
THEORETICAL AND PRACTICAL ASPECTS OF NEURAL NETWORK TECHNOLOGIES IN FOREIGN LANGUAGE EDUCATION WITH FUTURE IMPLICATIONS

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INTRODUCTION

The integration of artificial intelligence (AI), particularly neural networks, into the process of foreign language acquisition is a rapidly growing area within contemporary educational research. This trend is largely influenced by the widespread digitalization of educational practices, a trend accelerated by the global growth of distance learning and the increasing focus on customizing educational processes. According to the 2023 report from the International Society for Technology in Education, more than 70% of educational institutions worldwide have incorporated various forms of AI into their systems curricula, with foreign language instruction being among the most demanding areas¹. Neural networks, capable of deep learning and recognizing complex patterns, make it possible to personalize language instruction to the individual needs of learners, helping to overcome traditional challenges such as the one-size-fits-all approach and limited opportunities for speaking practice.

1. The problem's prerequisites emergence and the problem's formulation

As noted above, the demand for foreign language proficiency has reached an unprecedented level, a direct consequence of globalization, the expansion of international business, and the growing need for intercultural communication. A 2024 study by the Modern Languages Association revealed that language skills rank among the top five most in-demand competencies in the global labor market². However, traditional methods of language instruction often struggle

¹ International Society for Technology in Education. Report on the state of educational technologies. 2023. URL: <https://www.unesco.org/gem-report/en/publication/technology>

² Modern Language Association. (2024). Skills for the future: Global trends in the labor market. URL: <https://www.mla.org/report2024>

to keep pace with these demands, particularly when it comes to providing real-time feedback and creating adaptive learning paths. Neural networks are well-positioned to bridge this gap by delivering instant, data-driven analytical insights into learner performance, thereby enhancing both the efficiency and effectiveness of language instruction. For instance, such technologies can analyze pronunciation in real time, offer personalized exercises, and adjust task complexity based on the learner's proficiency level³.

2. The analysis of existing methods for solving the problem and formulating a task for the optimal technique development

Furthermore, the COVID-19 pandemic served as a powerful catalyst for the transition toward digital and hybrid learning models, underscoring the urgent need for innovative solutions capable of sustaining language education under diverse conditions. Neural network-based tools, such as AI tutors and speech recognition systems, have demonstrated significant potential in increasing learner engagement and improving learning outcomes, even in fully remote environments⁴. For example, a 2023 pilot program at the University of Tokyo revealed that students using an AI-powered language learning platform improved their conversational skills 30% faster than those studying in traditional classroom settings. This provides compelling evidence that, in the context of ongoing educational digitalization, neural networks are emerging not merely as an enhancement but as an essential instrument for meeting contemporary educational needs.

In this context, the study of neural networks in foreign language education is not merely timely but essential. It responds to both the immediate demands of the digital learning environment and the long-term objective of preparing linguistically competent global citizens. The purpose of this paper is to explore the potential of neural networks in language education and to develop practical strategies for their implementation aimed at enhancing the accessibility, inclusivity, and overall effectiveness of language learning.

Contemporary research in the field of foreign language instruction supported by neural network technologies demonstrates a qualitative shift in both theoretical frameworks and practical applications. Over the past three years, there has been a sharp increase in the number of publications devoted to the integration of artificial intelligence and neural network models—primarily large language models (LLM), automatic speech

³ Hwang G. J., Fu Q. K. Applications of artificial intelligence in language learning: A review of research from 2000 to 2019. *Educational Technology & Society*. 2023. Vol. 23, no. 3. P. 1–17.

⁴ International Society for Technology in Education. (2023). Report on the state of educational technologies. URL: <https://www.iste.org/report2023>

recognition (ASR), and neural machine translation (NMT)—into language education systems. An analysis of more than 50 English-language studies indicates that the most extensively explored areas include the development of speaking and writing skills, automated feedback, learner motivation and self-regulation, as well as the methodological and ethical dimensions of technology integration.

