Cultivating writing skills: the role of ChatGPT as a learning assistant—a case study

Nermin Punar Özçelik[1*] and Gonca Yangın Ekşi[2]

*Correspondence:
nerminpunar@tarsus.edu.tr

[1] Department of Foreign Languages, Tarsus University, Mersin, Turkey
[2] Department of English Language Teaching, Gazi University, Ankara, Turkey

Abstract

Artificial intelligence (AI) has garnered considerable interest in the field of language education in recent times; however, limited research has focused on the role of AI in the specific context of register knowledge learning during English language writing. This study aims to address this research gap by examining the impact of ChatGPT, an AI-powered chatbot, on the acquisition of register knowledge across various writing tasks. The research design employed a one-case shot pre-experimental design, with 11 voluntary participants selected through convenience sampling. Preliminary results indicate that students found ChatGPT beneficial for acquiring formal register knowledge but perceived it as unnecessary for informal writing. Additionally, the effectiveness of ChatGPT in teaching neutral register was questioned by the participants. This research contributes to the existing literature by shedding new light on the effects of AI-generated chatbots in register learning during the writing process, offering insights into their potential as learning assistants. Further investigation is warranted to explore the broader implications and applications of AI in language learning contexts.

Keywords: Artificial intelligence, ChatGPT, Writing skill, Register, Learning assistant

Introduction

Technological developments pave the way for the use of innovative technologies in various areas of education. Many studies have proved the significance of technology in this field (Andre, 1998; Christensen & Knezek, 2001; Raja & Nagasubramani, 2018; Stošić, 2015). According to Ennals (1987), new technologies have been used to reinforce and boost our capabilities to think and learn in the field of education. Raja and Nagasubramani (2018) stated in their study that the more the learners engage with modern technological equipment, the more they learn, increase their motivation and interact with the process. Enabling learners to use innovative technologies during learning opens the way for gaining essential 21st-century skills (Ratheeswari, 2018). These skills are necessary for students to get a job in their future careers (González-Pérez & Ramírez-Montoya, 2022). Governments and businesses formed the Partnership for 21st-Century Skills, which established a framework for fostering the knowledge, abilities, and attitudes necessary for success in the workforce and 21st-century society (2019). The organization, besides, classifies three types of competencies: learning and innovation skills,

information, media, and technology skills, and life and career skills. As the organization and other scholars claimed, to catch up with the steps of the new technological era, each of us is required to learn, implement, and enhance our use of technological tools.

Grounded on this requirement, a successful and effective way of technology integration into education has been an intriguing topic for scholars in the field. Within many years, some learning theories have been released to shed light on learners' learning processes. Now, these theories, such as behaviorism, constructivism, and cognitivism, attempt to illuminate the effects of technology integration into education.

Artificial intelligence

As technology develops, new tools have been emerging. One of these innovative and modern technologies is Artificial Intelligence (AI). AI is a term defined in different ways. McCarthy (2007) came up with one of AI's first and most significant definitions: "the science and engineering of making intelligent machines". Shneiderman (2020) claims that AI is a type of system that can be automated using technologies like machine learning, neural nets, and statistical methods. According to him, these systems can help us do things faster and more accurately than we could. Artificial intelligence exists with us in many areas of life, even if we are unaware of its existence. For instance, while driving to somewhere we do not know, and we use navigation applications, it shows the fastest road with less traffic with the help of AI. Besides, we use some social media applications using facial recognition, a kind of AI technology. Additionally, we have started using digital intelligent assistants on our phones to call someone or set an alarm. All these actions are the results of AI technology.

In addition to being used in daily life, it has started to be used in different fields today, including education. Actually, the use of AI in education began in the 1990s when computers were first introduced to the field (Salas-Pilco & Yang, 2022). As an example, Intelligent Tutoring Systems, one of the well-known AI applications used in education, enable learners to follow their learning process at their own pace by providing feedback, hint, or guidance to the learners (Holmes et al., 2019). The studies on AI have increased enormously in the last 2 years (Crompton & Burke, 2023). Various studies reported some ways to utilize AI in teaching and learning. For instance, Crampton et al. (2022) summarized that the integration of AI might be a tool to grade learners' essays, give corrective feedback, or design teaching processes according to the needs of individual learners. Zhan et al. (2022) reviewed empirical studies that apply game-based learning to the field of AI education and analyzes its possibility of further research. The study concludes that the use of AI in the learning process promotes creativity, increases motivation and attention, and enhances learners' learning achievement and experience.

