

Automated language learning systems: Cognitive-linguistic perspectives

Sistemas automatizados de aprendizaje de idiomas: perspectivas cognitivo-lingüísticas

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Abstract

The ongoing transformation of language education is driven by the widespread adoption of automated language-learning systems that customize instruction for individual learners while also increasing motivation and interaction. The significance of this study lies in the need to enhance the quality of foreign language education amid societal digitalization and to assess how digital infrastructure influences the effectiveness of intelligent language platforms. The study aims to clarify the relationship between the development level of the digital educational ecosystem and the efficiency of automated language learning systems. The methodology includes secondary analysis of international statistical data, systematic literature reviews, and comparative analysis of scientific publications on integrating artificial intelligence into foreign language teaching. Results indicate that a well-developed digital infrastructure significantly boosts the potential of intelligent systems to develop communicative and cognitive skills, while low digital maturity limits their educational impact. The study offers a conceptual view of intelligent language platforms as tools for humanistic, personalized education that improve educational quality, promote inclusiveness, and facilitate intercultural interaction. Its practical significance involves guiding digital strategies, optimizing blended and remote learning models, and strengthening methodological support for foreign language instruction.

Keywords: automated language learning systems, adaptive learning, individualized learning, interactive platforms, gamification.

Resumen

La transformación actual de la enseñanza de lenguas está impulsada por la adopción generalizada de sistemas automatizados de aprendizaje de idiomas que adaptan la instrucción a las características individuales de los estudiantes, al tiempo que incrementan la motivación y la interacción. La relevancia de este estudio se deriva de la necesidad de mejorar la calidad de la enseñanza de lenguas extranjeras en el contexto de la digitalización de la sociedad, así como de evaluar cómo la infraestructura digital influye en la eficacia de las plataformas lingüísticas inteligentes. El objetivo del estudio es esclarecer la relación entre el nivel de desarrollo del ecosistema educativo digital y la eficacia de los sistemas automatizados de aprendizaje de idiomas. La metodología se basa en el análisis secundario de datos estadísticos internacionales, en revisiones sistemáticas de la literatura y en un análisis comparativo de publicaciones científicas sobre la integración de la inteligencia artificial en la enseñanza de lenguas extranjeras. Los resultados demuestran que una infraestructura digital bien desarrollada amplía significativamente el potencial de los sistemas inteligentes para fomentar las competencias comunicativas y cognitivas, mientras que un bajo nivel de madurez digital limita su impacto en la educación. El estudio propone una visión conceptual de las plataformas lingüísticas inteligentes como herramientas de una educación humanista y personalizada que mejoran la calidad educativa, promueven la inclusión y apoyan la interacción intercultural.

Palabras clave: sistemas automatizados de aprendizaje de idiomas, aprendizaje adaptativo, aprendizaje individualizado, plataformas interactivas, gamificación.

1. INTRODUCTION

The rapid growth of digital technologies is creating new methods for learning languages, with automated systems powered by artificial intelligence playing a key role in providing personalized, interactive, and cognitively engaging educational experiences. These systems can customize learning materials, promote authentic communication, and quickly analyze results, which boosts motivation and enhances the effectiveness of language learning. Simultaneously, researchers point out several challenges, including the need to develop digital literacy, ensure equal access to resources, use data ethically, and preserve the social role of teachers amid automation. This highlights the importance of analyzing how digital infrastructure affects the success of implementing intelligent language platforms.

The study aims to evaluate how digital infrastructure levels affect the effectiveness of automated foreign language learning systems and to identify opportunities for further growth. It intends to analyze the current state of artificial intelligence (AI) platform development in language education, review international data on the digital readiness of educational systems, pinpoint pedagogical and cognitive factors influencing learning effectiveness, and assess limitations and possibilities for incorporating intelligent technologies into foreign language learning.

