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Reducir las diferencias sociales con la IA: mejorar el acceso a la terminología lingüística especializada

Irina Okhremenko¹, Vitalii Vasyukov², Alibi Shapauov³, Evgeniy Kochetkov⁴,
Elena Panova⁵

¹Universidad Rusa de Economía Plejánov (sucursal de Volgogrado), Volgogrado, Rusia.
E-mail: vfrsteu-econom@bk.ru; ORCID: <https://orcid.org/0009-0000-6046-0998>.

²Instituto Estatal de Relaciones Internacionales de Moscú (Universidad), Moscú, Rusia.
E-mail: vvf0109@yandex.ru; ORCID: <https://orcid.org/0000-0003-0743-5616>.

³Departamento de Lengua y Literatura Kazajas, Universidad Sh. Ualikhanov Kokshetau,
Kazajstán. E-mail: shapau@mail.ru; ORCID: <https://orcid.org/0000-0002-3709-4309>.

⁴Universidad Financiera dependiente del Gobierno de la Federación Rusa, Moscú, Rusia.
E-mail: kochetkove@mail.ru; ORCID: <http://orcid.org/0000-0002-1136-6804>.

⁵Universidad Politécnica de Moscú, Moscú, Rusia.
E-mail: panova_ep@mail.ru; ORCID: <https://orcid.org/0000-0002-3868-3834>.

Resumen. Este artículo explora el papel transformador de la inteligencia artificial (IA) a la hora de abordar las desigualdades sociales en la enseñanza de idiomas, mejorando el acceso a la terminología lingüística especializada. A medida que la educación evoluciona en la era digital, la IA emerge como una herramienta revolucionaria que personaliza y mejora la experiencia de aprendizaje, haciendo que la adquisición de lenguas extranjeras sea más accesible y eficaz. El estudio se centra en la aplicación de ChatGPT en el aprendizaje de lenguas extranjeras, demostrando cómo la IA puede optimizar los resultados del aprendizaje proporcionando apoyo individualizado y un acceso más amplio a materiales auténticos. Aprovechando la IA, los estudiantes pueden mejorar su dominio de la terminología especializada, perfeccionar su comunicación oral y mejorar sus habilidades de escritura. La investigación subraya el potencial de ChatGPT para salvar las brechas sociales en la educación ofreciendo un acceso equitativo a recursos de aprendizaje de idiomas de alta calidad, lo que permite a alumnos de diversos orígenes lograr mejores resultados educativos. El estudio concluye que la IA, y ChatGPT en particular, es una poderosa herramienta para democratizar la enseñanza de idiomas y mejorar la competencia lingüística especializada.

Palabras clave: inteligencia artificial, tecnologías de IA, herramientas de IA, ChatGPT, lengua inglesa.

Bridging social gaps with AI: improving access to specialized language terminology

Abstract. This article explores the transformative role of artificial intelligence (AI) in addressing social inequities in language education by improving access to specialized language terminology. As education evolves in the digital age, AI emerges as a revolutionary tool that personalizes and enhances the learning experience, making foreign language acquisition more accessible and effective. The study focuses on the application of ChatGPT in foreign language learning, demonstrating how AI can optimize learning outcomes by providing individualized support and broader access to authentic materials. By leveraging AI, students can improve their proficiency in specialized terminology, refine their spoken communication, and enhance their writing skills. The research highlights the potential of ChatGPT to bridge social gaps in education by offering equitable access to high-quality language learning resources, thereby empowering learners from diverse backgrounds to achieve better educational outcomes. The study concludes that AI, and ChatGPT in particular, is a powerful tool for democratizing language education and improving specialized language proficiency.

Key words: artificial intelligence, AI technologies, AI tools, ChatGPT, english language.

INTRODUCTION

Artificial intelligence has become a true technological breakthrough of the 21st century (Abdullaev et al., 2023a), generating debate about its potential and further improvement and use, including in education (Kiselitsa et al., 2024). The AI industry has been developing rapidly in the past few years, adjusting all spheres of science and technology (Abdullaev et al., 2023b). Today, there are numerous AI-based instruments for language learning, including translators (Litwinowa et al., 2022), chatbots (imitating conversations with native speakers), adaptive educational games (personalizing the learning process), and interactive exercises (providing instant feedback) (Chernova et al., 2022; Kostyunina, 2022). These tools present students with more convenient and effective ways of learning foreign languages (Lopukhina et al., 2024). Language skills are necessary to communicate effectively and are vital in any sphere (Kabzhanova et al., 2024). A priority for teachers is to provide students with the necessary resources and support to improve their language skills and help them to realize their full potential (Knyazeva et al., 2023).

