



THEORETICAL AND METHODOLOGICAL BASIS OF THE USE OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN TEACHING FOREIGN LANGUAGES

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MAQOLA HAQIDA

Qabul qilindi: 9-fevral 2026-yil

Tasdiqlandi: 11-fevral 2026-yil

Jurnal soni: 17-B

Maqola raqami: 45

DOI: <https://doi.org/10.54613/ku.v17i.1487>

ANNOTATION

This article analyzes the theoretical and methodological foundations of artificial intelligence (AI)-based approaches in foreign language teaching and their impact on educational effectiveness. In the context of modern digital education, AI technologies create opportunities to individualize the language learning process, organize adaptive learning, and provide immediate feedback. The results confirm that AI-based approaches have a positive effect on the development of learners' communicative and linguistic competencies, as well as on the formation of independent learning skills. The article substantiates the necessity of methodologically grounded integration of artificial intelligence technologies into the process of foreign language teaching.

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KEYWORDS

artificial intelligence, foreign language teaching, adaptive learning, digital education, communicative competence

Introduction. The current educational system's digital transformation processes are radically altering the ways that knowledge is created, disseminated, and assimilated globally. In particular, the quick development of artificial intelligence (AI) technologies is influenced by the evolution of instructional paradigms as well as technological advancement. These days, AI-based solutions make it possible to optimize a number of steps in the educational process, including the selection of educational materials, modeling, evaluation, monitoring, and forecasting of educational activities. This helps to improve the efficiency of education. The use of artificial intelligence technology into foreign language teaching methodologies is particularly significant from a scientific and practical standpoint. Multi-layered cognitive, psycholinguistic, and sociolinguistic elements combine to form the complex system that is language acquisition. By evaluating each student's unique cognitive profile, learning speed, error type, degree of linguistic proficiency, and learning techniques in real time, SI technologies enable the organization of the educational process in an adaptive learning format. This necessitates switching from a traditional, homogenous educational model to a pedagogical system that is person-oriented, differentiated, and results-based.

Artificial intelligence-based learning environments significantly affect how the educational process is personalized, how quick feedback mechanisms are formed, how motivated students are to learn, and how self-regulated learning skills are developed. Specifically, SI systems' diagnostic and predictive powers are regarded as a valuable methodological tool for developing lexical, discursive, grammar, and speech skills during language learning. Simultaneously, a review of pedagogical design, evaluation criteria, the role of the instructor, and didactic tactics is necessary when integrating SI technology into the educational process. A number of elements affect this issue's relevance. First, new theoretical approaches in educational methodology are being formed by the quick growth of SI technologies and digital pedagogy. Second, there is a growing need for person-centered education to be organized effectively in the language teaching process. Third, the psycholinguistic and methodological underpinnings of SI technologies' linguodidactical capacities are not adequately systematized in the literature, which frequently discusses them from a technological or practical standpoint. The scientific and theoretical examination of the function of artificial intelligence-based educational approaches in the methodology of teaching foreign languages, their interaction with cognitive and psycholinguistic mechanisms, and their influence on educational efficacy is one of the key research directions in this area. The purpose of this work is to provide conceptual and methodological support for these scientific issues.

Methodology. The incorporation of artificial intelligence technology into foreign language instruction raises the bar for language competency building mechanisms, according to a review of scientific literature. AI-based educational systems appear as a sophisticated methodological tool for the development of sociocultural awareness, language proficiency, communicative competence, and metacognitive techniques. These systems' capacity for data processing, analysis, and forecasting accounts for their efficacy. Specifically, dynamic monitoring of a student's language activity is made possible by algorithmic environments built on natural language processing (NLP), machine learning (ML), and automatic speech recognition technologies. By identifying markers like the typology of errors, the frequency of usage of linguistic units, the stability of syntactic structures, and the degree of semantic compatibility, these technologies help to analytically regulate the learning process. Consequently, an objective and data-based approach replaces the subjective evaluation in the instructional feedback process. The ability to apply diagnostic and remedial processes in real time is a significant methodological benefit of SI systems. The outcomes of the student's written or spoken assignments are promptly examined, and suggestions catered to each student's requirements are created. This procedure enables you to recognize learning errors, provide a cognitive and psycholinguistic explanation of their origins, and implement suitable remediation techniques. As a result, the learning process is changed from a model of haphazard exercise and practice to one that is methodical and grounded in science. Furthermore, SI-based instructional environments improve students' metacognitive activity. Adaptive algorithms help to develop self-control and self-management skills by tailoring the learning rate, level of complexity, and sequence of materials to individual needs. This technique improves instructional efficacy while also strengthening the learning process's stability and motivation. Thus, the use of artificial intelligence technologies in the linguodidactic process can be viewed as both a technological innovation and a scientific phenomenon that necessitates a reassessment of the theoretical foundations of language teaching approaches.