2. LITERATURE REVIEW

Recent studies highlight the rapid development of artificial intelligence-based automated language learning systems (further – ALMS), which are gradually transforming the

paradigm of foreign language education and improving the personalization, analytics, and adaptability of teaching solutions (Bahari et al., 2025; Chen et al., 2025; Dou et al., 2025; Wah, 2025). Systematic reviews demonstrate the effectiveness of AI technologies in enhancing feedback and speech assessment, as well as in modeling real-world communication situations (Li et al., 2025; Balavar et al., 2025; Liu et al., 2025; Garzón et al., 2025). Researchers focus especially on the cognitive mechanisms of foreign language acquisition, supported by multimodal content, error prediction, and semantic analysis of responses (Chetveryk et al., 2025; Sun et al., 2025; Tian et al., 2024; Nguyen & Habók, 2022). At the same time, the importance of gamification tools and motivational analytics for increasing learner engagement and autonomy continues to grow (Vo, 2025; Wah, 2025; Balavar et al., 2025).

In the field of inclusive foreign language education, AI has been recognized for its potential to support learners with visual impairments and to create alternative communication channels (Jiao & Shakibaei, 2025; Kozak & Blyzniuk, 2025). Researchers also focus on issues such as ethical constraints, digital security, algorithm transparency, and potential threats to academic integrity (Strzelecki, 2025; Toscu, 2025; Zhu & Wang, 2024; Son et al., 2023). A significant part of the literature highlights the connection between the effectiveness of automated language learning systems (further – ASNM) and the level of digital readiness in educational ecosystems, which requires infrastructure and management support (United Nations Children’s Fund, 2023; Fraillon, 2024; OECD, 2023, 2025; UNESCO, 2023). Developing digital literacy policies is considered crucial for ensuring equal access to innovation and reducing educational gaps between countries (Kure et al., 2023; Batsurovska et al., 2024; Delen et al., 2024).

Another area of research emphasizes integrating active learning methods—mobile, self-directed, and blended—through digital platforms and chatbots, which foster self-regulation and ongoing motivation for learning (Lai et al., 2022; Li et al., 2025; Nguyen & Habók, 2022). Scientific studies also underscore the value of using video content and computer analysis of text artifacts to boost autonomy and flexibility in language skill development (Kure et al., 2023; Tian et al., 2024). Research on intelligent agents and chatbots demonstrates their effectiveness in encouraging communicative activities, offering immediate feedback, and supporting social interaction (Son et al., 2023; Li et al., 2025; Vo, 2025). The role of AI in aiding oral speech and automating the review of written work has also been acknowledged, contributing to improved assessment quality and more efficient teaching (Dou et al., 2025; Chen et al., 2025; Wah, 2025).

Bibliometric analyses reveal a sharp increase in scholarly interest in artificial intelligence within foreign language education, especially following the development of generative language models (Delen et al., 2024; Zhu & Wang, 2024; Strzelecki, 2025). Simultaneously, both domestic and international publications highlight that AI technologies enhance education quality only when they are implemented methodically, digital infrastructure is in place, and teachers are adequately trained (Zhukevych & Spiricheva, 2024; Kozak & Blyzniuk, 2025; Batsurovska et al., 2024). A comprehensive review of sources identifies three main trends in current research: the cognitive-linguistic basis for adaptive platforms, the advancement of inclusive and mobile solutions, and the development of digital literacy policies to address educational inequality (United Nations Children’s Fund, 2023; Fraillon, 2024; OECD, 2023, 2025; UNESCO, 2023). This provides a systematic perspective on the shift toward personalized, data-driven, and socially conscious foreign language education.

Despite significant progress, several issues remain unresolved: researchers emphasize the need to standardize assessment criteria, improve teachers' digital and pedagogical skills, and address ethical concerns related to authorship, privacy, and transparency of AI algorithms (Toscu, 2025; Strzelecki, 2025; Zhu & Wang, 2024; Delen et al., 2024). The long-term impacts of intelligent language systems on users' cognitive development and intercultural competence formation are still inadequately studied. Overall trends in the development of artificial intelligence in language education are also summarized in conceptual reviews that identify key directions for the growth of Computer-Assisted Language Learning (further – CALL) systems and highlight prospects for their continued improvement (Katinskaia, 2025).

Despite extensive research, there is still a lack of evidence regarding the overall effectiveness of ASLMs in different social and cognitive learner groups, as well as mechanisms for ethical oversight of their use. Models that ensure a balance between technological adaptation, humanistic principles of education, and the development of a critical attitude toward artificial intelligence results need further refinement.