One of the central vectors is the use of neural network chatbots and voice agents (in particular, based on GPT models) for the development of oral speech and communicative competence. The papers by Liu et al. (2024), AlTwijri et al. (2024), Chen & Liu (2024) demonstrated that AI-assisted interaction not only improves fluency and pronunciation, but also reduces anxiety, increases willingness to communicate (WTC), and overall engagement in language practice. At the same time, the emotional design of systems (including realistic avatars and voice interfaces) has an additional impact on the affective factors of learning. These results underscore the importance of considering interface and emotional variables when developing neural network solutions for language learning.

Meanwhile, automatic assessment and feedback in written language are actively developing, with neural network tools—from Grammarly to ChatGPT—being used in both formative and summative assessment. Research by Kim & Lee (2024), Mendoza-Denton et al. (2023), Han et al. (2023, 2024) confirm that such systems significantly improve the accuracy, fluency, and structure of written work. Particular attention is paid to prompt engineering – the skills of creating and refining queries to LLM, which are becoming a new literacy of the 21st century. The use of platforms such as RECIPE and ChEDDAR demonstrates a high degree of student engagement and the development of their creative and metacognitive thinking. For countries with limited resources, this opens up vast opportunities for scaling written assignments with minimal burden on the teacher.

A distinct body of research focuses on motivation, learner engagement, and self-regulated learning (SRL), where neural network technologies are viewed as catalysts for autonomous learning. Systematic reviews (Chang & Sun, 2024; Alhusaiyan, 2024) and empirical studies (Wei, 2023; Qiao & Zhao, 2023) indicate that AI integration enhances learners' control over their educational process, stimulates cognitive interest, and enables the adaptation of learning strategies to individual needs. These findings are particularly relevant in hybrid and distance learning environments, where the role of facilitator increasingly shifts from the instructor to the intelligent system.

Neural machine translators (NMT), including DeepL, Google Translate, and NLLB, are considered tools for improving the quality of written

and reference materials. The works of Klimova & Polakova (2022), Lo (2023), Mao & Liu (2024) confirm that their use contributes to improving vocabulary, understanding context, and developing self-correction strategies. At the same time, the importance of educational support is emphasized, as automated translations can reinforce errors in the absence of critical analysis.

Equally significant are the issues of ethics, privacy, and pedagogical design, particularly within educational systems undergoing transformational challenges—such as Ukraine’s. Reviews by Gonzalez & Hoffmann (2024) and Mejia-Camacho & Gomez (2023) provide a theoretical and methodological foundation for the safe and productive integration of AI. In particular, the “Privacy by Design” model and the SMART-ELT framework emphasize adherence to principles of transparency, data security, and maintaining a balance between automation and human facilitation.

In the Ukrainian context, as shown by research by Chukhno (2024), Yunina (2023), Rudnik & Grinchenko (2024), there has been a modest but steady growth in interest in generative and conversational AI tools. Projects such as Interlocutor and Promova, developed at the national level, confirm the possibility of adapting neural network technologies to local cultural and educational realities. Nevertheless, challenges remain, ranging from a lack of digital literacy to the risks of dependence on AI and loss of authenticity in the learning process. This is why systematic approaches to training both students and teachers in working with neural network systems are so important.

Although the potential of neural networks in education is widely recognized, their specific application in foreign language teaching remains an area requiring significant development and in-depth research. Existing works, such as Murad's study (2025), have laid an important fundamental basis by exploring the general principles of neural networks in language learning. Murad emphasized how recurrent neural networks (RNNs) can effectively model language sequences, potentially helping in the teaching of grammar and syntax⁵. Similarly, Zhao and Li (2019) explored the use of convolutional neural networks (CNN) for processing audio inputs in pronunciation training, showing moderate success in improving student accuracy⁶.

However, these studies, while undoubtedly valuable, tend to focus on specific aspects of language learning or particular neural network architectures.

⁵ Murad A. Using neural network principles for learning the English language. *Eurasian Science Review*. 2025. Vol. 1, no. 3. P. 2262–2274. DOI: 10.63034/esr-380.