Chatbots and ChatGPT

Chatbot is of the innovative technologies of AI, and it refers to an artificially-intelligent computer program that can perform audio or text conversations (Haristiani, 2019). Many information-focused websites and messaging programs (e.g., universities, libraries, and museums) currently have online chatbots (Fryer et al., 2020). Fryer et al. (2020) claim that chatbots are not new; instead, they have existed for decades. In the early 2000s, Coniam (2004) evaluated two chatbots as potential language-learning companions. One

of them was Dave, developed by the ALICE Artificial Intelligence Foundation, which was portrayed as an ideal personal tutor (Coniam, 2004, p. 160). However, interactions with Dave highlighted certain syntax errors and communication disruptions, despite exhibiting several natural conversational techniques. The second chatbot examined by Coniam was Lucy. Lucy offered starter help, where mistakes made by L2 learners were manually addressed, allowing Lucy to suggest corrections for particular grammar mistakes occasionally. Potential users and chatbots have experienced significant shifts since these early efforts to develop chatbots that facilitate language learning.

Scholars have proved the potential benefits of using chatbots in language learning. The research carried out by Haristiani (2019) showed that chatbots have great potential for implementation as a language learning tool, both as an independent learning tool and as a tutor for language practice. Further, the research revealed that language learners are enthusiastic about using chatbots since they can be used regardless of when and where they are. They are more at ease learning languages through chatbots than through direct interaction with human tutors. A review study by Huang et al. (2021) uncovered three technological advantages of using chatbots for language learning: timeliness, ease of use, and personalization, and reported that the chatbots are helpful in promoting social presence among students through emotional, authentic, and coherent discourse.

In 2022, a highly well-developed chatbot model, ChatGPT ("Chat Generative Pre-Trained Transformer"), was released. ChatGPT is a "large language model (LLM), a type of machine learning system that learns on its own from data and is trained on a vast corpus of text to produce sophisticated and presumably intelligent writing" (van Dis et al., 2023). ChatGPT is the most recent model in a series of similar counterparts released by San Francisco, California-based AI company OpenAI and other companies. ChatGPT has two versions: GPT-3,5 and GPT-4. For the present study, version GPT-3,5 was used.

Theoretical background of ChatGPT as a learning assistant

The use of ChatGPT as a learning assistant can be associated with some learning theories, such as constructivism, social constructivism, cognitive load theory, and information processing theory. According to constructivist learning theory, learners can construct their own learning by actively engaging with new information and building on their knowledge (Bruner, 1996). By offering individualized feedback and suggestions appropriate to the learners' needs and former knowledge, ChatGPT can perform as an assistant in the learning process. In terms of social constructivist learning, the role of social interaction and collaboration is of great importance (Vygotsky, 1980). ChatGPT can promote social interaction by offering a conversational interface in that learners are able to collaborate within a natural environment. On the other hand, cognitive load theory claims that, due to the limited capacity of cognition, the learning materials should be eligible to balance the cognitive loads of learners (Atkinson & Shiffrin, 1968). Therefore, as a combination of providing feedback and a conversational interface, ChatGPT might be a beneficial tool to reduce the unneeded cognitive load while increasing the necessary cognitive load to enhance effective learning, as claimed in cognitive load theory. Lastly, information processing theory identifies several phases of learning to become intake, which is the final learned version of knowledge (Simon, 1978). ChatGPT can aid learners

in this process of learning by offering feedback and guidance that corresponds to each learner's strengths and weaknesses and learning style.

Writing skill and register in writing

Writing is an essential skill to acquire while learning a foreign language because it is a necessary skill to be used in both academic and professional lives (Walsh, 2010). Klimova (2012) summarized the significance of writing skills in her article as writing assists in promoting communication, expanding thinking skills, allowing reflecting, providing feedback, and getting ready for both academic and professional life.

The register is an indispensable part of writing, as Malinowski (1923, p. 307) claimed, "A statement is never detached from the situation in which it has been uttered." Much research on student writing, including the types of texts students compose and their progression toward register-appropriate standards, has been motivated by the importance of writing in educational contexts (Goulart et al. (2020). According to sociolinguistics, a register is a language variation utilized for a clear objective or in a particular communication context (Biber & Conrad, 2009). This term was first coined by the linguists Thomas Bertram Wallace Reid, mostly known as Reid (1956) to explain how people use language differently in various social contexts. In linguistics, it is mostly accepted that there are three register types in writing: formal, informal, and neutral. The formal register is highly preferred in a professional setting while writing to a boss, manager, or stranger. In social conversational settings, writing to friends or people known well, the informal register is preferred. Lastly, in technical writings which require non-emotional aspects, the neutral register is applicable.