In the context of educational institutions' variability in the spectrum of choice of technologies to work with educational process participants (Gabidullina et al., 2023), the need arises to define the content of mastering AI systems and offer variants of its application, considering the needs of vocational training subjects (Bialik et al., 2022; Batashev et al., 2023).

ChatGPT (Generative Pre-Trained Transformer) by OpenAI is the most promising incarnation of neural network-based AI. This large statistical language model can function in a dialog format and support queries generated in natural languages (Ivakhnenko & Nikolskii, 2023). Unlike other chatbots, this neural network "remembers" the answers and questions of the interlocutor in each dialog and can maintain a consistent and coherent conversation (Ali et al., 2023).

Since Russians have only recently become active ChatGPT users (Eflova et al., 2023), the impact of this technology on learning outcomes and its application in the academic environment for learning English is under-researched, despite being a topical and promising issue.

LITERATURE REVIEW

Our analysis of scientific literature allows us to allocate the vectors of AI implementation in the educational process in the following areas:

- educational process management (personalization of the educational process, the ability to track the individual process of each student and notify the teacher about difficulties in understanding the educational material, analysis of the educational activity of the educational institution, monitoring of the quality of educational services, creation of educational courses, etc.) (Shefieva & Isaeva, 2020),
- design of educational courses (creation of outline plans, development of modules for courses, etc.) (Hussin, 2018),
- creation of educational content (visualization of materials, creation of texts, multimedia, exercises, and tasks, current and final attestations) (Baker, 2016),
- automatic assessment (the opportunity to analyze the responses based on automatic assessment, provide individual feedback, and create individual learning plans for everyone) (Sorokin, 2023),
- proctoring (control and monitoring of the assessment procedure in online exams or tests) (Kotenko & Lutsenko, 2020),
- consolidation of educational material (can be implemented in stages) (Garkusha & Gorodova, 2023),
- a tool for solving common tasks (project activities, creative tasks, etc.) (Anokhin et al., 2022).

AI in foreign language classes serves four main functions:

- 1) Independent assessment of student's achievements, which is an important criterion of modern education. The most simple and clear AI application is knowledge control, automated checking of tasks, identification and correction of errors, assistance to teachers, and determining the independence of assignment completion in grading. AI helps to eliminate cheating by analyzing camera images and user activity in the browser. The independence of task completion is determined by AI-based proctoring systems. Significant positive effects are demonstrated by AI for knowledge and skill acquisition and by text and voice recognition features followed by natural language analysis (Sysoev, 2024).
- 2) Learning assistant. Students can use voice assistants like Amazon Alexa and Apple Siri and automatic translators and apps to proofread their text for vocabulary, grammar, and syntax errors (Cherkasova, 2023).
- 3) Global learning. Students can participate in various activities around the world and expand their circle of acquaintances in other countries and cultures. AI helps to find relevant information and tailor the search results to users' needs (Kostiukovich, 2023).

- 4) Individualized approach to foreign language learning. Each participant in the learning process can perform tasks at their own pace. AI systems allow performing tasks considering previous mistakes (Fomin & Sadovikov, 2022).

Teachers gain an additional resource opportunity to turn to AI algorithms and approach their work more creatively and productively (Li & Fu, 2022). By skillfully using AI, teachers can make the educational process more effective and transfer some of their functions to the computer, freeing their time to perform more intellectually demanding and creative tasks.

The integration of AI into the learning process can help students to learn foreign languages more effectively by providing them with a more personalized and technologically advanced approach to learning (Islamov, 2020).

AI methods in foreign language learning can significantly improve the learning process and give students more opportunities to develop language skills (Kantorovich & Pavliutina, 2023). Interactive language learning platforms that use AI (Duolingo, Rosetta Stone, Babbel, Memrise, Busuu, Lingodeer, etc.) enjoy popularity (Pokrivcakova, 2019).

Other noteworthy instruments include adaptive programs that analyze student progress and propose personalized exercises and tasks; speech and pronunciation recognition systems that correct pronunciation errors; machine learning that analyzes data on students' training and provides personalized recommendations; augmented reality (AR) and virtual reality (VR) that deepen language learning; automated assessment systems that simplify teaching and learning; mobile applications for language learning, etc. (Eltanskaia & Arzhanovskaia, 2024).