⁶ Zhao Y., Li S. Deep learning for speech pronunciation assessment: A review. *Speech Communication*. 2019. Vol. 111. P. 1–15..

For example, Dzyubata's (2024) study on the use of transformer models for generating language exercises showed promising results but did not consider how these tools could be integrated into a comprehensive curriculum⁷. Moreover, much of the current literature is either too technical, aimed at AI specialists, or overly general, lacking specific practical recommendations for teachers. This creates a significant gap between theoretical developments and their real-world application in the classroom.

There is also a notable gap in research concerning the pedagogical implications of integrating neural networks. A limited number of studies have examined how these technologies affect the teacher's role, classroom dynamics, or student motivation. For example, questions remain open as to how AI might reshape teacher–student interaction or influence learners' own perceptions of the educational process⁸. Moreover, ethical considerations—such as data privacy and potential algorithmic bias—have received only limited attention in the context of language education, despite their critical importance in the age of big data and the pervasive use of technology.

An analysis of recent publications shows that neural network technologies are not simply being integrated into language education systems – they are transforming their fundamental foundations, moving from an auxiliary function to the role of a full-fledged cognitive and didactic partner (see Table 1). This requires a rethinking of the role of the teacher, the structure of educational programs, and the strategy for developing students' digital skills. For Ukraine, this means not simply borrowing technologies, but the need to form its own ethical and methodological framework based on global experience and local needs.

The focus of new approaches is on moving away from universalism and toward context-oriented strategies that emphasize flexibility, personalization, and interaction with technology. The post-methodological paradigm, which is replacing the rigid methods of the past, affirms the priority of the teacher as a critical mediator between the learner and knowledge (Kumaravadivelu, 2006). Language teaching in the 21st century is no longer conceivable outside the digital environment, which has radically changed the forms of presentation, methods of communication, and types of learning activities. AI-based language learning, which is enhanced by artificial intelligence, is developing particularly rapidly.

⁷ Dziubata Z. Application of artificial intelligence in teaching ESL and ESP. *Pedagogical Discourse*. 2022. Vol. 15, no. 1. P. 1199–1210. URL: <https://ojs.kgpa.km.ua/index.php/peddiscourse/article/view/1199>

⁸ Lai C., Yeung Y. Y. The role of artificial intelligence in language learning: A pedagogical perspective. *Journal of Computer Assisted Learning*. 2021. Vol. 37, no. 1. P. 22–35.

Table 1

Analytical Report on the Use of Artificial Intelligence in Foreign Language Teaching (Based on 50 Publications)

GENERAL RESEARCH TOPICS		
Research Focus	Number of Studies	Key Directions & Findings
AI tutors and chatbots	9	Improve speaking skills, simplify role-playing scenarios, and boost learner confidence.
Automated writing assessment	8	Tools like Grammarly, ChatGPT, and E-rater enhance noticing skills and complement teacher-led evaluation.
NMT (Neural Machine Translation)	11	Platforms such as DeepL, Google Translate, and NLLB support academic summarizing, paraphrasing, and vocabulary retention.
Student motivation & engagement	7	AI support reduces anxiety, fosters self-assessment, and provides timely feedback.
AR/VR/virtual environments	6	Mixed-reality tools aid in preparing presentations, meetings, and dialogues.
Low-resource languages & ethics	5	Use of NLLB technologies while respecting cultural identity and student rights.

Numerous studies confirm that digital transformation has not only facilitated access to educational materials, but has also changed the very structure of learning. The use of Web 2.0 platforms, learning management systems (Moodle, Canvas), and mobile applications for language practice (Duolingo, Babbel) contributes to the formation of ecosystems in which the learner becomes an active subject rather than a passive recipient of information (Godwin-Jones, 2020). Mobile-assisted language learning (MALL) and data-driven learning allow students to build their own trajectories by analyzing language patterns and real language data (Boulton & Cobb, 2017). However, it is the integration of AI that has opened up qualitatively different opportunities for language teaching.