Literature review

To date, several studies focused on investigating or identifying the use of chatbots in the language learning process. Due to the fact that it is a new research topic, studies in this area are, of course, limited to the last few years. Claiming the limited studies on using chatbots in language learning, Pham et al. (2018) developed an AI-generated chatbot, named English Practice, for English language learners, and their study revealed that students use the majority of the system's fundamental features, and this suggests that it would be widely used in the future.

Another study, which is based on the ADDIE framework, by Haristiani and Rifai (2021) aimed to utilize the chatbot-based Japanese grammar learning application Gengobot as an autonomous Japanese learning medium to give teachers an alternative autonomous learning medium. The study results showed that the students were more autonomous while using Gengobot and more interested in learning grammar with the help of that chatbot.

Liang et al. (2021) conducted a review study with articles on the use of Artificial Intelligence in language education published in the Web of Science between 1990 and 2020. The study revealed that AI in language education was primarily applied in writing, reading, and vocabulary acquisition, focusing less on higher-order thinking, complex problem-solving, and learners' collaborative learning. Besides, as a suggestion, they claimed it would be a further study to research the effects of using AI-based chatbots on learning efficiency.

Vázquez-Cano et al. (2021) investigated the pedagogical usefulness of a chatbot to help students access the university in the discipline of the Spanish Language and the study's findings showed that compared to students who interacted with the course teacher, those who interacted with the chatbot scored better academically.

Kohnke (2022) developed a chatbot application to assist and stimulate language learners during the COVID-19 pandemic. The study concluded that the students were more engaged in completing the chatbot tasks and managed themselves better.

Divekar et al. (2022) investigated the use of both AI and Extended Reality (XR) in multimodal spoken dialogue in second language learning. They reported that learners' vocabulary learning, comprehension, and conversation skills statistically showed a significant rise due to these modern technologies in favor of AI and XR.

Another review study was conducted by Ji et al. (2022). They reviewed the empirical studies on using AI-integrated language learning environments published from 2015 to 2021. In conclusion, the obstacles and recommendations for conversational AI-integrated language learning were recognized, along with the responsibilities of conversational AI and teachers at each level of language acquisition. They also reported the importance of AI integration to promote language learning and decrease teachers' workload in the classroom.

A recent article reviewing the literature and offering potential benefits of ChatGPT in the field of education has been written by Baidoo-Anu and Owusu-Ansah (2023). Given the rise of AI in businesses, he suggested that implementing dynamic AI tools in the classroom and instructing students on how to use them appropriately and effectively would also equip them to succeed in an AI-dominated workplace after graduation.

Another recent study on AI from a different point of view, the use of email reply suggestions, is examined in the study by Algouzi and Alzubi (2023) from a sociocultural perspective of several language-related characteristics. The study suggests extending AI-mediated communication in email reply responses in conjunction with some sociolinguistic aspects in light of the findings.

A highly new study on using chatbots as a language learning tool was conducted by Kohnke (2023), developing a chatbot to help language learners at the tertiary level. Similar results with previous studies have revealed that the participants appeared to like interacting with the chatbot both in and outside of class and felt that it helped them with their English.

Problem statement and research questions

Many studies have been carried out in a very short time on ChatGPT, which emerged as a result of the rapid advancement of technology and artificial intelligence-supported chatbots. The recent race for AI development cannot be underestimated, as many researchers have conducted various studies focusing on ChatGPT in various fields. However, up to now, very few studies have examined the role of AI in the language learning process. Remarkably, previous research has not utilized AI-generated chatbots to explore register learning in English language writing. What remains unknown is to what degree ChatGPT, which is an AI-generated chatbot, impacts writing tasks, including various registers. Hence, this study set out to explore the impact

of ChatGPT on the learning the register in different writing tasks by shedding new light on its effects through an experimental process. Specifically, the following issues will be addressed:

1. Can the use of ChatGPT as a learning assistant help students improve self-editing their writing?
2. What are the students' opinions and suggestions regarding using ChatGPT as a learning assistant?

By concentrating on utilizing AI-generated chatbots while mastering English writing skills in terms of optimal register, this paper, as is evident above, first explains the technology, Artificial Intelligence (AI), and ChatGPT in language learning. Then, it briefly overviews the recent literature on AI in language learning, followed by the methodology section. The last part of the study analyses and discusses the data results undertaken during the experimental process. It ends with the limitations, pedagogical implications, and further study suggestions.