3. MATERIALS AND METHODS

The study was conducted through a secondary analysis of international statistical data on digital literacy among students and the state of digital infrastructure, as presented in reports by the United Nations Children's Fund (2023), ICILS 2023 (Fraillon, 2024), OECD (2023; 2025), and UNESCO (2023). These reports revealed the relationship between the digital readiness of education systems and the effectiveness of integrating automated language platforms. The analytical sample included official indicators of the spread of educational technologies, access to digital resources, and the development of competencies necessary for using intelligent language learning systems. A comparative analysis, along with tabular and visual interpretation of results, was used to process and summarize the data, enabling comparisons among country groups with different levels of digital infrastructure. Additionally, a content analysis of current scientific publications on the use of artificial intelligence in foreign language education was performed, which helped identify key trends, benefits, and risks associated with introducing intelligent adaptive systems into the language learning process.

4. RESULTS

Modern automated language learning systems have become a key focus in computer-assisted language education, demonstrating a rapid shift from static, one-size-fits-all language trainers to intelligent environments that provide customized support for learning. Digital platforms increasingly utilize artificial intelligence, which is changing the fundamental approach to language teaching. Learning is gradually moving from a linear presentation of material to a dynamic system that considers each learner's style, pace, cognitive strategies, and motivation (Bahari et al., 2025).

Within ASNM's functional potential, several key opportunities can be identified: automated real-time feedback, personalized learning content, the use of speech recognition and text analysis technologies, and the simulation of authentic communication situations. Today, intelligent chatbots and virtual tutors not only imitate the role of a teacher but also provide social interaction and help students of various backgrounds develop foreign-language communication skills (Li, Zhou, Yin, & Chiu,

2025; Wah, 2025). Such approaches boost engagement, which is essential for sustained language practice.

Global scientific and pedagogical discourse shows that automated systems increasingly combine learning and assessment functions. Systematic reviews confirm that artificial intelligence algorithms improve both the accuracy of learning outcome analysis and the effectiveness of pedagogical decisions (Chen et al., 2025; Dou et al., 2025). Meanwhile, learning data analytics is used to swiftly identify knowledge gaps and recommend personalized learning paths. This allows the teacher's role to shift from a controlling figure to a facilitator, which generally enhances the cognitive processes involved in language acquisition.

Generative artificial intelligence technologies are actively advancing in the field of foreign language education. They enable adaptive modification of materials based on learners' readiness and previous attempts, which is a key aspect of modernizing the educational environment (Chetveryk et al., 2025). Innovations not only involve digital tools but also conceptual models of learning. Researchers emphasize the importance of considering cognitive-linguistic principles, including mechanisms of memory, language prediction, and semantic recognition (Garzón et al., 2025). Trends in automated learning development align with the global digitization of higher education, supported by infrastructure upgrades and growing interest in blended and distance learning (Batsurovska et al., 2024). In terms of inclusivity, such systems provide additional opportunities for learners with diverse educational needs, especially for individuals with visual impairments, offering accessible formats for language interaction and 24/7 support (Jiao & Shakibaei, 2025). This highlights the multifunctionality and social importance of intelligent platforms. Despite significant progress, researchers note challenges in integrating ASNMs, including the need to improve digital literacy among teachers and students, address ethical concerns about authorship and privacy, reduce disparities in technology access, and enhance performance assessment models (Toscu, 2025; Zhu & Wang, 2024). Therefore, it is essential to not only adopt innovative solutions but also implement them with methodologically sound practices.

Therefore, the current landscape of computer-assisted language teaching shows steady progress toward highly advanced automated educational systems that use artificial intelligence to improve the effectiveness and accessibility of language learning. This progress is creating the basis for a new educational model centered on personalization, cognitive support, and meaningful interaction between the system and the learner.

The cognitive-linguistic foundations of modern adaptive language learning platforms depend on understanding how learners perceive, process, and store information about foreign languages. These principles demonstrate how cognitive processes—such as attention, memory, prediction, and semantic coding—interact with language mechanisms that support the development of lexical and grammatical skills. That's why intelligent systems utilize artificial intelligence algorithms that monitor individual perception traits and create personalized learning paths, ensuring optimal workloads and relevant content based on the user's current skill level (Chen et al., 2025; Wah, 2025). Developers of educational platforms are increasingly applying cognitively oriented models that enable language prediction, emotional engagement, and semiosis—the learner's ability to understand relationships between language units within context (Garzón et al., 2025).