Intelligent CALL systems, chatbots, automatic assessment of written work, generation of dialogues and adaptive tasks based on analysis of the student's language profile – all these are examples of AIALL (Artificial Intelligence-Assisted Language Learning), a rapidly developing field (Li, Link, & Hegelheimer, 2022). Leading platforms such as Duolingo and ELSA Speak use neural network models to analyze pronunciation, rhythm, and error frequency and offer personalized tips. Moreover, with the advent of large language models (LLMs) such as ChatGPT, it is now possible to engage in immediate dialogue with an artificial interlocutor who can answer questions, offer explanations of grammatical phenomena, edit texts, and even simulate real-life situations (Lee, 2023). These results are shown in the Table 2.

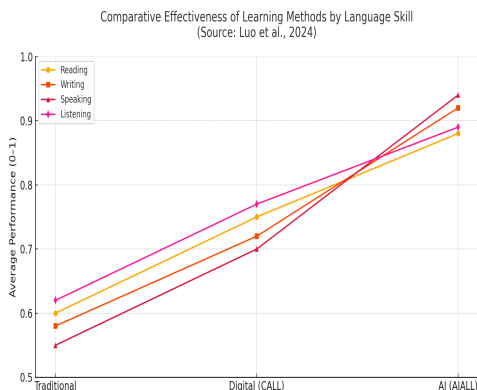


Fig. 1. Comparative effectiveness of language learning methods by type of speech activity

Empirical data confirms the high effectiveness of AI integration. A meta-analysis by Luo et al. (2024) shows that the use of AI tools leads to a significant improvement in all four language skills, especially writing and speaking. The SMD (standardized mean difference) in the samples exceeds 0.95, which is considered a large effect according to Cohen's criteria as depicted in Figure. 1. At the same time, researchers emphasize the need for pedagogical support: the use of AI without teacher involvement reduces the level of critical thinking and can reinforce mechanical repetition without deep understanding (Shadiev & Yang, 2023).

Table 2

Comparison of Traditional, Digital, and AI-Enhanced Approaches in Language Learning

Characteristic	Traditional Approach	Digital (CALL, MALL)	AI-Enhanced (ICALL, ChatGPT)
Personalization	Low	Medium	High
Feedback	Delayed, from instructor	Fast, templated	Instant, adaptive
Student Role	Passive participant	Active user	Co-creator, explorer
Content Adaptability	Limited	Medium	High (based on profile)
Grammar Effectiveness	Medium	Medium	High (automated checking)

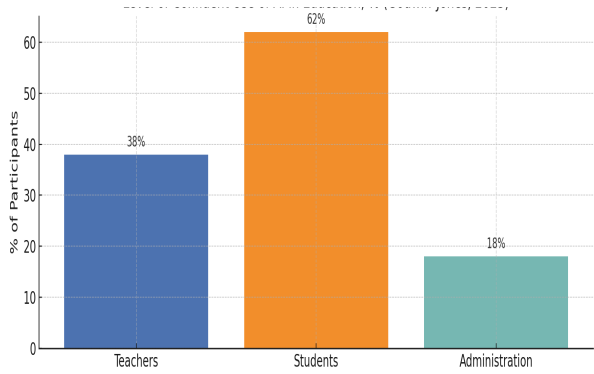
Despite the obvious advantages, it is important to consider the limitations and risks. First, artificial intelligence does not convey sociocultural context

and, therefore, is unable to fully convey the pragmatic and cultural nuances of communication (Tafazoli et al., 2023). Second, there is a risk of “hallucinations” – the generation of false or unverified statements, which is particularly critical in advanced learning. In addition, there is growing concern about academic integrity: students may use ChatGPT to automatically write essays without developing their own skills (OECD, 2023).

Effective integration of AI requires appropriate training for teachers. A study by Godwin-Jones (2023) showed that only 38% of foreign language teachers are confident in using AI tools in their teaching practice, and less than 25% are able to critically evaluate their work (see Figure 2). This points to the need to rethink professional development models, in which digital pedagogy and critical thinking take center stage.

