPT can assist in the development of students' vocabulary. It can provide explanations of unfamiliar words found in the reading texts in the native language, the target language, or even in any other language, along with examples. This way, not only will the comprehensibility of the reading texts increase, but also the vocabulary in the foreign language will be enhanced.

ChatGPT can also be used to improve writing skills. Various texts can be presented to ChatGPT to request the correction of spelling and grammatical errors. ChatGPT can detect various language errors within the text and/or provide new suggestions. It can guide foreign language learners by offering different word structures, phrases, chunks, and other language components that they can use in relation to the topic. Through the feedback provided by ChatGPT, foreign language learners can enhance their writing skills and create nearly error-free, fluent, and understandable texts. Additionally, based on the feedback received from ChatGPT, unknown or confused grammar topics can be explained in detail to foreign language learners, with the provision of examples. As a result, foreign language learners can gain better mastery of grammar concepts.

Although there are numerous advantages to using ChatGPT in the foreign language learning process, it also has some disadvantages and limitations. As mentioned earlier, while ChatGPT can directly contribute to the development of reading and writing skills in a foreign language, it may not provide direct assistance in improving listening and speaking skills. This is due to the fact that ChatGPT is a text-based artificial intelligence tool. ChatGPT cannot directly provide users with audio or video content, thus its ability to enhance listening and speaking skills through its usage is quite limited.

Furthermore, in order to obtain clear and desired answers from ChatGPT, it is necessary to ask clear and well-structured questions. Well-formulated questions that accurately address the desired information from ChatGPT will enhance the quality of the responses received. For example, when requesting ChatGPT to generate text, it should be specified to align with the foreign language learners' proficiency level and vocabulary. Otherwise, the generated texts may not be suitable for the learner's level. By paying attention to this aspect, ChatGPT will strive to provide the closest answer to the given request.

Due to its nature, ChatGPT generates responses based on the information it has learned from a given text, which means it can sometimes provide unexpected or ambiguous answers. In such cases, when more detailed feedback is provided to ChatGPT, it will attempt to improve its responses.

Users should avoid asking multiple questions to ChatGPT at the same time, as this may result in unsatisfactory answers. It is advisable to separate the questions into individual sections when posing them to ChatGPT. Asking each question separately increases the likelihood of receiving more detailed answers from ChatGPT. This way, it is possible to communicate more effectively with ChatGPT.

In general, the responses provided by ChatGPT should always be carefully reviewed and read critically. Errors and inconsistencies may be present in the answers given by ChatGPT. Human checks should be conducted to ensure the accuracy, consistency, and comprehensibility of the responses.

Conclusion

Artificial intelligence technology is prevalent in almost every aspect of our lives, and it also makes its presence felt in the field of foreign language learning. This study examines how ChatGPT, an AI-powered chatbot developed by OpenAI, contributes to the development of four key skills in foreign languages. Generally, it has been determined that ChatGPT will guide foreign language learners and contribute to the improvement of their language skills. Learners will have the opportunity to practice their foreign language by interacting with ChatGPT. As an AI model specialized in text generation, ChatGPT has been identified as particularly helpful in enhancing reading and writing skills for language learners. It can provide learners with various authentic learning materials, explain various topics, and provide necessary feedback. However, it is important to remember that ChatGPT also has limitations and disadvantages. Additionally, in order to receive satisfactory responses from ChatGPT, it is crucial to ask detailed and specific questions. It is expected that individuals with a certain level of digital proficiency will be able to benefit more from the advantages of artificial intelligence and overcome its disadvantages.

Overall, when used carefully and critically in the process of learning German as a foreign language, ChatGPT is anticipated to support learners in rapidly improving their language skills.

References

- Aktay, S. (2022). The usability of images generated by artificial intelligence (AI) in education. *International technology and education journal*, 6(2), 51-62.
- Ashfaque, M.W., Tharewal, S., Iqbal, S., & Kayte, N. C., (2020). A review on techniques, characteristics and approaches to an intelligent tutoring chatbot system. In *2020 International Conference on Smart Innovations in Design, Environment, Management, Planning and Computing (ICSIDEMPC)*, (pp.258–262). Aurangabad.
- Beliūnas, L. Linas Beliūnas' Post. 2023. <https://www.linkedin.com/feed/update/urn:li:activity:7005954084134350849/>
- Bhattacharya, K., Bhattacharya, A.S., Bhattacharya, N., Yagnik, V.D., Garg P., & Kumar, S. (2023) ChatGPT in surgical practice-a new kid on the block. *Indian J Surg* 1-4. <https://doi.org/10.1007/s12262-023-03727-x>

