

## PAPER

# Developing Future Teachers' Academic Writing and Critical Thinking Skills Using ChatGPT

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## ABSTRACT

Preparing future teachers to meet the demands of an increasingly dynamic world is a paramount challenge. Academic writing and critical thinking skills influence foreign language teachers' professional growth, shaping their students' cognitive development. This paper explores the integration of ChatGPT (generative pre-trained transformer) as a tool to augment future foreign language teachers' academic writing and critical thinking skills. Through engagement with ChatGPT, future foreign language teachers have the opportunity to interact with a large language model that can provide targeted feedback, prompt thought-provoking discussions, and assist in refining professionally oriented competencies. This study examines the impact of ChatGPT on skills development through a comprehensive analysis of empirical data, pedagogical frameworks, and student experiences. A qualitative study conducted with 35 students enrolled in a foreign languages master's program utilized focus group interviews and thematic analysis. The findings highlight ChatGPT's limitations in content generation while also recognizing its potential to reduce research labor and assist in formatting and referencing tasks. The study underscores the importance of informed usage of ChatGPT, with students and educators recognizing the necessity of verifying information and maintaining academic integrity.

## KEYWORDS

academic writing skills, ChatGPT, critical thinking skills, future teachers, foreign language

## 1 INTRODUCTION

Preparing future teachers to meet the demands of a dynamic and rapidly changing world is a paramount challenge. Academic writing and critical thinking skills are important for educators, as they influence not only their professional growth and advancement but also shape the cognitive development of the students they teach. Recognizing the transformative potential of emerging technologies, universities increasingly consider the integration of ChatGPT (generative pre-trained transformer)

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as a tool to augment the academic writing and critical thinking skills of future foreign language teachers.

By engaging with ChatGPT, future foreign language teachers have the opportunity to interact with a sophisticated language model that can provide targeted feedback, prompt thought-provoking discussions, and assist in the refinement of their professionally oriented competencies.

This paper aims to explore the ways of incorporating ChatGPT into teacher education programs, examining its impact on the development of students' academic writing and critical thinking skills. Through a comprehensive analysis of empirical data, pedagogical frameworks, and student experiences, we seek to expound on the potential of ChatGPT as a tool for the skills development of future foreign language teachers.

## 2 LITERATURE REVIEW

According to the Future of Jobs Report, jobs in the education industry were expected to grow in 2023 by about 10%, leading to three million additional jobs for vocational education teachers and university and higher education teachers [1]. The highest priority for skills training from 2023 to 2027 is analytical thinking, the second priority for workforce development is to promote creative thinking, and training workers to utilize artificial intelligence (AI) and big data ranks third among company skills-training priorities in the next five years. The report shows a high demand for people with AI skills, increasing opportunities for job-seekers, and the need for higher education institutions (HEIs) to meet the challenge.

Across fields, opinion is split on whether ChatGPT's use should be restricted or legislated [2]. HEIs are seeking ways to adjust to a world in which AI has become widespread, accessible, and easy to use. According to the UNESCO International Institute for Higher Education guide on ChatGPT and AI in higher education, the chat can be used but requires both care and creativity to ensure it is handled ethically and appropriately [3].

With the rapid advancement of technology, university teachers all over the world have to rethink the use of materials and tools. Although concerns have been voiced about the "death" of academic essays [4], [5], the LLM implications for students' research have been less widely discussed.

The big worry in the research community is that authors could deceitfully pass off LLM-written text as their own, or use LLMs in a simplistic fashion (such as to conduct an incomplete literature review) and produce unreliable work [5], [6], [7]. However, a major task for educators at different levels is to raise awareness, familiarize students with AI, which assists their educational efforts and makes them productive, and expand their use of AI-based tools as necessary, so that university graduates remain competitive in the job market [2], [8]. A recent study by Paratore [9] posits optimism for future improvements in writing instruction, emphasizing "the joining together of rigorous studies that define successful instructional approaches with educational technologies that use generative AI to partner with the teacher to improve writing instruction and also lessen writing instructional demands on teachers' time."