The diagram presented, illustrating data from the Godwin-Jones (2023) study, reveals the distribution of confidence levels in the use of artificial intelligence (AI) among key stakeholders in the education sector. This analysis reveals significant differences in perceptions and readiness to integrate AI into academic practice.

The student community shows a high level of confidence in using AI tools (over 60%) in an educational setting, while the teaching staff has a more cautious view of these technologies. According to empirical data, about 38% of teachers are confident in using AI in their professional activities. Although this figure cannot be considered insignificant, it is significantly lower than the level of confidence among students. Such a gap may indicate the existence of institutional and methodological barriers that hinder the wider implementation of AI in teaching practice.



**Fig. 2. Level of confidence in using AI in education, %
(according to Godwin-Jones, 2023)**

Among the potential reasons are limited access to adapted teaching materials, a lack of sufficient examples of successful AI integration into the learning process, and a shortage of comprehensive professional development programs specifically focused on the digital transformation of teaching. These circumstances underscore the need to rethink approaches to teacher professional development and to revise institutional strategies to support innovative teaching practices. Increasing the level of digital confidence among faculty members is a key condition for the successful integration of AI into the structure of academic interaction.

The least confident attitude toward the use of AI is observed among administrative staff—less than 20% of respondents in this group demonstrated a readiness for the systematic application of digital intelligent technologies. This trend may be due to several interrelated factors. First, unlike students and teachers, administrative staff are less often involved in the direct application of AI in educational scenarios. Second, there is often a lack of strategic vision regarding the role of AI in institutional management, which leads to low motivation to master the relevant tools. Third, the absence of institutionalized policies and clearly defined mechanisms for the digitalization of administrative processes hinders the meaningful integration of AI at the management decision-making level.

It is this category of employees that requires special attention when formulating educational and organizational policies in the field of digital transformation. The development of specialized programs in digital leadership aimed at building competencies in the strategic application of AI, as well as the creation of a regulatory and organizational framework for its use in management, appears to be a critically important task.

A key aspect of successful AI integration is explainability—the ability of systems to provide clear and transparent explanations for their recommendations. Many generative AI models operate on a “black box” principle, which contradicts the pedagogical values of transparency and collaborative knowledge construction (Selwyn et al., 2023). Explainability allows teachers and learners to trust AI tools and use them effectively in educational practice. Only technologies that ensure transparency in decision-making can be organically integrated into learning, maintaining trust and promoting collaborative knowledge creation as depicted in Figure. 3.

The modern educational paradigm, shaped by digitalization and the introduction of intelligent systems, is transforming the traditional roles of participants in the learning process, methodological approaches, tools used, and conceptual trends. The presented structure of artificial intelligence (AI) integration into foreign language teaching covers four key components: learning

subjects (teacher and learner), tools, methodological challenges, and promising areas of development as depicted in Figure. 4.

Thus, artificial intelligence is an effective tool in the arsenal of a modern language teacher, but its effectiveness depends on the correct pedagogical approach, critical thinking, and compliance with ethical standards. AI does not replace the teacher, but complements them, opening up new forms of interaction and analysis, but requires conscious integration into educational practice. The transition to hybrid models, where technology and humans act synergistically, is today a key vector for the development of language education.

