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INTEGRATION OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN FOREIGN LANGUAGE TEACHING AND LEARNING

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Abstract. Rapid advancements in artificial intelligence are transforming education, particularly foreign language teaching. AI technologies, including natural language processing, speech recognition, adaptive systems and chatbots, enable individualized, interactive learning. This article examines AI integration in language education, its impact on skills, teachers' and students' roles, advantages, limitations and implications for future research.

Keywords: Artificial intelligence, foreign language teaching, language learning, educational technologies, individualized learning.

SÜNİ İNTELLEKT TEXNOLOGİYALARININ XARİCİ DİLLƏRİN TƏDRİSİNƏ VƏ ÖYRƏNİLMƏSİNƏ İNTEQRASİYASI

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Xülasə. Süni intellektin sürətli inkişafı təhsilə, xüsusilə də xarici dillərin tədrisinə təsir göstərir. Təbii dilin emalı, nitqin tanınması, adaptiv sistemlər və çat-botlar daxil olmaqla süni intellekt texnologiyaları fərdiləşdirilmiş, interaktiv öyrənməyə imkan verir. Məqalədə AI-in inteqrasiyası, dil bacarıqlarına təsiri, müəllim və tələbələrin rolu, üstünlükləri, məhdudiyyətlər və gələcək tədqiqat perspektivləri araşdırılmışdır.
Açar sözlər: Süni intellekt, xarici dillərin tədrisi, dil öyrənmə, təhsil texnologiyaları, fərdiləşdirilmiş öyrənmə.

1. Introduction

The rapid advancements in artificial intelligence (AI) technologies in recent years have led to profound transformations in education. AI-based applications, particularly machine learning, natural language processing and speech recognition, are enabling teaching processes to become more individualized, interactive and data-driven. One area significantly impacted by this transformation is foreign language teaching and learning. The limitations of traditional teaching methods, their inability to adequately address the individual needs of learners and motivational issues have paved the way for the increasing adoption of AI-supported solutions in this field. In foreign language teaching, AI technologies support the learning process through adaptive learning systems, intelligent language learning applications, automated feedback mechanisms and chatbots. These technologies allow students to develop their language skills at their own pace, while also providing teachers with important data for monitoring and evaluating the learning process. Furthermore, AI contributes to the reshaping of pedagogical approaches by enabling the creation of personalized learning environments that take individual differences into account in language learning. The aim of this article is to examine the integration of artificial intelligence technologies in foreign language teaching and learning from both theoretical and practical perspectives. The study addresses the main artificial intelligence

technologies used in foreign language education; their effects on language skills are evaluated within the context of teacher and student roles. Furthermore, the opportunities and limitations offered by artificial intelligence integration are discussed, aiming to provide implications for future research and pedagogical applications.

2. Artificial Intelligence and language teaching: Theoretical framework

Artificial intelligence (AI) is defined as a set of systems capable of mimicking human cognitive processes, with applications spanning problem-solving, decision-making and language processing [10]. In educational contexts, AI is increasingly used to analyze learners' progress, adapt instructional content to individual needs and provide real-time feedback [7]. Specifically, in the domain of foreign language teaching, AI technologies align closely with constructivist learning theory, which emphasizes active learner participation and knowledge construction through experience [8]. AI-based learning platforms, such as intelligent tutoring systems and adaptive learning software, reinforce this interaction by responding dynamically to learner inputs. Cognitive language learning theories, which focus on how learners process, store and retrieve linguistic information, also provide a theoretical underpinning for AI applications in language education [2]. AI tools are consistent with these theories because they can analyze learner errors, track progress and offer personalized scaffolding. For example, grammar-correcting AI applications like Grammarly or AI-powered writing assistants provide immediate, individualized feedback that supports cognitive learning processes.