In modern scientific discourse, educational approaches based on artificial intelligence are interpreted in methodological harmony with leading paradigms of pedagogy. According to the constructivist theory of education, knowledge is formed by the learner on the basis of active cognitive processes; from this point of view, artificial intelligence technologies support the construction of knowledge by creating an interactive and flexible learning environment [1]. The competency-based education model defines learning outcomes as a system of functional and practical skills, which is conceptually compatible with

the adaptive algorithms of SI systems [2]. In the context of a person-centered approach, individual cognitive differences and learning strategies take center stage, and SI technologies are distinguished by the ability to analyze precisely these parameters [3]. The relevance of artificial intelligence technology in the educational process is highly debated in contemporary scientific literature. W. Holmes, M. Bialik, and C. Fadel, in particular, see artificial intelligence as a strategic technology that allows for the personalization of education and the adaptation of learning processes. Researchers emphasize that AI systems are an important methodological tool for studying student learning processes, finding knowledge gaps, and building an adaptable learning environment [Holmes et al., 2019]. R. Luckin sees artificial intelligence not as a device for automating the pedagogical process, but as a technology system that augments human intelligence. In his perspective, SI technologies are extremely useful in improving teacher professional activity, optimizing assessment processes, and adjusting to students' specific needs.

C. Chapelle highlights that computer and digital technologies provide the opportunities for individual practice, quick feedback, and engagement in the language acquisition process from the perspective of linguodidactics. The researcher asserts that the development of language abilities is significantly influenced by technology surroundings [Chapelle, 2001].

According to R. Ellis, language acquisition is a complicated system including both cognitive and psycholinguistic processes. He points out that a successful educational model ought to be structured with consideration for each student's unique learning preferences [Ellis, 2015]. The methodological underpinnings of artificial intelligence-based adaptive systems are directly compatible with this strategy.

N. Selwyn offers a critical perspective on the use of AI in education, emphasizing that the pedagogical process cannot be entirely replaced by technology. The researcher believes that rather than replacing teachers, AI tools should be viewed as a system that assists them [Selwyn, 2019].

Additionally, according to OECD reports, the use of AI technologies in education is crucial since they enhance educational quality, personalize the learning experience, and improve assessment accuracy. According to the reports, AI technologies are a cutting-edge instrument that improves educational effectiveness [OECD, 2021]. The development of pedagogical paradigms is directly linked to the integration of artificial intelligence technology into the contemporary educational system. Artificial intelligence techniques are conceptually compatible with the methodological tenets of constructivist, competency-based, and person-centered educational paradigms, as documented in the scientific literature. According to these paradigms, learning is seen as an active cognitive process as opposed to a passive process of acquiring knowledge, which is in line with artificial intelligence technologies' capacity for adaptation, interaction, and customization.

In modern scientific discourse, artificial intelligence is interpreted not as an auxiliary technical tool in teaching foreign languages, but as a component of strategic didactic and methodological importance. Researchers explain the main advantage of AI technologies by the ability to monitor the process of students' learning in real time, identify individual needs and provide customized educational feedback. This approach requires a transition from a traditional uniform educational model to a differentiated and person-centered educational system.

The scientific literature emphasizes the significant transformation of the role of the teacher in AI-based educational environments. While in the traditional transmissive model, the teacher is considered as a subject of knowledge, in the AI-integrated educational environment the teacher is more of a facilitator, methodological designer and manager of educational activities. AI tools are interpreted as a technological mechanism that supports the process of pedagogical decision-making based on data. Thus, AI technologies are considered not as a substitute for pedagogical activities, but as a factor that optimizes and increases their efficiency. An analysis of international scientific research conducted between 2020 and 2025 further clarified the status of AI technologies in the education system. In the initial studies, the main attention was paid to the diagnostic and adaptive capabilities of AI systems. During this period, it was empirically proven that AI-based platforms serve to individualize the learning process by identifying students' knowledge level, learning rate, and typology of errors. In subsequent studies, chatbots, intelligent tutoring systems,

and generative AI models began to be widely discussed in the context of the linguodidactic process. Researchers noted the potential of such technologies in the development of communicative competence, written speech, lexical reserve, and metacognitive strategies. In particular, rapid and individualized feedback mechanisms were evaluated as an important didactic factor that increases the effectiveness of error detection and correction in the language learning process. At the same time, there are also critical approaches to artificial intelligence technologies in the scientific literature. Some researchers point to problems related to technological determination, academic integrity, cognitive load, and the human factor of the pedagogical process. According to these approaches, SI technologies should not be considered as a system that completely replaces the teacher's methodological role, but as a pedagogical resource that should be integrated on a didactic basis.