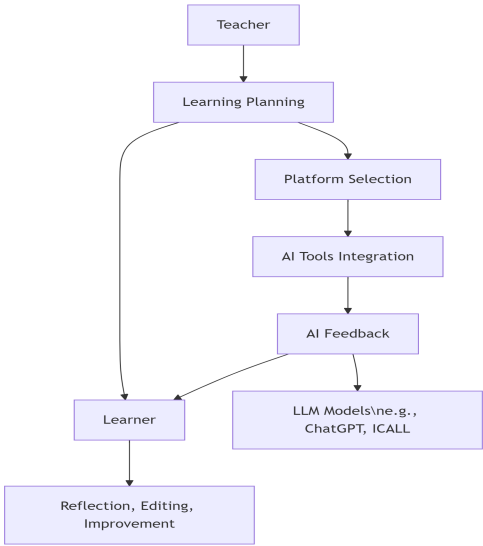


Fig. 3. Ecosystem of AI integration in language education

The experimental part of the study includes a description of the methodology, characteristics of the participants, assessment tools, and the results obtained, which together allow us to verify the hypothetical advantages of AI. The key objective of this study was to identify the impact of AI assistant integration on the development of students' language skills. Particular attention was paid to academic writing, lexical and grammatical competence, as well as the perception of foreign speech in listening and writing. During the experimental work, students' attitudes toward working with neural networks, their level of motivation to study, and the influence of technology on their independence and creative thinking were also studied.

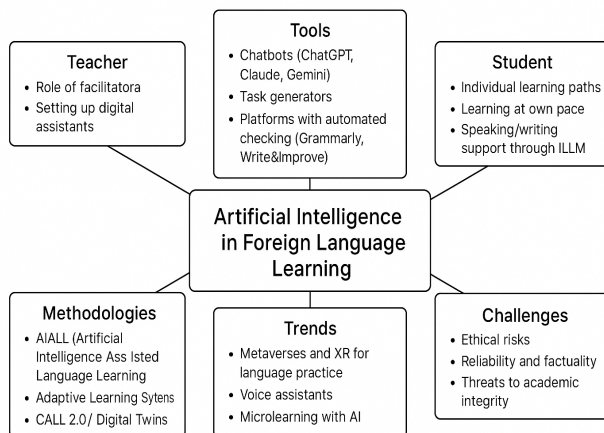


Fig. 4. Structure of artificial intelligence (AI) integration in foreign language teaching

The experiment was conducted in the context of the natural educational process, without artificially simplifying or complicating factors, within the framework of a professionally oriented course in the field of law.

Students from two parallel study groups studying English as a professionally oriented course participated in the study. The division into control and experimental groups was based on language proficiency (B1 according to CEFR), the curriculum, and basic motivation. This ensured the comparability of the initial conditions.

The control group studied in the traditional format, using standard textbooks, audio and video materials, written exercises, and frontal teaching. The experimental group, on the other hand, had access to an AI assistant—a digital assistant based on neural network architecture capable of generating texts, correcting errors, simulating dialogues, explaining grammatical structures, and creating personalized exercises. These results are shown in the Table 3.

Table 3

Comparative parameters of study participants

Parameter	Control group	Experimental group
Number of students	64	68
Average age	20.4 years	20,7 years
Field of study	Law	Law
Language level (CEFR)	B1	B1
Duration of study	1 semester (16 weeks)	1 semester (16 weeks)

The control and experimental groups worked on the same curriculum, with the only difference being the nature of the digital support. All classes were conducted by teachers who used the same methodological approaches, which eliminated pedagogical variability as a variable.

The effectiveness of using neural network solutions was assessed through comprehensive diagnostic measures, including entrance and exit tests, analysis of written work, listening and reading results, and student questionnaires. This approach made it possible to take into account both quantitative indicators and qualitative characteristics of changes in educational activities as depicted in Figure. 5.

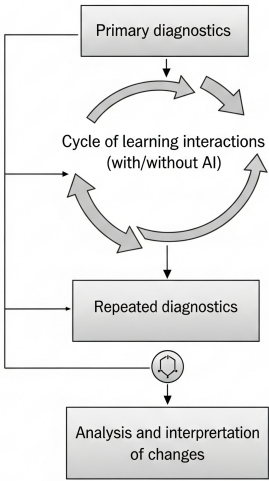


Fig. 5. Logic diagram of the experimental study

The following indicators were considered as criteria for the effectiveness of teaching: improvement in lexical and grammatical competence, improvement in the structure of academic writing, successful perception of educational information, and subjective satisfaction of students with the learning process.