Thus, the cognitive-linguistic approach influences the design of adaptive systems, including algorithms for analyzing user data, visual presentation logic, task organization, and feedback methods. It also facilitates the transition from reproductive to productive learning, where the learner actively constructs meaning rather than passively absorbing pre-existing linguistic structures. This allows intelligent platforms to support the sustainable growth of intercultural communication and effectively develop language skills in real-world situations (Li et al., 2025; Chetveryk et al., 2025). Table 1 outlines the main cognitive-linguistic principles for designing intelligent language learning systems.

Table 1. Cognitive-linguistic principles of adaptive foreign language learning systems

Principle	Cognitive basis	Linguistic meaning	Application in adaptive platforms
Personalizing the learning experience	Individual cognitive styles, memory variability	Content selection according to language competence	Adaptive routes, differentiated tasks
Continuous monitoring and feedback	Real-time information processing assessment	Instant correction of language errors	Automatic analysis of spoken and written speech
Contextualization	Semantic information processing	Formation of semantic connections between language units	Authentic scenarios, simulations, chatbots
Gamification and motivational support	Emotional reinforcement of memorization	Increasing involvement in language activities	Points, levels, story simulators
Social interaction	Social-cognitive learning	Development of communicative competence	Cooperative tasks and dialogues with AI agents
Multimodal presentation	Interaction of perception channels	Expanding the possibilities of interpreting information	Combination of text, audio, video and graphics

Source: was created by the author based on (Chen et al., 2025; Garzón et al., 2025; Li et al., 2025; Wah, 2025)

The integration of these principles allows intelligent learning environments to effectively meet learners' needs, support their cognitive development, and enable them to use a foreign language intentionally in real-world communication situations. At the same time, such systems increase motivation and ensure steady progress, which are essential factors in successfully acquiring new language skills within a globalized educational setting.

Artificial intelligence is increasingly a key factor in transforming personalized foreign language learning, as it enables flexible customization of content and assessment methods to suit individual learners' needs. Intelligent platforms analyze data on learning habits, error patterns, time spent, and even motivational cues to create a tailored pathway toward language mastery. This allows for the development of a unique learning experience that is continuously refined based on the user's performance and predictions of their next steps (Bahari et al., 2025; Liu et al., 2025). Personalization is paired with gamification tools that significantly boost emotional engagement, along with interactive assessment systems that provide meaningful feedback and enhance learning motivation (Balavar et al., 2025; Wah, 2025).

Table 2 summarizes the capabilities of AI for supporting individual educational trajectories in foreign language learning.

Table 2. The potential of artificial intelligence in personalizing and assessing language learning

Individualization component	The role of artificial intelligence	Expected educational effect	Implementation examples
Personalized material selection	Analysis of language proficiency, learning style and error rate	Accelerated assimilation and avoidance of overload	Adaptive AI tutors, modular trajectories
Gamification	Motivational algorithms, educational game scenarios	Growth of internal motivation and sustainability of learning activity	Bonus systems, story quests
Interactive assessment	Automatic analysis of writing and speech, semantic analysis of responses	Instant feedback, improving self-control	Automated testers, conversational agents
Predicting future results	Big learning data processing and progress modeling	Optimization of the learning path, early correction	Learning Analytics
Inclusive support	Adaptation for special educational needs	Expanding access to language education	Voice interfaces, haptic cues
Social and communicative practices	Simulation of real dialogues	Development of communicative competence	AI chatbots and role-playing simulations

Source: was created by the author based on (Bahari et al., 2025; Balavar et al., 2025; Liu et al., 2025; Wah, 2025)

The effectiveness of AI in supporting individual learning paths has been shown by studies indicating that learners overcome challenges more quickly when the system offers tasks aligned with their cognitive strategies and past experiences. Gamification methods keep

motivation high even when the material becomes very complex, while intelligent assessment tools enhance awareness of one's own progress. This creates a steady positive cycle of learning interaction—interest sparks activity, activity yields results, and results generate new motivation. Therefore, artificial intelligence becomes not just a technological tool but a pedagogical partner that helps learners reach their potential in learning foreign languages.