Methodology

In the present study, a one-shot case study which is a pre-experimental design has been administered. In this kind of research, the researchers form a group of students and then expose them to a treatment process, finalizing the process with data interpretation and some kinds of interviews (Creswell, 2014). Data was collected qualitatively, with the help of observations recording field notes during the process and an unstructured, open-ended interview.

Participants

The participants of the study were undergraduate students majoring in the Faculty of Engineering, Faculty of Economics and Administrative Sciences, and The Faculty of Education in a state university in Türkiye. Their age range was 19–21. A total of 11 students from different departments with an English language level above B1 were included in this study on a voluntary basis. The participants were proficient technology users, as they all claimed to use technological devices for both their daily and academic lives. Using a purposeful qualitative sampling method, which is a non-probability sampling technique used to choose members of the target population for the study if they fit specific practical requirements (Dörnyei, 2007). The objective is to gather appropriate data in order to establish thorough knowledge (Creswell, 2014).

The limited number of participants was directly related to the devastating earthquake that occurred on February 6, 2023. The study was conducted in May, 2023 and due to the earthquake, the students did not come to the schools at those times and the lessons were carried out online. It was hard to reach learners during that time as they had no obligation to attend lectures. Only the volunteer learners attended, so the participant number stayed limited. Due to the limited number of participants, the present study is a kind of case study.

Treatment and data collection process

This study was carried out through a lesson plan created by the researchers (see "Appendix" for the lesson plan and treatment process in detail). According to the lesson plan, a writing lesson was held with the participants via Google Meet for 2 weeks, with two weekly lessons consisting of 50 min. In each lesson, a different writing task was assigned to the participants by following the appropriate language register. While participants engage with ChatGPT-3,5, they were observed by the researcher based on some criteria (see appendix) to make better interpretation of collected data.

The writing task follows a set procedure to improve students' writing abilities (see Fig. 1). Each lesson starts with a brainstorming exercise to create ideas and inspire original thought. The teacher provides discussion questions about the writing subjects when brainstorming is finished to encourage critical thinking and class engagement.

The teacher next displays other text formats, including emails, blog posts, messages, and letters of request, and ask the pupils to point out the language used in each one. With the help of this activity, students become more accustomed to various writing formats and better understand how language should be used in various situations. There then is a discussion where the students can express their thoughts and understanding of the subject.
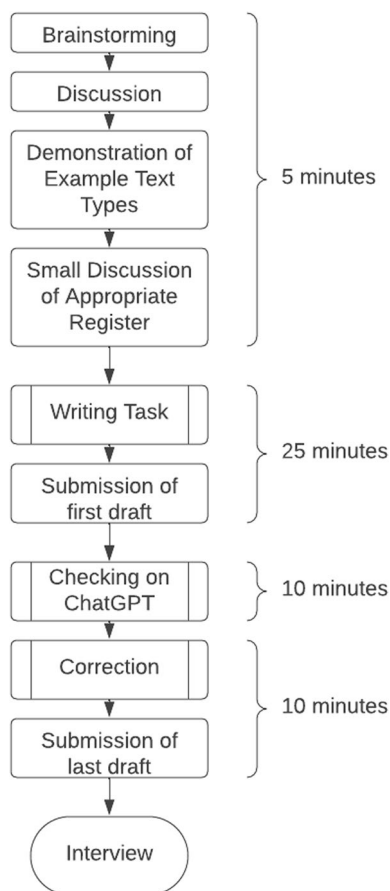

Fig. 1 Data collection process

The students are given writing tasks based on the text types discussed throughout the session. They must complete their first draft, which they must turn in to the teacher for review and comments. The students are given instructions on using ChatGPT to edit their writing to further improve their writing abilities. Each task includes specific phrases, and the students can ask ChatGPT for help figuring out where they made mistakes.

Students could chat on ChatGPT, "Is my formal email correct? (It is an email to a manager about my personal qualifications to get a job in a company)". From ChatGPT, the students obtain a list of all their errors in grammar, vocabulary, register, and other areas. Similarly, the students ask for assistance with their blog posts, letters of inquiry, or text messages and receive suitable guidance based on their particular requirements. The students turn in their final versions to the teacher for a thorough review after including the ChatGPT suggestions and corrections.