The level of mastery of grammatical structures and active vocabulary was assessed using an adapted version of a standardized test based on the APTIS format. The results showed that the control group's score increased by 9.4%, while the experimental group's score increased by 18.7%, which is almost twice as high. These results are shown in the Table.4.

Table 4

Changes in Grammatical and Lexical Test Scores

Group	Average Score Before	Average Score After	Increase (%)
Control	64,3	70,3	+9,4%
Experimental	65,1	77,3	+18,7%

The work of students in the experimental group showed an increase in the variety of structures used, a decrease in the number of spelling and punctuation errors, and improved agreement of tenses and articles. These changes are particularly noticeable in written assignments, where the AI assistant acted as a proofreader and generator of alternative formulations.

One of the most significant effects was an improvement in academic writing. Students interacting with neural network solutions demonstrated greater structure in their arguments, improved logical presentation of texts, and a higher level of stylistic adequacy. The GPT model offered frames, templates, and ready-made fragments that students could adapt to their needs. This contributed to more confident writing of essays, abstracts, and analytical reviews as depicted in Figure. 6.

Content analysis of written work revealed an expansion of thematic vocabulary, which is particularly important in the context of professionally oriented education.

The assessment of receptive skills also showed positive dynamics in the experimental group. Students who regularly interacted with the AI assistant performed better on listening and reading tasks, especially in a professional context. The use of AI made it possible to simulate complex audio situations, create adaptive tasks, and select explanations for unfamiliar words and expressions.

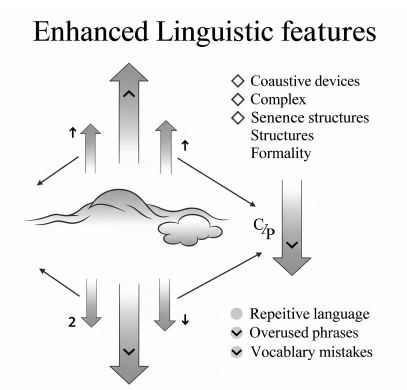


Fig. 6. Typical improvements in written work in the experimental group

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Table 5

Successful completion of receptive tasks (Reading & Listening)			
Group	Average Result (%)	After	Increase
Control	62,1	68,4	+6,3%
Experimental	63,8	74,7	+10,9%

This result indicates that the neural network tool not only compensates for gaps, but also promotes autonomous learning by activating cognitive mechanisms for context recognition and information decoding.

An equally important component of the study was the assessment of students' subjective impressions of using the AI tool. Most participants in the experimental group expressed satisfaction with the quality of interaction and positively assessed the possibilities for individualizing learning. However, among the respondents, there was also a group of students who were concerned that excessive use of neural networks could reduce creativity and the ability to formulate thoughts independently as depicted in Figure. 7.

Thus, neural network solutions are perceived by students primarily as a supporting tool rather than a replacement tool, which is generally consistent with the principles of digital humanities in education.

A comprehensive analysis of theoretical foundations, practical applications, and empirical data obtained allows us to speak with a high degree of confidence about the positive impact of neural network solutions on the effectiveness of foreign language teaching at universities. The analysis confirms that the use of artificial intelligence in foreign language teaching contributes to improving the effectiveness of material assimilation, personalizing educational trajectories, and developing student motivation. AI can act as a tutor, editor, simulator, and interpreter, significantly enhancing both the cognitive and motivational components of learning.