### 2.1 Academic writing in foreign language teacher education

Academic writing helps scholars present ideas, analyze research and construct an effective argument. It is a fundamental skill for language educators, influencing their

ability to communicate effectively, engage in scholarly discourse, and contribute to the field [10]. Teacher education programs recognize the importance of cultivating strong writing skills among future educators, emphasizing the need for pedagogical strategies that support the development of clear, and concise scholarly writing [11], [12].

As effective ways to use ChatGPT in instruction are being identified [13], [14] it will likely have a major impact on research writing and the teaching of writing [15]. We are moving toward a day when every writer will effectively have a personal assistant to aid with writing responsibilities, and we will need to radically rethink teaching writing [9]. Just asking students to write an essay on a predetermined topic for an assignment will no longer be successful [4]. We will be able to do much more in the way of instruction if generative writing tools become widely available. Generative writing tools, at the very least, enable us to raise the bar for students and add more depth to assignments. Rogers and Graham [16] pose that developing awareness of writing as a recursive process, demonstrating and guiding students to fully engage in the process, improves students' writing. Gero [17] suggests that AI is unlikely to write for humans but might best be viewed as a tool to write with humans.

Several recent studies [2], [4], and [5] have suggested that now is the time to harness the knowledge and resources to improve the teaching of writing. The rapid growth of generative AI makes it possible to leverage educational technologies to implement some important teaching actions. Awareness of the importance of writing outside of school has continued to build, which may lead all stakeholders to increase educational funding and resources to improve and extend students' opportunities to become engaged and inspired writers [9]. In the context of our study, the importance of implementing best teaching practices by informed, close-to-the-action teachers is highlighted.

Effective writing instruction develops students' knowledge and use of all parts of the writing process; develops students' awareness of text structure and its importance in planning and composing "considerate" text; builds students' awareness of and attention to varied writing purposes and different writing audiences; develops strategies and routines for gathering rich knowledge related to writing topics; creates writing contexts that are agentive and collaborative; situates instruction in grammar and usage within the context of students' writing; provides facilitative feedback throughout the writing process; provides substantial classroom time for writing instruction and for students to write [9].

The advent of generative AI has the potential to substantively change the ways writing is taught by supporting the design of program features that can assume some of the most time-consuming teaching actions required to teach and guide good writing (formulating writing prompts, providing research-based frames or structures to guide students' planning and composing, and providing early, individualized feedback on students' drafts) [9].

A qualitative study by Wijaya [12] found that the utilization of critical thinking skills progressively enabled graduate university English as a foreign language (EFL) learners to be more strategic, analytical, and proficient academic writers. The participants acknowledged that critical thinking skills should be practiced intensively to foster their academic writing skills.

## 2.2 Critical thinking in foreign language teacher education

Analytical thinking and creative thinking will remain the most important skills for professionals in 2024. Critical thinking is widely acknowledged as a cornerstone

of effective teaching and learning. It is “reasonable and reflective thinking focused on deciding what to believe or do” [18]. In the context of teacher education, fostering critical thinking skills is essential for preparing teachers to navigate complex educational landscapes, make informed decisions, and adapt to evolving classroom dynamics [19], [20]. The integration of technology in teacher preparation programs has been explored as a means to enhance critical thinking skills [21].

Black maintains that “the construct of critical thinking is not precisely defined, nor is it the case that there is a single agreed definition” [22, p. 2]. Research supports the view that critical thinking should be part of students' educational experience, however, there is no agreement whether its provision should be embedded in subject domains or stand alone as a separate academic discipline. Equally unclear for students, according to [22], is whether critical thinking is an explicitly teachable skill or a personality trait including dispositions.

We believe that teaching critical thinking should be embedded in teacher education programs, and recognize it as a big part of developing academic writing skills. Students are to take a position and support that position in their writing. They need to analyze a research topic from multiple perspectives, consider alternative views, and evaluate the evidence. The ability to articulate the opposite side of an argument requires a deeper understanding of the topic and leads to a better explanation of one's position. By seeing a topic from several angles, students can better formulate their position and present evidence supporting that position. In so doing, they actively interpret and evaluate their observations, communications, information and argumentation. In an academic context, critical thinking is crucial for making judgments about sources of information and forming one's arguments. It helps students navigate biases, evaluate evidence, and engage independently with the sources of information.