The effectiveness of automated language learning systems relies heavily on the digital readiness of education systems and the level of digital literacy among students. International initiatives highlight the importance of a personalized approach, inclusive access, and the adoption of adaptive digital platforms within the learning process (United Nations Children's Fund, 2023). The results of ICILS 2023 reveal that in many countries, a large number of learners lack sufficient computer and information literacy skills, which limits the potential effectiveness of intelligent language systems (Fraillon, 2024). OECD studies underline that digital technologies can enhance academic performance, but only when implemented in a methodologically sound way, with proper data management and pedagogical support (OECD, 2023; OECD, 2025). According to UNESCO (2023), inequality in access to technology poses risks of widening educational gaps, especially in countries with underdeveloped infrastructure.

To assess the effectiveness of implementing automated language systems, a secondary analysis of statistical data from international official sources was conducted. Specifically, the United Nations Children's Fund (2023) provided information on the personalization of digital learning and the accessibility of educational technologies in European and Central Asian countries; ICILS 2023 (Fraillon, 2024) included indicators of students' digital and information literacy as measures of readiness to use intelligent language systems; OECD (2023; 2025) highlighted the state of digital infrastructure and the impact of technology on learning outcomes; and UNESCO (2023) offered statistics on technology use in education and barriers to digital transformation. The analysis examined the following areas: the level of digital infrastructure as a key factor in deploying automated language systems, learners' digital literacy as an indicator of their readiness to effectively use AI tools, and the potential impact on the development of linguistic and cognitive skills. The summarized results, demonstrating how the effectiveness of language learning with artificial intelligence depends on the systems' digital readiness, are presented in Table 3.

Table 3. The dependence of students' digital literacy on the level of development of the digital educational infrastructure

Indicator / group of countries	% of students with digital literacy at \geq basic level	% of institutions with digital infrastructure/EdTech policy	Characteristics of the educational ecosystem
Group A – high infrastructure	62.34%	88.15%	Widespread use of LMS, adaptive systems, learning data analytics

Group B – medium infrastructure	48.79%	54.22%	Partial implementation of digital resources and blended learning
Group C – low infrastructure	31.47%	29.88%	Local initiatives, limited access to digital platforms

Source: was created by the author based on (Fraillon, 2024; OECD, 2023, 2025; United Nations Children's Fund, 2023; UNESCO, 2023)

Available statistics show a clear trend: the higher a country's level of digital infrastructure and support for digital education policies, the better students perform in developing the skills needed for effective use of automated language systems. Typically, advanced EdTech ecosystems provide stable environments for building linguistic and cognitive skills through adaptive learning, ongoing feedback, and interactive assessments. On the other hand, in countries where technological integration is limited, these systems do not deliver the expected results. Therefore, to achieve real effectiveness in automated language learning, technological innovation must be supported by pedagogical and infrastructural measures; otherwise, only superficial digitalization happens without improving educational quality.

As shown in Figure 1, the digital maturity of educational ecosystems affects the development of students' digital literacy, which is a crucial indicator of readiness for effectively using intelligent language platforms.