Communicative language teaching (CLT) offers another significant framework for integrating AI into language instruction [9]. Chatbots, speech recognition systems and virtual conversation partners allow learners to practice speaking and writing in authentic communicative contexts, thus aligning with CLT principles. Second language acquisition (SLA) theories, particularly Krashen's Input Hypothesis and Long's Interaction Hypothesis, stress the importance of comprehensible input and meaningful interaction [3]. AI-supported learning environments can implement these principles by adjusting input complexity to the learner's proficiency level and simulating interactive dialogues. For instance, AI language apps like Duolingo or Busuu tailor exercises to learners' skill levels and provide opportunities for interactive language practice. Moreover, AI can facilitate task-based learning by creating adaptive exercises that reflect real-world language use, supporting both fluency and accuracy. The integration of AI in language education also resonates with sociocultural theory, emphasizing the role of mediated learning and scaffolding in cognitive development [11]. AI systems can act as "more knowledgeable others", guiding learners through complex tasks and promoting autonomous learning. In this sense, AI is not merely a technological innovation but a pedagogical tool that complements contemporary theories of language learning. By combining elements from constructivist, cognitive, communicative and sociocultural frameworks, AI offers a theoretically informed approach to enhancing language instruction.

Ultimately, AI facilitates personalized, interactive and contextually meaningful learning experiences, demonstrating its potential to transform traditional language teaching methodologies.

3. Artificial Intelligence technologies used in foreign language teaching

Artificial intelligence (AI) refers to systems capable of simulating human cognitive functions such as learning, reasoning and problem-solving. In education, AI is increasingly applied as a tool to analyze learners' progress, adapt content to individual needs and provide personalized feedback. In the context of language teaching, AI aligns closely with constructivist learning theory, which emphasizes that learners construct knowledge actively through engagement and interaction. AI-based learning environments, such as intelligent tutoring systems, enable students to engage with language tasks dynamically, responding to their inputs and adjusting the difficulty of exercises in real time. Cognitive language learning theories, which focus on how learners process and internalize language, also underpin AI-supported instruction. For instance, AI systems can identify common errors in grammar, vocabulary or syntax and provide corrective guidance tailored to each learner's strengths and weaknesses. This individualized feedback fosters deeper cognitive engagement and supports the internalization of linguistic rules.

Communicative language teaching (CLT) provides another important theoretical framework for AI integration. AI-powered chatbots, virtual conversation partners and speech recognition technologies allow learners to practice authentic communication in controlled, low-pressure environments. These tools enable learners to interact using the target language, aligning with CLT's emphasis on meaningful language use. Furthermore, principles from second language acquisition, such as Krashen's Input Hypothesis and Long's Interaction Hypothesis, highlight the need for comprehensible input and meaningful interaction. AI systems support these principles by offering level-appropriate language input and simulating interactive dialogues. For example, language learning platforms can present scenarios, prompts or conversation simulations that encourage learners to negotiate meaning and produce language actively. AI also contributes to task-based and project-based learning by designing exercises that reflect real-world language use, enhancing both fluency and accuracy.

From a sociocultural perspective, AI can act as a scaffold, guiding learners through challenging tasks and promoting independent problem-solving. Intelligent systems can adapt to learners' zone of proximal development, offering assistance just when it is needed and fading support as competence grows. In this sense, AI becomes more than a technological tool; it functions as a pedagogical instrument that supports contemporary language learning theories. By integrating constructivist, cognitive, communicative and sociocultural principles, AI-enhanced environments promote personalized, interactive and contextually meaningful language learning experiences. Consequently, AI is positioned not only as an innovation in

technology but also as a strategic method for enhancing language acquisition and learner engagement.

4. The impact of Artificial intelligence on language learning skills

The impact of AI-supported applications on language learning skills has been addressed in many studies in recent years. These studies show that AI technologies support vocabulary and grammar development. Adaptive learning systems, in particular, focus on areas where learners are lacking and offer targeted exercises. This contributes to a more efficient learning process. When evaluated in terms of reading and writing skills, AI-based text analysis tools offer significant advantages. Automated writing assessment systems analyze students' written output and provide feedback on grammar, word choice and text structure. Such systems help students independently improve their writing skills. In reading skills, artificial intelligence can adjust the difficulty level of texts according to the learner's level. For example, AI-powered platforms like ReadTheory and Newsela tailor reading materials to individual proficiency, helping learners engage with texts without becoming overwhelmed.