Researchers argue the relevance of using chatbots, or virtual assistants, to practice speaking and listening comprehension (Seghier, 2023). Chatbots offer a unique mode of interaction with the user through dialogue, which is crucial for learning; save the history of communication with the user, which allows them to access their prior responses; contribute to students' motivation and engagement by giving them clues on what to do, entertaining, and simultaneously educating; operate 24/7 (Sysoev & Filatov, 2023).

The advantages and possibilities of ChatGPT in English learning have not yet been researched separately.

The study aims to examine ChatGPT as an innovative tool for English learning, including specialized terminology, identify and explore its advantages and possibilities, determine its limitations, give recommendations on its use, and experimentally demonstrate the increase in the productivity of English learning, including in specialized terminology.

METHODS

The study employed the following general and special scientific methods, the complex of which was designed to obtain objective and reliable results:

- systems analysis to establish the degree of the development of the research problem by Russian scholars,
- a pedagogical experiment was used in the implementation of the experimental study of English teaching using ChatGPT,

- a survey helped to determine the effectiveness of English learning using ChatGPT,
- synthesis enabled the systematization of research materials.

As part of the overview of research methods, we would like to note that ChatGPT is the basic model used for context-based text generation. It uses the Transformer architecture, which allows the model to understand context and generate responses that match the user's query. ChatGPT is trained on a large body of text data that includes a variety of content in English.

ChatGPT has powerful potential for English learning, helping to improve speaking skills, listening and reading comprehension, vocabulary, and accuracy.

We shall dwell on some aspects of the use of ChatGPT within the framework of the experiment.

ChatGPT combined with the Google Chrome extension "Talk to me!" is a simulator of English speech activities. As part of their practice sessions, students were asked to select the recognized language and the language of the interlocutor, e.g., American or British English, and the speaker's gender.

ChatGPT communication parameters were specified in the following format: "Communicate like a (*choice of specialty*). Communicate like a real person, not an AI. You have been working as a (*choice of specialty*) for three years. I will ask you questions about your job, and you will answer. My level of proficiency in English is B1".

During communication, the students asked the following questions:

- Why did you choose your profession?
- Could you tell me anything from your work experience?
- Could you give any advice to beginners? etc.

As part of grammar practice, the students were asked to instruct ChatGPT to correct grammar errors in their conversation (provided they had installed "Talk to me!") and writing (in chatbot format), explain the rules, and select grammar exercises to practice the topic in which the mistakes were made.

As part of vocabulary expansion, ChatGPT was provided with specialized terminology to be learned with instructions to create three situations for each word or phrase to be translated into English. After the translation, ChatGPT checked the answers for errors and provided feedback.

ChatGPT can regulate tone (degree of formality or informality) when generating texts to train skills in applying specialized terminology to appropriate professional situations.

The effectiveness of English learning using ChatGPT was assessed based on a survey. The students were proposed to use ChatGPT in their training. A total of 106 people agreed to participate in the experiment.

Using comparative analysis, experimental group students were surveyed twice over the year: before the start of the 2023 autumn semester before using ChatGPT and after 3 months of using it.

RESULTS

The survey results are presented in Table 1.

TABLE 1. Results of the survey on the effectiveness of English learning using ChatGPT

No.	Question	Before using ChatGPT (0-10), mean value	After using ChatGPT (0-10), mean value
1	How would you rate your speaking skills?	6.3	7.2
2	How would you rate your listening comprehension skills?	5.5	6.2
	How would you rate your grammar knowledge?	4.5	5.3
3	How would you rate your active vocabulary?	5.1	5.9
4	How would you rate your passive vocabulary?	6.5	6.7
5	How would you rate your knowledge of specialized terminology?	6.2	7.7

The survey results show an improvement in the effectiveness of English learning using ChatGPT ($t_{emp} = 4.8, p \leq 0.01$), including the highest results in the development of speaking and knowledge of specialized terminology.

We experimentally proved that a significant improvement in learning performance indicators was achieved by introducing ChatGPT as an additional teaching tool.

DISCUSSION

Summarizing the experiment, we note that the responses of ChatGPT as a communicative simulator were exhaustive and creative and had sufficient accuracy and lexical content with specialized terminology. Apart from opportunities to create an effective artificial language environment, this simulation of foreign language activity gives a degree of psychological comfort, since the student understands that they are dealing with software and thus can repeat the question several times before voicing it. Since the chatbot responds to coherent speech and perceives pauses as a signal to start responding, students develop the habit of speaking without pauses and stops, with the right rhythm and correct pronunciation. The gamification of the educational process using ChatGPT and the opportunity to personalize communication and choose the topic serve as additional factors encouraging students to develop their speaking skills.