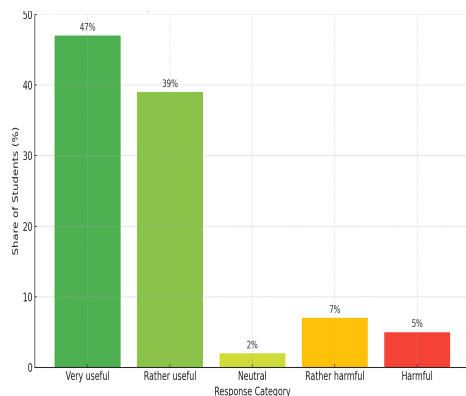


Fig. 7. Subjective Evaluation of AI Assistant Usefulness

At the same time, certain limitations have been identified, related to the need to adapt pedagogical approaches, ensure the accessibility of technologies, and address ethical issues such as data protection and preventing excessive dependence on AI. It is expected that in the coming years, AI will be further integrated into educational platforms, enabling the creation of more complex adaptive learning systems capable of taking into account the individual cognitive characteristics of students. The development of natural language processing (NLP) technologies and generative models, such as large language models, is likely to lead to the creation of virtual tutors capable of providing full-fledged interaction at the level of human communication. In addition, the use of multimodal approaches, including the analysis of audio, video, and text data, is expected to grow in order to create comprehensive educational environments. Another important area will be the development of systems focused on intercultural learning and multilingual support, which is particularly relevant in the context of globalization. However, realizing these opportunities will require solving a number of technical and organizational challenges, including increasing the accessibility of AI tools for educational institutions with limited resources and developing standards for their implementation. An important task remains the pedagogical regulation of AI use, the development of digital literacy among teachers, and the development of ethical and methodological standards for its application. The experiment demonstrated the high effectiveness of neural network integration, but at the same time emphasized the need to develop a critical attitude toward the information received and to preserve the autonomy of the learner's thinking. In the long term, it is particularly important to study the long-term consequences of introducing AI into the educational

environment, including the development of critical thinking, communication strategies, and professional language identity. In addition, further steps should be aimed at creating blended learning models in which the role of AI will be organically integrated into the pedagogical ecosystem.

Based on the analysis, the following recommendations are proposed for teachers, educational program developers, and researchers:

1. Integration of AI into teaching practice. Teachers should actively use AI tools to create personalized assignments and feedback, while maintaining a balance between technological and traditional teaching methods.

2. Professional training. It is necessary to organize professional development programs for teachers aimed at mastering the skills of working with neural network technologies.

3. Ethical aspects. Developers of educational platforms are advised to implement transparent data protection mechanisms and inform users about the principles of AI systems.

4. Research activities. Further research should focus on studying the long-term effects of AI use in foreign language teaching, including an analysis of its impact on cognitive and sociocultural aspects.

CONCLUSIONS

Neural network technologies open up new horizons for foreign language learning, providing flexibility, interactivity, and adaptability in the educational process. However, their successful implementation requires a comprehensive approach that includes both technological and pedagogical innovations. The further development of neural network technologies in education will depend on the ability of the academic community to adapt to new challenges while maintaining a focus on humanistic values and the individual needs of learners. This study is intended to serve as a starting point for further developments and discussions in this rapidly evolving field.

SUMMARY

This research presents a comprehensive examination of the integration of neural network technologies within foreign language education, arguing for their transformative potential while acknowledging the attendant pedagogical and ethical complexities. The author posits that the convergence of globalization, digitalization, and the limitations of traditional instructional methods has created a critical need for adaptive, personalized learning solutions. Neural networks, with their capacity for deep learning and complex pattern recognition, are positioned as powerful tools to meet this need by facilitating real-time, data-driven feedback, curating personalized exercise

regimens, and dynamically adjusting task difficulty to align with individual learner proficiency.

A systematic analysis of extant literature indicates that applications such as AI-driven tutors and chatbots, automated writing evaluation systems, and neural machine translation platforms significantly enhance speaking fluency, writing accuracy, and learner motivation and autonomy. Crucially, the research underscores that these technologies serve not merely as instructional aids but as catalysts for a pedagogical shift, redefining the educator's role from a knowledge deliverer to a facilitator of learning and a critical mediator between the student and the technology.

The research further substantiates its claims with empirical evidence from a controlled experiment involving law students. The experimental group, utilizing a neural network-based assistant, demonstrated markedly superior gains in grammatical and lexical competence, academic writing structure, and receptive skills compared to the control group. Student feedback revealed nuanced concerns regarding the potential stifling of creative and independent thought, highlighting the indispensable role of the teacher in guiding critical engagement with AI-generated content.

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