### 2.3 ChatGPT in foreign language teacher education

Recent studies have investigated the potential of ChatGPT as an educational tool. Initial findings suggest that its ability to generate coherent and contextually relevant responses can contribute to the development of foreign language skills and stimulate critical thinking [23], [24]. ChatGPT can enhance critical thinking by providing access to information, supporting self-study, and promoting creativity and problem-solving skills [24].

However, there is a notable gap in the literature regarding the specific application of ChatGPT in teacher education programs and its impact on the academic writing and critical thinking skills of future foreign language teachers.

Findings [25] showed that ChatGPT generally motivates learners to develop reading and writing skills. The respondents had neutral attitudes towards the effect of ChatGPT on developing listening and speaking skills. The conclusion has been drawn that ChatGPT-based teaching is motivational.

ChatGPT has been found to have a positive impact on critical thinking skills [26]. It helps in finding information, supports self-study, aids in language learning, enables creativity, and provides various forms of assistance in education [27], [28]. However, it is important to note that there are limitations to relying solely on ChatGPT for critical thinking. Additionally, there is a risk of misinformation and the inability to differentiate reliable information from unreliable sources. Therefore, while ChatGPT can be a valuable resource, it should be used cautiously and in conjunction with other reliable sources to develop well-rounded critical thinking skills [29].

In synthesizing the existing literature, this review underscores the need for empirical study exploring the integration of ChatGPT in FL teacher education. The subsequent sections of this paper will describe the methodology, findings, and implications of the study.

### 3 STUDY METHODOLOGY

In the 2023–2024 academic year, a study that analyzed the development of future teachers' academic writing and critical thinking skills using ChatGPT was conducted. 35 Foreign Languages Department students of Ternopil National Pedagogical University (Ukraine) in the first semester of a three-semester master's level program "Secondary Education (English Language, German/French Languages and Literatures, World Literature)" working on their master's theses participated in the study. Among them, there were 29 females and six males aged between 21 and 25 years old. For this study, a qualitative methodology comprising focus group interviews and subsequent qualitative thematic analysis has been selected.

#### 3.1 Data collection

The data were collected from three focus group meetings in the fall of 2023 during the first semester of the program. The recordings and handwritten notes by both studiers were transcribed electronically and analyzed.

#### 3.2 Data analysis

A qualitative thematic analysis was used to analyze students' responses obtained during the focus group meetings. The analysis included six steps: 1. becoming familiar with the data; 2. generating initial theory-based codes; 3. searching for themes; 4. reviewing themes; 5. defining themes; and 6. writing up [30].

After the studiers became familiar with the data transcripts, theory-based initial coding was employed. The data was initially coded. Six themes emerged through coding and discussion, namely "ChatGPT's limitations in generating the paper's content," "ChatGPT's limitations in outlining the paper's structure," "ChatGPT's potential in reducing research labour," "ChatGPT's role as a research assistant," "Responsible use of ChatGPT by teachers/research advisors," "Responsible use of ChatGPT by students." Through a comprehensive coding cycle and discussion two pairs of similar themes: 1) "ChatGPT's limitations in generating research paper content," "ChatGPT's limitations in outlining the paper's structure"; and 2) "Responsible use of ChatGPT by teachers and research advisors," and "Responsible use of ChatGPT by students" were identified and merged into one. Four major themes, which were defined in a final cycle of coding will be presented in the findings.

### 4 FINDINGS AND DISCUSSION

The formatting of an article reflects its structure, which in turn reflects the writer's thoughts. Since some students may be tempted to use ChatGPT to produce research papers, they should be informed about its possibilities and limitations. At the initial



stage of our study in preparation for the first focus group meeting, we prompted ChatGPT on what it can and cannot do while assisting pre-service teachers of foreign languages with writing a research paper and asked our students to do the same. During the focus group meeting, the students shared their answers and discussed the limitations of using ChatGPT while writing their theses.

The second focus group meeting focused on ChatGPT's role as a research assistant. The participants compared samples of AI and human-generated content, and discussed authorship attribution, responsible use of ChatGPT, and examples of its "hallucinations."