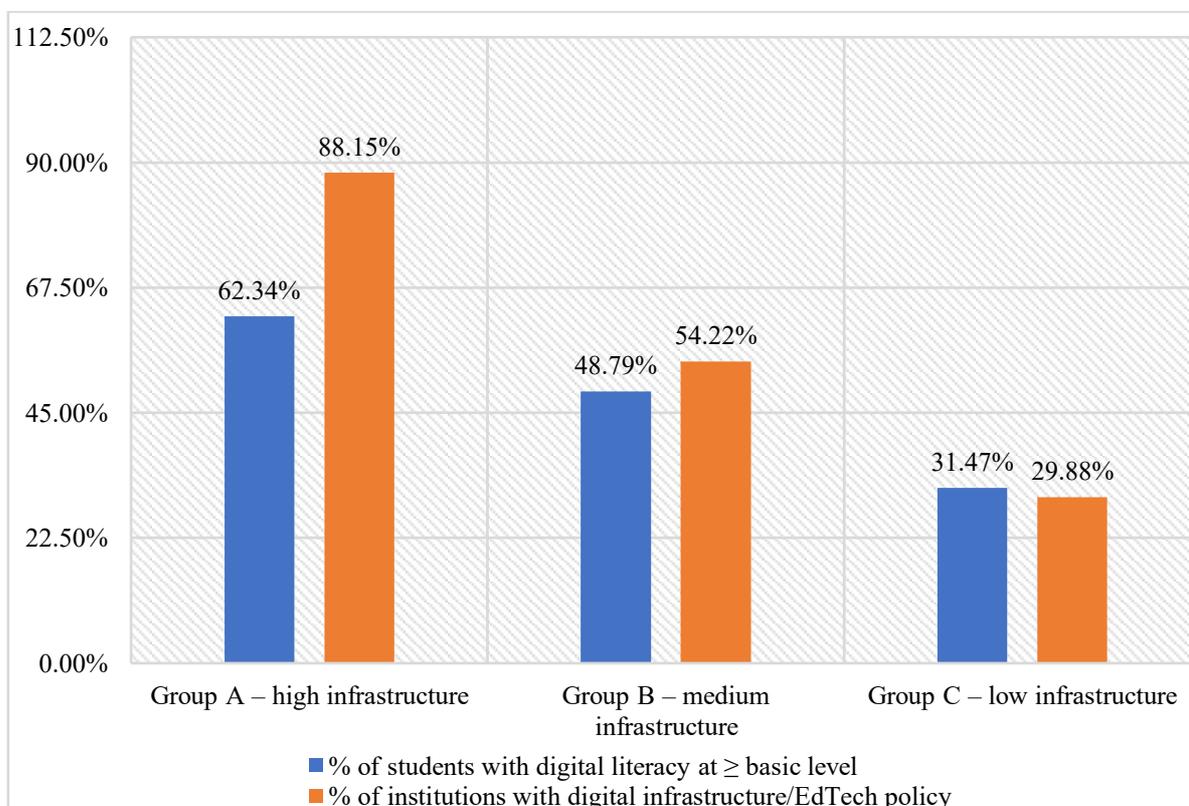


Figure 1. The impact of digital infrastructure development on the effectiveness of students' digital competence formation in international comparison

Source: was created by the author based on (Fraillon, 2024; OECD, 2023, 2025; United Nations Children's Fund, 2023; UNESCO, 2023)

The data in the figure show clear gaps between countries with different levels of digital infrastructure: countries with a well-developed digital ecosystem (group A) have the highest percentage of students with basic or higher digital literacy – 62.34%. This is 13.55 percentage points above group B (48.79%) and 30.87 points above group C (31.47%). This indicates that good infrastructure, including access to devices, networks, and educational platforms, directly helps students use automated language systems effectively. Additionally, group A also has the highest level of digital policies and learning management systems (88.15%), which is 33.93 points above group B and nearly three times higher than group C, where digitization is mostly limited to fragmented efforts. The results show that the success of intelligent language learning largely depends on how ready the educational environment is: automated systems work best when they are a normal part of learning, not just a luxury.

The further development of automated language learning systems relies heavily on artificial intelligence technologies' ability to expand the scope of personalized, inclusive, and intercultural learning. The new generation of AI tools not only adapts content but also provides intelligent communication support in real multilingual environments, boosts motivational mechanisms, and encourages social interaction among learners (Li et al., 2025; Wah, 2025). Researchers note that speech analysis technologies, generative models, chatbots, and multimodal interfaces open new opportunities for developing cognitive skills, building speech abilities, and enhancing intercultural competence (Garzón et al., 2025; Bahari et al., 2025). At the same time, future systems must prioritize accessibility: they should support learners with disabilities, offer various interaction methods, and customize learning scenarios to suit individual educational needs (Jiao & Shakibaei, 2025). Table 4 highlights promising fields for advancing AI in foreign language education.

Table 4. Promising directions for integrating artificial intelligence into the process of learning foreign languages

Development direction	AI capabilities	Expected educational outcomes	Application examples
Advanced personalization	Dynamic forecasting of needs, emotional analysis	Growth of learning autonomy, accuracy of adaptation	AI tutors with behavioral analytics
Intercultural dialogue	Intelligent translation systems, cultural context in tasks	Deepening intercultural competence	Auto-generation of international communication situations
Inclusive learning	Multimodal interfaces, voice control, haptic cues	Expanding access for applicants with OOP	Specialized inclusive language platforms
Motivational analytics	Engagement tracking, personal incentives	Sustained learning motivation, reduced dropout rates	Gamification metrics and game scenarios
Interactive assessment	In-depth analysis of writing and speech	Accurate gap diagnosis, self-regulation	Automated language examiners