Our results demonstrate that the introduction of AI to master specialized foreign-language terminology must focus on the following key components:

- 1) *Providing clear learning objectives.* Teachers need to formulate the goals of learning with the help of AI. These goals need to correspond to the general goals of the curriculum and emphasize the mastery of specialized terminology, which students will be able to improve using AI.

- 2) *Offering accessible and user-friendly AI tools.* AI tools used in learning specialized foreign-language terminology must be easily accessible and convenient. This can be achieved by offering clear instructions on how to access and operate AI tools. Instructors should consider providing tutorials on the operation and features of AI tools to help students use them effectively (Islamov, 2020).
- 3) *Providing the right prompts.* To maximize the effectiveness of AI tools for mastering specialized foreign-language terminology, students need to focus on the effectiveness of AI prompts. Educators can support students in structuring and refining the prompts based on their specific goals. This can be accomplished by guiding students to generate questions and prompts that meet their learning goals (Kotenko & Lutsenko, 2020).
- 4) *Providing immediate feedback and corrections.* A key advantage of AI tools is their ability to provide instant feedback and corrections. This feature should be used in the implementation of AI tools for learning specialized foreign-language terminology. Teachers should ensure that AI tools provide immediate feedback on the use of specialized vocabulary. This feedback should be clear and impactful, allowing students to identify the areas in need of improvement and make corrections.
- 5) *Encouraging personalization and autonomy.* It is important to encourage students to personalize their learning experience and provide for their autonomy. Students can pick topics or content that interest them and incorporate them into their practice of mastering specialized foreign-language terminology using AI. That is why the strategic implementation of AI tools has the potential to significantly improve the mastery of specialized foreign-language terminology among students in higher education institutions. By integrating AI into a special program for learning specialized foreign-language terminology, teachers can create a more engaging and interactive learning environment (Garkusha & Gorodova, 2023). Transparency in teaching and learning plays a decisive role in promoting students' awareness and understanding that they benefit from AI in learning specialized foreign-language terminology.
- 6) *Monitoring and assessment of progress using AI.* AI tools can provide valuable data and insight into the level of mastery of specialized foreign-language terminology, enabling targeted interventions and personalized support.

By clearly defining the learning objectives, making AI tools accessible and user-friendly, leading students to effective prompts, using immediate feedback and correction, and encouraging student personalization and autonomy, instructors foster an optimal environment for students to master specialized foreign-language terminology using AI (Kostiukovich, 2023). Educating students on the limitations and potential caveats of AI can help them develop critical thinking and make informed decisions about using AI-generated content.

By focusing on these key components and continually evaluating and refining the AI methodology based on student feedback and technological advances, higher education institutions can effectively provide their students with the knowledge of specialized foreign-language terminology required for educational and professional activities (Ling et al., 2023).

Considering our recommendations for improving the use of AI for mastering specialized foreign-language terminology and ways of their implementation in the educational process, it is crucial to emphasize the integral role of the teacher. As argued by P.V. Sysoev (2024), AI is transforming higher education. However, it cannot completely replace the teacher, mentor, supervisor, etc., be-

cause the learning process is multifaceted and does not boil down to completing the assigned tasks. Human interaction is irreplaceable and has numerous social objectives. This includes adaptation to a new learning environment, the formation and development of emotional intelligence, educational function, motivation, control, punishment and encouragement, the differentiation of learning, and an individualized approach. The educational process aims at shaping a harmonious, comprehensively developed personality with clear beliefs and values, not just knowledge, skills, and abilities to perform tasks.

CONCLUSIONS

Our findings lead us to conclude that the advantages of using ChatGPT in English learning include broader access to authentic materials, optimization of spoken communication training, the development of special terminology vocabulary and accuracy, the improvement of writing skills, and the individualization of learning. ChatGPT is thus seen as an effective innovative tool for English learners.

It is important to emphasize the need to integrate AI tools into educational programs and provide training and ongoing support to students. Higher education institutions should introduce students to the capabilities of AI tools, teach them how to use them effectively, and help them critically evaluate results. Continuous support from faculty is important to ensure that students feel confident and can get the most out of AI.

The use of AI to master specialized foreign-language terminology in higher education institutions is a complex process that requires careful attention to various factors, such as the choice of AI tools, their integration into the curriculum, ongoing faculty support, monitoring of progress, and facilitation of collaboration and interaction. Following these steps, teachers can effectively use the potential of AI to improve foreign language learning and ensure students' mastery of specialized foreign-language terminology.

Further prospects for the research and development of this direction of inquiry can be seen in the expansion of the range of AI applications in the academic environment.

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