During this process, the observation checklist directed the researcher to the points she needed to focus on, and the researcher simultaneously took fieldnotes. Those descriptive field notes have been taken by the researcher in order to keep the records of participants' mode switches, their behaviors, and reactions. After completing four lessons and four writing assignments, the students are interviewed about ChatGPT. They are asked to express their preferences for using ChatGPT and justify those opinions. This input is used to evaluate ChatGPT's efficacy as a writing aid and its influence on the students' learning process.

Data analysis

The data was analyzed based on the qualitative data analysis process suggested by Creswell (2014). According to Creswell (2014), there is no one tried-and-true approach to analyzing qualitative data as qualitative research is "interpretive", in which you judge a description that matches the context or themes that effectively summarize the main categories of data (p. 238). Following a "bottom-up" approach, the data were collected by observations, fieldnotes, and interviews. Then, the data was prepared for the analysis and read verbatim. The subsequent stage involved coding the data within the textual context, thereby enabling the identification and interpretation of emergent themes. The general themes were created based on two research questions. For the first research question, the themes are (1) the perceived benefits of ChatGPT as a learning assistant and (2) the challenges and limitations of ChatGPT as a learning assistant. For the second research question, the themes are (1) students' opinions on using ChatGPT and (2) suggestions and improvements for ChatGPT. Below are the findings for each research question under the themes.

Results and discussion

The present study investigating the impact of ChatGPT on the learning of the register in different writing tasks included 11 participants in total. The demographics of the participants are shown in Table 1.

As a first step of the data collection process, the participants were asked their opinion on the difficulty of writing skill in English, and most of them reported it as a hard skill. To date, many studies reported that students found writing skills

Table 1 Demographics of participants

	N (%)
Gender	
Male	5 (45.5%)
Female	6 (54.5%)
Age	
19	4 (36.4%)
20	3 (27.3%)
21	3 (27.3%)
22	1 (9.1%)
Is writing a hard skill in English?	
Yes	8 (72.7%)
No	3 (27.3%)

difficult (Fadda, 2012; Khatter, 2019; Rahmat et al., 2017). There might be some possible reasons behind this idea, such as the grammar complexity of English, the large vocabulary, variations in the levels of formality and register, or writing conventions in English, etc.

All the participants were active users of ChatGPT-3,5, and they reported that they had already used ChatGPT for various reasons, such as poetry writing, chatting and question-asking, math problem-solving, seeking help with research, etc. All their answers to the question are listed in Table 2. In a recent study by Chan (2023), it was also reported that students are currently engaging with Artificial Intelligence tools for different purposes which are similar to the ones in Table 2.

Table 2 ChatGPT use of students

Have you ever used ChatGPT?	
Yes	11 (%100)
No	0 (%0)
For what reasons have you used it?	Writing review and improvement
	English writing
	Turkish text analysis
	Poetry and creative writing
	Chat and question-asking
	Math problem-solving
	Academic tasks and projects
	Language learning and exams
	Searching for certain subjects
	Quick access to information
	Seeking help with research
	Error handling in coding
	Planning a vacation
	Paraphrasing biographical information
	Using the tool for homework
	General use on various topics

Research question 1: Can the use of ChatGPT as a learning assistant help students improve self-editing their writing?

The first research question of the present study focused on the usefulness of ChatGPT as a learning assistant for self-editing students' writings with different registers. The analysis of collected data was categorized under two main themes: the perceived benefits of ChatGPT and the challenges and limitations of ChatGPT. The results showed that the use of ChatGPT as a learning assistant appears to have the potential to help students improve their self-editing skills in writing—as shown in excerpts from participants P1 and P7's responses, several points from the interview answers supported this.

P1   It might be beneficial as a learning assistant.

P7   If I don't remember a phrase, I can ask different questions to make it remind of it. It is highly useful for long texts to make them shorter. We cannot learn how to write with the help of ChatGPT, but we can support our learning process with the help of it.

Students showed interest and engagement in using ChatGPT as a learning assistant for writing tasks. They tried to actively participate and write their tasks with the help of ChatGPT. The results of a recent study by Jin et al. (2023) are in line with the present result regarding the positive effect of AI on learners' engagement and active participation. Clearly, novel technologies increase learners' interests and appeal to them to participate in lessons more. ChatGPT provided corrections and suggestions for improving the formal aspects of writing, such as grammar, punctuation, and sentence structure. ChatGPT's corrections and suggestions helped students level up their writing and make it more professional. The participants P6 and P9 made comments about this issue as follows:

P6   It levels my writing up, this is the advantage…

P9   If I write something at B1 level, it levels up it to the C1. This is the advantage.