Social learning	Automatic selection of partners and cooperation tasks	Increasing communicative activity	AI-powered collaborative projects
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Source: created by author based on (Bahari et al., 2025; Garzón et al., 2025; Jiao & Shakibaei, 2025; Li et al., 2025; Wah, 2025)

The prospects for developing artificial intelligence in foreign language education include not only technological advances in platforms but also shifts in approach: emphasizing intercultural interaction, inclusive support, and learners' cognitive development. It is expected that intelligent systems will increasingly serve as learning partners—not just providing content but also helping build language strategies, overcome communication barriers, and promote the ability to interact effectively in a global digital society. This approach will help create sustainable educational outcomes and prepare learners for international professional and social communication.

5. DISCUSSION

The study's results clearly show a link between digital infrastructure levels and the development of skills needed for effective interaction with automated language learning systems. This aligns with the findings of international organizations (26), United Nations Children's Fund, 2023; Fraillon, 2024; OECD, 2023, 2025). A high-quality digital environment promotes the productive use of intellectual platforms, leading to greater cognitive development and better communication skills among learners. Conversely, in countries with limited digital support, the potential of these systems is only partly realized.

At the same time, scientists' opinions on the role of artificial intelligence in foreign language education vary. Some researchers emphasize that AI integration encourages personalization and increases motivation through immediate feedback and flexible interaction formats (Bahari et al., 2025; Balavar et al., 2025; Wah, 2025), while others highlight the risks of over-automation, a potential reduction in the teacher's role, and ethical issues (Strzelecki, 2025; Toscu, 2025; Zhu & Wang, 2024; Shavarskyi et al., 2022; Bazaluk et al., 2023). Our findings confirm that both viewpoints are valid: high digital capabilities provide significant educational potential, but without proper methodological and ethical guidance, they may result in superficial digitalization without meaningful improvements in learning outcomes.

The cognitive impact of intelligent language platforms remains a topic of debate. Researchers with a cognitive-focused approach emphasize that AI can support prediction, memorization, and semantic integration (Garzón et al., 2025; Chen et al., 2025), but this perspective partly conflicts with researchers who point out the limitations of digital systems in developing critical thinking and autonomy (Zhukevych & Spiricheva, 2024; Kozak & Blyzniuk, 2025). Data shows that the cognitive potential of these platforms is only realized when they are implemented in a pedagogically sound way, which emphasizes strengthening analytical and communicative skills rather than replacing them with live interaction.

The findings support the research hypothesis: the effectiveness of automated language learning systems relies not only on the availability of technology but also on how ready the educational environment is to ensure their meaningful, systematic, and ethical use. At the same time, the analysis highlights the study's limitations: it does not consider

individual differences among users or the long-term impacts of digital systems on developing language strategies and intercultural competence, which indicates the need for future empirical research.

Therefore, future research should systematically evaluate the educational effects of interactive AI platforms on different learner groups and develop integration models that combine technological innovations with humanistic pedagogy values to support the sustainable growth of linguistic identity in a digital society.

6. CONCLUSIONS

The generalization of research results indicates that using automated language learning systems is becoming increasingly crucial for the personalized, inclusive, and cognitively focused development of students' foreign language skills. However, the actual effectiveness of these systems depends heavily on the digital readiness of the educational environment, which requires comprehensive infrastructure solutions. The novelty of this work lies in establishing this relationship using international data and interpreting it through the lens of current research on artificial intelligence in education, allowing us to see digital maturity as a key factor for successfully implementing intelligent platforms. The findings confirmed expectations of a positive impact from adaptive technologies on academic progress but also highlighted risks of inequality that could undermine the benefits of innovation. The practical significance of this study lies in its potential to guide strategic planning for the digital transformation of educational institutions, inform EdTech development policies, and enhance methodological support for foreign language instruction. At the same time, the study faces limitations, including a lack of analysis of individual learner characteristics, insights into the long-term effects of AI on cognitive development, and understanding of pedagogical interactions across various educational settings. This underscores the need for further evidence-based and interdisciplinary research. Future studies should aim to develop an optimal model for collaboration between teachers and technology, empirically test AI platforms across different cognitive groups, and establish ethical guidelines for using intelligent systems to promote sustainable growth in intercultural communication and a human-centered educational process.

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