At the concluding focus group meeting we addressed the issues of plagiarism and academic integrity. Together with students we created an infographics "Can do and can't do of ChatGPT for research" in Canva and developed a draft of students' guidelines regarding using ChatGPT for research.

The responses from ChatGPT on assistance it can provide pre-service foreign language teachers with writing a research paper include: topic selection and narrowing, research proposal outlining, literature review writing assistance, research methodology explanation, data analysis assistance, writing (revision and proofreading) assistance, advice on overcoming writer's block, research ethics, presentation and visualization, and time management. The chat also made an acknowledgement we later adopted in developing the guidelines draft, namely the necessity to consult with one's research advisor or instructor for specific requirements related to one's research paper and to exercise critical thinking and academic integrity while seeking assistance from AI tools.

The responses from ChatGPT on the limitations it has while assisting pre-service teachers of foreign languages with writing a research paper included: lack of personalization, limited subject knowledge (up to the chat's last training data in September 2021), no access to specific institutional guidelines, inability to provide specific guidance on ethical considerations, limited review of original research, citation accuracy, proofreading, grammar, and limited context awareness. The chat warned pre-service FL teachers not to overly rely on its responses, as this could unintentionally lead to issues of plagiarism or academic dishonesty and listed the lack of real-time interaction in the form of discussion as another potential limitation.

The subsequent analysis proved that ChatGPT can write the abstract of the paper provided that it is given the correct prompt. The prompting technique can be improved by doing relevant research. The technology can reformat citations and footnote styles such as APA, MLA, or Chicago. However, students commented that DSTU, State Standard of Ukraine 8302:2015, is not included in the list of styles the chat can work with. Moreover, the generated text can appear bland or contain errors. Also, the chat cannot correctly cite the sources used. ChatGPT cannot be held accountable for the work, and it can't be attributed authorship. The scholarly journal *Nature* advises documenting the use of ChatGPT in the methods or acknowledgements sections of a paper [31].

The technology relies on its training materials (till 2021) that do not include the latest research in the field. It cannot reason, analyze, or evaluate; therefore, it cannot yet write the literature review section properly. We asked the technology to list the top papers in our fields (philology and foreign language teaching and learning) and have been offered entirely fictional lists of titles and authors. As of now, ChatGPT does not give students the ability to restrict data sources and provides too many of them, which are often irrelevant to the researched problem. Much of the records of digitized university archives are still inaccessible to ChatGPT; hence relying solely on the chat, students won't be able to include them in their research.

ChatGPT can work well in tandem with a human to produce insightful research papers summarizing ideas and concepts and revising the text for clarity. It can also assist in correcting the use of language. Using the tool, student researchers can devote more time to conducting experiments and less time to polishing final drafts.

The guidelines draft specifies that research advisors will have different expectations, and it is important for students to verify what these expectations are before submitting their papers. When research advisors permit their students to use ChatGPT, the latter need to document the use of ChatGPT in the methods or acknowledgements sections of a paper. If a paper does not include these sections, the introduction or another appropriate section can be used to document the use of ChatGPT or any other large language model. The student should ask their research advisor if they have different expectations. There are significant privacy and security concerns about using ChatGPT that has not been checked through university information technology channels that students should be aware of.

Four major themes emerged from the focus groups' data analysis: 1. ChatGPT's limitations in generating the content and outlining the structure of the paper. 2. ChatGPT is assisting research labor. 3. ChatGPT's role as a research assistant. 4. Responsible use of ChatGPT by teachers and students.

### **T. 1. ChatGPT's limitations in generating the content and structure of the paper.**

Students recognized the connection between the content and the structure of a research paper and allowed for ChatGPT's assistance in suggesting the structure, provided that it meets the university and department requirements. Content, on the other hand, was unanimously believed to be the student researcher's responsibility.

*"ChatGPT can suggest the structure for my paper. The papers' content is my responsibility." (S 1)*

*"It is important to understand the link between the structure and content of your paper. The content has to include my findings. It is connected with the research that I am doing. The structure gives my content shape. ChatGPT can help with the structure if prompted correctly." (S 4)*

*"The content loses its meaning without the form. ChatGPT works well with suggesting the structure for our paper. However, one must know the requirements for the structure in order to prompt the Chat." (S 7)*

*"ChatGPT is trained on huge amounts of text structured in different ways. It has a very good understanding of the academic paper. However, it can't generate original content. The content it generates is predictable and has no academic value." (S 18)*

### **T. 2. ChatGPT is assisting research labor.**

Several students acknowledged outsourcing academic labor to AI.