Students found it beneficial to continue the conversation with ChatGPT to ask for more examples and clarification, indicating a desire for improvement. The statements made by P4 and P6 reported that:

P4   The most beneficial advantage is that it makes the corrections whenever we want.

P6   When I asked for reason, it explained it. It said "it should be better if you use this…".

Students also reported that ChatGPT might be beneficial for beginner writers. They said that if they had a lower level of English, ChatGPT could help them find mistakes and make it better for formal writing, which is essential for their professional and academic lives. Besides, they claimed it might not be so beneficial if they had a higher level of English, as they could do the same things without any help from ChatGPT. P10's view of this issue was reported below.

P10   I can use it for formal texts, absolutely not for informal. I don't need it for my informal language, I have enough knowledge of English for it, but for formal of

course I need it. It makes my writing more professional.

On the other hand, regarding the challenges and limitations of ChatGPT as a learning assistant, the students reported that ChatGPT had technical issues, such as problems with logging in or regenerating answers. It made corrections incorrectly or confusingly. This was a big challenge for the students who had a relatively, lower level of English than the others in a way, as their writings included different items from their intended writings, for example P1 claimed that:

P1   ChatGPT has some problems while logging in and using it.

ChatGPT sometimes changed the meaning or context of the text. Hence, students reported that it might pose a big problem for their, mainly formal, writing. ChatGPT struggled with conjunctions and sometimes made sentences more complex. It added unnecessary or unrelated items to the text. Students encountered difficulties in correcting ChatGPT's suggested corrections. They reported that they could not understand why ChatGPT made a correction in their text, as they believed it seemed intelligible. They reported that they did not want to apply all the suggested changes by ChatGPT in their writings. P6's statement was an example of it.

P6   I use it but I don't make all of the corrections it's said. I don't use the parts it changed.

Some students felt ChatGPT was stereotypical or lacked a nuanced understanding of language. Students used slang or casual English, particularly in their informal writing task, which was a text message sent to their friend. Even if they gave a prompt to ChatGPT describing their task as an informal text message, ChatGPT could not understand the use of slang and offered corrections for them; however, the students rejected the proposed changes, as they claimed in a text message they wrote to their friends that such usages were considered normal, and they preferred not to change their writing. According to the reflections of P8 and P9,

P8   It has an algorithmic infrastructure, so it doesn't have the knowledge of casual language.
P9   It doesn't know informal register. Informal register for ChatGPT is only slang language use.

Regarding learning register knowledge, students reported that they could identify the differences among registers while correcting their mistakes with the help of ChatGPT. Even if they believed their writings included correct vocabulary for their target register, they had a chance to distinguish the appropriate vocabulary, especially for formal register. As mentioned above, according to their ideas, ChatGPT seemed not beneficial for the students for informal or neutral registers. P3 made comment about this issue as follows;

Table 3 Perceived benefits, challenges and limitations of ChatGPT as a learning assistant

Themes	Codes
Perceived benefits of ChatGPT as a learning assistant	Engaging and interesting
	Helping actively participate in writing tasks
	Providing corrections and suggestions to improve writing
	Assisting in making writing more formal
	Clarifying doubts and providing explanations upon further questioning
	Beneficial for beginner writers
Challenges and limitations of ChatGPT as a learning assistant	Technical issues (i.e. logging in)
	Incorrect or confusing corrections
	Changing meaning or context of the text
	Problems with conjunctions and making sentences more complex
	Adding unnecessary or unrelated items to the text
	Difficulties in correcting ChatGPT's suggested corrections
	Being stereotypical or lacking a nuanced understanding of language

P3   I didn't like its neutral correction as it changes the text a lot. Mostly, it changes the neutral language into formal language. I think ChatGPT doesn't know neutral language. If the informal is not so informal, it also makes it to the formal.

The answers to the first research question provide insights into the students' experiences and perceptions regarding using ChatGPT as a learning assistant for self-editing their writing. It indicates the potential benefits and the challenges students encountered while using ChatGPT. Table 3 shows the themes and codes based on the data analysis.

Research question 2: What are the students' opinions and suggestions regarding using ChatGPT as a learning assistant?

The second research question focused on the students' opinions and suggestions regarding using ChatGPT as a learning assistant. The results were also categorized under two themes: the students' opinions and recommendations, and improvements for ChatGPT.