The impact of AI-supported technologies on listening and speaking skills is particularly noteworthy. Speech recognition systems evaluate students' pronunciations and provide accurate pronunciation models. This is of great importance, especially for learners whose native language differs from the target language. Furthermore, immediate feedback makes it easier for learners to identify and correct their mistakes. Applications such as ELSA Speak and Duolingo’s speaking exercises offer interactive pronunciation training that tracks progress over time. AI also allows for simulated conversation practice through chatbots, which help learners develop fluency and confidence in real-life communication situations. Studies indicate that learners using AI-assisted speaking tools demonstrate significant improvement in both accuracy and oral fluency [5, pp.135-156]. Moreover, AI can track long-term progress and adapt exercises to target persistent weaknesses, creating a highly personalized learning pathway [1]. In addition, AI-based gamified platforms increase learner motivation by combining skill development with engaging activities. Collectively, these technologies contribute to the holistic development of language skills, making AI an effective complement to traditional language teaching methods.

5. Artificial intelligence from the perspective of teachers and students

The integration of artificial intelligence technologies into foreign language teaching is leading to significant changes in the roles of teachers and students. While in the traditional teaching approach the teacher is in the position of a knowledge transmitter, in AI-supported learning environments the role of guide and facilitator comes to the forefront. Teachers can more closely monitor students' development by analyzing the data provided by artificial

intelligence. This contributes to a more conscious and goal-oriented conduct of the teaching process.

From the students' perspective, artificial intelligence encourages them to take a more active and autonomous role in the learning process. Students can work with content suitable to their own learning pace and receive the feedback they need instantly. This is considered an important factor that increases learning motivation. In addition, AI-supported applications reduce the fear of making mistakes, allowing students to use the language more comfortably. Students also develop self-regulated learning strategies, such as setting learning goals, monitoring their progress and adjusting study methods based on AI feedback. Moreover, personalized learning pathways created by AI systems ensure that learners are consistently challenged without feeling overwhelmed, which enhances both engagement and retention.

Teachers benefit from AI not only in terms of assessment but also in lesson planning. AI analytics can identify common learner difficulties, allowing teachers to design targeted interventions or additional practice materials. This data-driven approach enables more efficient classroom management and allows teachers to focus on higher-order skills such as critical thinking, discussion and problem-solving. AI tools also facilitate collaborative learning, as they can organize pair or group activities based on complementary skill levels. Additionally, the integration of AI promotes innovative teaching practices, such as flipped classrooms and project-based learning, where technology supports active student participation outside the traditional classroom.

However, teachers need to improve their digital literacy in order to effectively use artificial intelligence technologies. Otherwise, technology may be used only as a technical tool instead of for pedagogical purposes. Therefore, including AI literacy in teacher training and professional development programs is of great importance. Teachers must be trained to interpret AI-generated data correctly, make informed pedagogical decisions and integrate AI seamlessly into their teaching methods. Likewise, educators need to be aware of ethical considerations, such as data privacy, algorithmic bias and equitable access to AI resources. When teachers and students are prepared, AI-supported environments foster a more interactive, learner-centered and adaptive educational experience. Ultimately, the evolving roles of teachers and students reflect a shift from traditional instruction to a more collaborative and technology-enhanced model of language learning.

6. Advantages and limitations of ai integration

The integration of artificial intelligence technologies into foreign language education offers many pedagogical advantages. Chief among these are the opportunities for individualized learning. AI can create personalized learning paths by analyzing learners' performance [1]. Adaptive learning systems, such as Duolingo and Busuu, adjust exercises according to the learner’s skill level, ensuring that learners are consistently challenged without being overwhelmed [5, pp.135-156]. Furthermore, the possibility of learning independently of time

and place makes language learning more accessible, particularly for students in remote or under-resourced areas. Continuous feedback is also an important advantage that supports the learning process. AI-driven writing assistants and speech recognition systems provide instant corrective feedback, allowing learners to improve their skills more efficiently [4, pp.156-179].