*"ChatGPT did a very good job formatting my reference list in APA style. It would have taken a lot of time, had I done it manually using the reference guide." (S 10)*

*"I know how to use citation generators online, but it is very helpful to have this service built in ChatGPT." (S 23)*

*However, they admitted that their thinking could not be delegated to ChatGPT:*

*"I had more time to analyse the material I collected, knowing that ChatGPT will do part of the work for me, e.g. formatting the reference list." (S 31)*

### T. 3. ChatGPT's role as a research assistant.

Participants shared their experience with ChatGPT generating inaccurate content.

*"Always check the output the chat generates." (S 7)*

*"Don't trust ChatGPT generated output without checking the source first." (S 28)*

*"Your paper is your responsibility. You can't blame inaccurate information on ChatGPT because it is a language model, not a researcher." (S 3)*

*"Relying on ChatGPT completely would be a big mistake. You need to use your common sense. Remember the information you learned in class, make use of your notes, books, etc." (S 34)*

*"ChatGPT occasionally 'hallucinates.' It gives you information that is not correct. You have to take that into account and double-check the information before including it in your paper." (S 16)*

### T. 4. Responsible use of ChatGPT by teachers and students.

Discussing the future of AI in education students reached the following conclusions:

*"ChatGPT will not replace teachers. I've heard somewhere that the teachers who know how to use ChatGPT will replace those who don't. I think this is true about any job." (S 10)*

*"Teachers who know how to use ChatGPT responsibly will be an advantage. They will then pass on this knowledge to their students. That way, we can reduce plagiarism and promote academic integrity." (S 21)*

*"ChatGPT and other AI apps will continue to develop and improve. If we don't engage with them, we won't be able to equip our students with the latest tools that they will need to be successful." (S 3)*

One student expressed the need for being taught how to use AI:

*"Forbidding us to use ChatGPT to write papers will have no effect. Students should be taught the difference between human and language model generated paper and encouraged to think." (S 8)*

Our findings are in line with [32–34] in evaluating the opportunities and challenges of using ChatGPT and focusing on harnessing this AI-powered writing assistant to facilitate more innovative teaching and learning. Since tools such as ChatGPT will become part of everyday writing [34], students and instructors should engage in utilizing them to support learning rather than stopping the students from using them.

We agree with [33] that ChatGPT represents a huge opportunity for learning innovators to use it to transform education and favor an approach that builds trusting relationships with the students in student-centered pedagogy and assessments aimed at developing their critical thinking.

## 5 CONCLUSIONS

Academic writing and critical thinking skills are foundational for educators, influencing their ability to communicate effectively, engage in scholarly discourse, and navigate complex educational landscapes. This paper has explored the integration



of ChatGPT as a tool to enhance the academic writing and critical thinking skills of future FL teachers. The synthesis of these themes highlights the potential of ChatGPT as a promising tool to be incorporated into teacher preparation programs. The literature suggests that technology, when thoughtfully integrated, can offer personalized and interactive learning experiences.

The outcomes of this study contribute to the ongoing dialogue surrounding the intersection of technology and teacher preparation, offering insights into the effectiveness of ChatGPT as a means to nurture a generation of educators with enhanced academic writing and critical thinking skills.

In shaping the future of teacher education, it is imperative to consider the ethical implications, practical implementation strategies, and ongoing professional development necessary to maximize the benefits of technology integration. As the educational community continues to recognize the potential of AI, this study serves as a stepping stone towards a more comprehensive understanding of how emerging technologies can be leveraged to empower and equip future teachers for success in their classrooms and beyond. AI is a technology that, although not embraced universally, can't be ignored. It has already changed the way we learn, teach and do research. When used ethically, ChatGPT could provide students with a more relevant learning and research experience, and advance their academic writing and critical thinking skills.

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