The results under the opinion theme showed that the students had mixed opinions about using ChatGPT for formal and informal texts. ChatGPT was perceived as more beneficial for formal text corrections. It was criticized for making changes without providing explanations. Students felt that ChatGPT focused more on grammar and punctuation than vocabulary. Therefore, even if some of them were keen to use ChatGPT only for their formal writings, others did not want to use ChatGPT for their, especially, informal writings.

Regarding the suggestions and improvements for ChatGPT, students suggested being more cautious with ChatGPT's proposed changes. They recommended asking specific questions to limit ChatGPT's alterations. For example, they offered to ask for only grammatical corrections without any change in vocabulary selection. As examples, the excerpts of P3 and P10 can be given.

P3   I can use it both formal and informal text but with more carefully selected questions. I can ask not to add any additional sentence or not to remove any sentence, or it can completely change the sentences.

P10   As long as it doesn't change the things that I wrote, if we limit it with some questions, it might be more beneficial.

Students desired more explanations for corrections and suggestions. Therefore, they suggested asking for clarification from ChatGPT about its suggested corrections. The students noted ChatGPT's limitations in understanding informal language and different registers. Some highlighted the need for improvements and more development to use it effectively as a learning assistant while self-editing their writings. Table 4 shows the themes in detail.

Grounded on the analysis of students' interview answers in general, combined with observation notes, it might be claimed that students had a lack of interest and fear in writing tasks; however, with the help of ChatGPT, they were engaged and actively participated in writing tasks. ChatGPT had benefits with time management as it was quick to use it. The students faced some technical problems and difficulties in logging in. On the other hand, ChatGPT's ability to make formal corrections, its impact on the level and novelty of writing, its tendency to add unnecessary or unrelated items to text, and its effects on sentence complexity and problems with conjunctions were highly noted by the students during the treatment process.

Students had perceived benefits of using ChatGPT for formal text corrections, while they reported its lack of didactic nature. They had some trustworthiness and reliability concerns. Students stated that ChatGPT's limitations in understanding neutral and informal registers posed potential challenges as a learning assistant, making it suitable only for specific types of texts. They reported the need for improvement in ChatGPT's algorithms and suggestions. While they had negative opinions on its impact on writing levels and meaning changes, its usefulness for timesaving and shortening long texts were noted as positive.

Beyond these, it might be beneficial to discuss the role of prompt engineering in using ChatGPT as a learning assistant grounded on observation and field notes. The participants of the study were aware of using correct prompts to get better results and corrections by ChatGPT. As they engaged with ChatGPT as a learning assistant, they were acquainted with the prompt engineering, and during the process they somehow tried to give better prompts. P2 made a comment about this issue.

Table 4 Students' opinions, suggestions and improvements for ChatGPT

Themes	Codes
Students' opinions on using ChatGPT	Not sure of using ChatGPT for formal and informal texts
	More beneficial for formal text corrections
	Criticism for making changes without providing explanations
	More focus on grammar and punctuation than vocabulary
Suggestions and improvements for ChatGPT	Being more cautious with ChatGPT's suggested changes
	Asking specific questions to limit ChatGPT's alterations
	Desire for more explanations for corrections and suggestions
	ChatGPT's limitations in understanding informal language and different registers
	The need for improvements and more development

P2   When I asked a different question, the answers were more detailed.

Prompt engineering appears crucial in the context of the current study, which aims to investigate the influence of ChatGPT on learning register in various writing tasks. In this study, the input prompt serves as a guide for the language model, allowing it to produce responses that aid in comprehending how ChatGPT affects the learning register. It might be beneficial to keep these points in mind; in order to identify the writing tasks pertinent to the learning register, the input prompt should be thoughtfully created. Guidelines for assessing the answers may also be included in the input questions. This can entail asking the model to justify the register selection or to describe how particular language components contribute to a particular register. Considering the study's exploratory nature, it could be advantageous to do iterative testing using various prompts. In light of the initial replies and learnings from the model, this enables researchers to improve and tailor prompts.

Conclusion

Writing skill has always been a problematic issue for English language learners due to the several reasons. One of the aspects making writing hard is the register knowledge in English. Register is a required knowledge as it is the use of appropriate language in appropriate context. Hence, language learners need to master register knowledge for English writing.