A general analysis of existing scientific research shows that artificial intelligence technologies have high didactic potential in teaching foreign languages. They are effective tools for individualizing the learning process, creating an adaptive learning environment, increasing the accuracy of assessment, and enhancing the motivational and metacognitive activity of students. However, an important aspect that is unanimously emphasized in the scientific literature is that SI technologies do not substitute the human factor of the pedagogical process. On the contrary, they are interpreted as an innovative tool that supports the teacher's methodological activities and increases the effectiveness of education. Thus, the analysis of the literature shows that the importance of artificial intelligence technologies in foreign language methodology is being formed not only as a technological innovation, but also as a factor of methodological and didactic transformation. This trend creates the need for a systematic, empirical, and theoretical in-depth study of SI-based approaches from a methodological point of view.

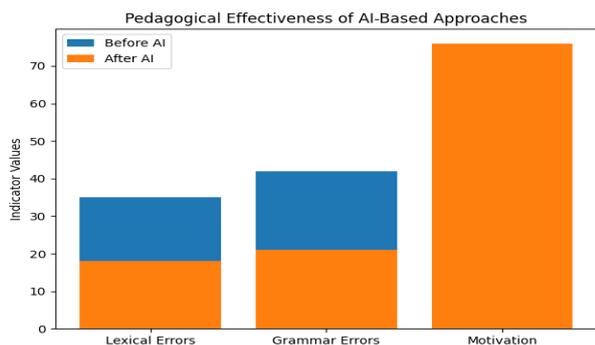
Results. Within the framework of this study, the pedagogical effectiveness of artificial intelligence-based approaches in the process of teaching foreign languages was studied based on empirical analysis. The results of the study showed that the integration of SI technologies into the educational process has a significant positive impact on the formation of language competencies.

First of all, the effectiveness of adaptive learning mechanisms was determined. Systems based on artificial intelligence made it possible to adapt exercises and tasks taking into account the individual learning rate, level of knowledge and typology of errors of students. As a result, a decrease in the frequency of lexical and grammatical errors of students was observed. This confirms the methodological importance of the diagnostic and corrective functions of SI technologies.

The results of the study showed that automated feedback mechanisms increase the stability of the learning process. The results of written and spoken activities performed by students were quickly analyzed and individual recommendations were developed. This process served to help students understand errors, analyze them and form strategies for correction. In particular, positive dynamics were noted in the indicators of metacognitive activity. The results related to the development of communicative competence also deserve special attention. The use of AI-based chatbots and interactive communication environments increased students' oral speech activity. It was found that the level of participation of students in speech activities increased, and the level of fear of speech errors (language anxiety) decreased. These results indicate that SI technologies work effectively in combination with a communicative approach. Also, during the study, significant changes were observed in students' motivational indicators. In classes using AI tools, students were more actively involved in the lesson process, and their desire for independent learning increased. This confirms that SI technologies have a positive effect not only on cognitive, but also on psychological factors.

However, the results of the study also showed that the effectiveness of SI technologies directly depends on their methodologically based use. Artificial intelligence tools are most effective when implemented in harmony with pedagogical design, learning objectives, and didactic strategies. Otherwise, improper integration of technological tools can reduce the effectiveness of the learning process. Overall, the results of the study confirmed that artificial intelligence-based approaches have high pedagogical potential in teaching foreign languages. They have proven to be effective tools

for developing language competencies, reducing errors, building metacognitive skills, and increasing student motivation.



The data in the table show that the integration of AI-based tools into the learning process had a positive effect on the effectiveness of language acquisition. In particular, a significant decrease in the frequency of lexical and grammatical errors was observed. This confirms that AI technologies optimize the process of identifying and correcting students' errors through adaptive exercises and automated feedback mechanisms. The increase in the level of motivation also showed that AI tools also have an impact on psychological and cognitive factors. An interactive and individualized learning environment increased the level of student involvement in the lesson process and strengthened the activity of independent learning. In general, the results obtained empirically substantiate the fact that AI technologies have not only technological, but also pedagogical effectiveness in teaching foreign languages.