- Chiui T.K.F., Moorhouse L.M., Chai, C.S., & Ismailov, M. (2023) Teacher support and student motivation to learn with Artificial Intelligence (AI) based chatbot. *Interactive Learning Environment*, 0(0), 1-21. <https://doi.org/10.1080/10494820.2023.2172044>
- Cooper, G. (2023) Examining Science Education in ChatGPT: An exploratory study of generative artificial intelligence. *Journal of Science Education and Technology*, 32(3), 444–452. <https://doi.org/10.1007/s10956-023-10039-y>
- Ferikoğlu, D., & Akgün, E. (2022). An Investigation of teachers' artificial intelligence awareness: A scale development study. *Malaysian Online Journal of Educational Technology*, 10(3), 215–231. <https://doi.org/10.52380/mojet.2022.10.3.407>
- Fryer, L.K. & Coniam, D., Carpenter, R., & Lăpuşeanu, D. (2020) Bots for language learning now: Current and future directions. *Language Learning & Technology*, 24(2), 8–22. <http://hdl.handle.net/10125/44719>
- Fryer, L.K. & Nakao, K., Thompson, A. (2019) Chatbot learning partners: Connecting learning experiences, interest and competence. *Computers in Human Behavior*, 93, 279–289. <https://doi.org/10.1016/j.chb.2018.12.023>
- Fryer, L.K. & Carpenter, R. (2006). Emerging technologies – bots as language learning tools. *Language Learning & Technology*, 10(3), 8–14. <http://dx.doi.org/10125/44068>
- Kohnke, L. & Moorhouse, B. L. & Zou, D. (2023). ChatGPT for language teaching and learning. *RELC Journal*, 0(0), 1-14. <https://doi.org/10.1177/00336882231162868>
- Kohnke, L. (2022). A Pedagogical Chatbot: A supplemental language learning tool. *RELC Journal*, 0(0), 1-11. <https://doi.org/10.1177/00336882211067054>
- Lee, H. (2023). The rise of ChatGPT: Exploring its potential in medical education. *Anatomical Sciences Education*, 0(0), 1–6. <https://doi.org/10.1002/ase.2270>
- Mollman, S. (2022, December 9). *ChatGPT has gained 1 million followers in a single week. Here's why the A.I. chatbot is primed to disrupt search as we know it.* https://finance.yahoo.com/news/chatgpt-gained-1-million-followers-224523258.html?guce_referrer=aHR0cHM6Ly9kdWNrZHVja2dvLmNvbS8&guce_referrer_sig=AQAAAFoAvt0Jgmrz33m4F8LQ93tU37YKNp45BNiRU295yW5YSO9PkirImoDOFuHuNU3b9C9E4zFl6W1R6mSZrM5SFK7y0Au9ht-wMKUfBuhQOY254BzjvjaYypRR60aUIPgL3xfTqaM81r3SoP4-QEwJD1IW3avB5uVyxoyu0Src7ffpU&guccounter=2
- Nghi, T. T. & Phuc, T. H. & Thang, N. T. (2019). Applying AI chatbot for teaching a foreign language: An empirical research. *International Journal of Scientific and Technology Research*, 8(12), 897–902. https://www.researchgate.net/profile/Tran-Nghi-4/publication/337965319_Applying_Ai_Chatbot_For_Teaching_A_Foreign_Language_An_Empirical_Research/links/5df8434f4585159aa482f4a2/Applying-Ai-Chatbot-For-Teaching-A-Foreign-Language-An-Empirical-Research.pdf
- OpenAI. (2023a). *ChatGPT*. <https://chat.openai.com/chat>
- OpenAI. (2023b). *ChatGPT: Optimizing language models for dialogue*. <https://openai.com/blog/chatgpt/>
- Pavlik, J. V. (2023). Collaborating with ChatGPT: Considering the Implications of Generative Artificial Intelligence for Journalism and Media Education. *Journalism & Mass Communication Educator*, 78(1), 84–93. <https://doi.org/10.1177/10776958221149577>

- Ruan, S. & Jiang, L., Xu, J., Tham, B. J. K., Qiu, Z., Zhu, Y., & Landay, J. A. (2019a, May). Quizbot: A dialogue-based adaptive learning system for factual knowledge. In Proceedings of the 2019 CHI conference on human factors in computing systems (pp. 1–13). <https://doi.org/10.1145/3290605.3300587>
- Scharth, M. (2022). *The ChatGPT chatbot is blowing people away with its writing skills. An expert explains why it's so impressive.* <https://theconversation.com/the-chatgpt-chatbot-is-blowing-people-away-with-its-writing-skills-an-expert-explains-why-its-so-impressive-195908>
- The Guardian. (2023). New York City schools ban AI chatbot ChatGPT. The Guardian. <https://www.theguardian.com/us-news/2023/jan/06/new-york-city-schools-ban-ai-chatbot-chatgpt>
- Tlili, A., Shehata, B., Adarkwah, M.A., Bozkurt, A., Hickey, D.T., Huang, R., & Agyemang, B. (2023) What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. *Smart Learning Environments*, 10(1), 1-24. <https://doi.org/10.1186/s40561-023-00237-x>
- Ventayen, R.J.M. (2023). OpenAI ChatGPT generated results: similarity index of artificial intelligence-based contents. *Social Science Research Network Electronic Journal*. <https://doi.org/10.2139/ssrn.4332664>
- Yiğit S, Berşe S, & Dirgar E. (2023), The Application of ChatGPT, an artificial intelligence assisted language processing technology in health services. *Eurasian Journal of Health Technology Assessment*, 7(1),57-65 <https://doi.org/10.52148/ehta.1302000>