It has been believed that the influence of ChatGPT, an artificial intelligence generated chatbot, on writing activities, encompassing diverse registers remains a phenomenon that requires further research. Therefore, this study sought to shed a new light on its impacts through an experimental procedure and investigate the influence of ChatGPT on the learning of register knowledge in various writing tasks. Ali et al (2023) claimed that instead of worrying about ChatGPT's negative effects, it might be used as a learning tool. The present study was focused on this aspect and tried to explore the potential for using ChatGPT as a learning tool for students to self-edit their writing in a variety of registers.

The results of the study showed that ChatGPT has the potential to assist students in developing their writing abilities, particularly in formal register. Students used ChatGPT enthusiastically and actively for their writing tasks. They benefited from its suggestions and corrections to enhance the formal aspects of their writings. The study noted several difficulties, though, including technical difficulties and limitations in interpreting informal and neutral registers. Despite these drawbacks, students' varied viewpoints and insightful ideas emphasized the need for significant functional improvements to ChatGPT to make it a more useful learning tool for self-editing. ChatGPT can provide significant assistance to students in their writing tasks with careful evaluation and modifications.

Despite the insightful conclusions derived from this study, it is imperative to acknowledge its inherent limitations, which may limit the practical validity of the results. Before anything else, there are issues with the results' generalizability due to the small sample size of only 11 individuals. Another limitation related to the participants is that even though their English proficiency levels are similar, they may have different proficiency in

using English for various purposes. Furthermore, it's possible that the study's emphasis on self-editing abilities and the use of ChatGPT as a learning tool did not adequately cover all facets of writing expertise. Furthermore, the length and scope of the study might not have permitted a thorough assessment of the long-term impacts of Chat-GPT use on writing development. The results of this study need to be confirmed and expanded upon by other research including larger, more diverse participant groups and a variety of writing assessments. Additionally, for further studies to enhance the credibility of the study, it might be useful to implement a detailed survey of the AI familiarity and use and a more balanced distribution of writing tasks for formal, informal, and neutral registers. The last issue, which is a must to think about further studies, is related to prompt engineering. In this study, the prompts were created by the researcher, and the participants used exactly those prompts; however, it might be better to use more structured and contextual prompts.

Appendix 1
Lesson plan
Four different writing tasks:

(1) Write an email to a manager about your personal qualifications to get a job in his company. (FORMAL REGISTER) (150–200 words)
(2) Write a blog post about your time management skills (NEUTRAL REGISTER) (150–200 words)
(3) Write a letter of request to the dean about the things you'd like to have on campus. (FORMAL REGISTER) (100–150 words)
(4) Write an informal text message to your friend about the traffic in your city. (INFORMAL REGISTER) (50–75 words)

For each writing task, there will be four sessions. For each session, the duration will be 50 min.

Each session will start with a brainstorming activity Then, there will be some discussion questions about the writing topics The teacher will show example text types (email, blog post, text, letter of request) and ask students to identify the use of language in those texts There will be a discussion on the appropriate use of language in those texts	5 min
Students will be asked to write the tasks *They will submit their first draft to the teacher at this stage*	25 min
Students will be asked to check their writings via ChatGPT with the following statements for each task: (5) "Is my formal email correct? (It is an email to a manager about your personal qualifications to get a job in his company.)" (6) "Is my blog post correct? (It is a neutral post on a blog about my time management skills.)" (7) "Is my letter of request correct? (It is a formal letter of request to the dean about the things I'd like to have on campus.)" (8) "Is my text message correct? (It is an informal text message to my friend about the traffic in my city.)"	10 min
Students will be asked to correct their mistakes, if any, with the help of ChatGPT answers *They will submit their last draft to the teacher at this stage*	10 min
After 4 sessions and 4 different writing tasks have been completed, students will be interviewed in focus groups about their process of using ChatGPT	

At the end, the first submissions and last submissions will be compared by the researchers to see the effects of the process. During students' writing process, they will be observed by the teacher.

Appendix 2
Observation checklist

No	Criteria	Responses		Notes
		Yes	No	
1.	Students appeared to be interested in using ChatGPT			
2.	Students made the effort to use ChatGPT			
3.	Students were able to participate in actively to write their tasks by using ChatGPT			
4.	Students were able to manage their time to check their writing in ChatGPT			
5.	Students showed physical sign of boredom while working on ChatGPT			
6.	Students were able to complete the writing task within the time frame without struggling			
7.	Students engaged in writing tasks			
8.	Students showed interest while writing the tasks			

Author contributions
Both authors made equal contributions to the article.

Availability of data and materials
The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Competing interests
The authors declare that they have no competing interests.

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