However, AI integration also brings some limitations. Data privacy and ethical issues are among the most important topics of discussion in this field. The issue of how students' personal data is collected, stored and used must be carefully considered, especially in applications that track learning behaviors over time [13]. In addition, technical infrastructure deficiencies, such as unreliable internet access or outdated hardware and high costs can limit the widespread adoption of AI applications. The effectiveness of AI is also dependent on teacher competence; educators need sufficient training to use AI tools in pedagogically meaningful ways [7]. From a pedagogical point of view, there is no risk of AI replacing teachers; however, excessive technology use may reduce human interaction, which is essential for developing communicative competence and socio-emotional skills.

Balanced integration is therefore crucial. AI technologies should be positioned as tools to support, rather than replace, human teaching [12]. Properly implemented, AI can enhance motivation by offering gamified learning experiences and adaptive challenges [1]. It can also assist teachers in identifying learning gaps, managing large classes and designing targeted interventions [4, pp.156-179]. Furthermore, AI encourages learner autonomy by promoting self-paced and self-directed study. By combining human guidance with AI-driven personalization, foreign language education can become more efficient, inclusive and engaging. Ultimately, AI should be seen as a complementary resource that amplifies the effectiveness of traditional teaching methods while addressing diverse learner needs.

Conclusion. This article reveals that the integration of artificial intelligence (AI) technologies in foreign language teaching and learning offers substantial pedagogical benefits. AI-supported applications strengthen learner-centered approaches by accommodating individual differences and adapting instruction to learners' needs. Personalized feedback, adaptive content and real-time performance tracking make the learning process more effective and engaging. Moreover, AI provides teachers with valuable data to monitor learners' progress, identify difficulties and design targeted interventions, which contributes to more informed and goal-oriented teaching practices. AI applications also promote learner autonomy, enabling students to work at their own pace, self-correct and develop self-regulated learning strategies.

In addition, AI-supported tools facilitate the development of all four language skills-reading, writing, listening and speaking - through intelligent tutoring systems, speech recognition and interactive chatbots. These technologies can simulate authentic communicative contexts and provide learners with opportunities to negotiate meaning, practice pronunciation and build confidence in a low-pressure environment. From a theoretical perspective, AI integration aligns with constructivist, cognitive, communicative and sociocultural frameworks,

highlighting its potential to transform traditional teaching methodologies into more interactive and scaffolded learning experiences.

However, the study also emphasizes that AI adoption comes with challenges. Ethical and data privacy concerns must be addressed to protect learners' personal information. Technical infrastructure limitations, such as unreliable internet access or insufficient hardware, can hinder the widespread use of AI applications. Teachers' digital literacy is a critical factor; without proper training, AI tools risk being used merely as technical aids rather than as pedagogically meaningful resources. Excessive reliance on technology may reduce human interaction, which is essential for developing communicative competence and socio-emotional skills.

Balanced integration of AI is therefore essential. Educators should use AI as a complementary tool, combining human guidance with technological personalization to optimize learning outcomes. Professional development programs should include AI literacy training, ethical considerations and data interpretation skills to empower teachers. Likewise, students should be guided to use AI consciously and effectively, enhancing motivation and promoting self-directed learning.

Future research should focus on longitudinal studies to assess the long-term effects of AI-supported language learning on proficiency, retention and learner engagement. Comparative studies across different educational contexts, age groups and language proficiency levels would provide more nuanced insights into the effectiveness of AI integration. Furthermore, investigations into the impact of gamified AI applications, collaborative AI tools and multimodal learning platforms could inform best practices for designing engaging, equitable and pedagogically sound AI-supported curricula. Ultimately, AI should be viewed as a transformative yet complementary resource that enhances foreign language teaching and learning while preserving the essential human element of education.

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