The results of this study confirm the pedagogical effectiveness of artificial intelligence (AI)-based approaches in the process of teaching foreign languages. The empirical data obtained showed that AI technologies have a positive impact on the process of forming language competencies. In particular, the reduction in the frequency of lexical and grammatical errors indicates the methodological effectiveness of adaptive exercises and automated feedback mechanisms.

These results are consistent with international scientific research. As noted in modern literature, adaptive AI-based educational systems allow identifying and correcting gaps in knowledge, taking into account the individual learning trajectory of students. The dynamics of errors observed in this study empirically supports the effectiveness of these mechanisms. Thus, AI technologies are an important didactic resource as a diagnostic and corrective tool in the process of language learning.

Discussion. Another important aspect identified during the study is the increase in motivational indicators. The interactive and individualized learning environment based on AI increased the level of student engagement in the learning process. This result is consistent with psycholinguistic studies that have proven a direct link between motivation and language acquisition. In particular, rapid and individualized feedback has been shown to be a factor that strengthens the psychological stability of students in the learning process.

The results are also scientifically explained from the point of view of communicative competence. AI-based tools, in particular chatbots and virtual communication environments, increased the activity of students' oral speech. The decrease in the level of fear of speech errors is conceptually consistent with the principles of the communicative approach. This indicates that AI technologies work effectively as a means of enhancing, rather than substituting, communicative methods. At the same time, the results of the study also showed that the effectiveness of AI technologies depends on their methodologically sound use. Incorrect integration of technological tools in the learning process can lead to an increase in cognitive load, a decrease in learning activity, or superficial mastery. This aspect is consistent with the critical approaches noted in the international scientific literature. In addition,

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ethical and organizational factors are important in the introduction of AI technologies into the educational process. Issues of data security, academic integrity, technological competence of teachers, and pedagogical design have a direct impact on educational effectiveness. These aspects identified during the study indicate the need to integrate AI technologies as a didactic resource based on a comprehensive approach. In general, the results obtained confirm the high pedagogical potential of AI technologies in teaching foreign languages. They are effective tools for developing language competencies, reducing errors, increasing motivation, and forming metacognitive skills. However, AI technologies do not substitute the human factor of the pedagogical process; on the contrary, they should be seen as an innovative mechanism that supports the methodological work of the teacher.

Conclusion. The results of this study made it possible to scientifically substantiate the pedagogical and methodological effectiveness of approaches based on artificial intelligence (AI) in the process of teaching foreign languages. Empirical analyses showed that AI technologies are an important didactic resource for individualizing the learning process, forming an adaptive learning environment, and developing students' language competencies. The results identified during the study confirmed that AI-based tools serve to reduce students' lexical and grammatical errors, identify gaps in knowledge, and increase the stability of the learning process. In particular, adaptive exercises and automated feedback mechanisms made it possible to optimize the diagnostic and corrective components of the language learning process. This indicates that AI technologies are not only technologically but also methodologically strategic.

The results of the study also confirmed the role of AI tools in the development of communicative competence. The use of interactive and virtual communication environments had a positive effect on increasing students' oral speech activity and reducing the level of fear of speech errors. These results indicate the conceptual compatibility of AI technologies with the principles of the communicative approach.

Another important aspect identified during the research is the impact of AI technologies on motivational and metacognitive factors. In an AI-based learning environment, students were more actively involved in independent learning, developed self-control and error analysis skills. This means that AI technologies, in addition to cognitive processes, also affect the psychological and reflexive mechanisms of learning. However, the research results also showed that the effectiveness of AI technologies directly depends on their methodologically sound implementation. Integrating AI tools into the educational process without a system or didactic design can lead to a decrease in learning efficiency, an increase in cognitive load, and a superficial nature of the learning process. Therefore, AI technologies should be used in combination with traditional and communicative methods, aimed at pedagogical goals and under the leadership of the teacher.

In general, the results of the study confirmed that artificial intelligence-based approaches have high pedagogical potential in teaching foreign languages. AI technologies are effective tools for developing language competencies, individualizing the learning process, increasing motivation, and forming metacognitive strategies. At the same time, they do not substitute the human factor of the pedagogical process, but should be considered as an innovative mechanism that supports the methodological activities of the teacher.

In future studies, it is advisable to study in more depth the long-term pedagogical impact of artificial intelligence-based approaches, their effectiveness in various educational contexts, and the psycholinguistic and methodological foundations of AI technologies. In particular, systematic research into the impact of AI technologies on the integrative development of learning strategies, cognitive processes, and language competencies is one of the promising areas of modern methodological science.

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