

training pedagogical professionals in the technological domain.

The interrelation among three key components—competence frameworks, computer technologies, and artificial intelligence (AI) tools—is analyzed in detail. It is proven that the use of computer technologies (AutoCAD, Tinkercad, Python, Fusion 360, etc.) fosters project-based thinking, digital analytics, and research skills, while the integration of AI tools (Scikit-Learn, TensorFlow, ChatGPT, Gemini) develops analytical, creative, and ethical competencies of teachers. The research emphasizes the role of digital competence frameworks as normative and methodological systems that ensure structured, measurable, and predictable teacher training processes.

Based on international and national sources (UNESCO, European Commission, Ministry of Digital Transformation of Ukraine), the article substantiates the necessity of creating an integrated pedagogical ecosystem where future technology teachers acquire technical, analytical, and ethical digital skills. The study concludes that the synergy of frameworks, computer technologies, and artificial intelligence creates a new model of teacher education for the digital age, focused on creativity, ethical awareness, and technological literacy.

It has been proven that the combination of the structural clarity of frameworks, the practical basis of computer technologies, and the innovative potential of artificial intelligence creates a synergistic model for training a new generation of teachers – thoughtful, creative, ethically responsible, and technologically literate.

Keywords: digital competence, future technology teachers, framework, computer technologies, artificial intelligence, DigComp, AI Competency Framework for Teachers.

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ARTIFICIAL INTELLIGENCE IN FOREIGN LANGUAGE TEACHING

The integration of AI into education, particularly in foreign language learning, signifies a move towards digital didactics, blending traditional methods with new technologies. This shift fosters personalized learning and student autonomy by allowing AI to act as an individual assistant, tailoring content, pace, and exercises to each student's unique needs, language proficiency, and interests. AI tools like chatbots and intelligent tutoring systems offer dialogue, practice, and individualized support, helping students overcome specific weaknesses and build confidence.

AI significantly enhances foreign language teaching by enabling adaptive feedback, increasing student engagement through gamification and authentic multimedia, and immediate feedback, which reduces anxiety. Furthermore, AI automates tasks such as content selection, feedback, and assessment, freeing teachers from time-consuming grading and potentially reducing the subjectivity and errors associated with human assessment. This can help address challenges like the high cost of language courses and teacher shortages. AI tools specifically support skill development by providing evaluative feedback on writing, real-time pronunciation feedback via voice recognition, and interactive speaking practice through chatbots and virtual assistants. They also aid vocabulary acquisition by identifying unknown words and providing contextualized explanations.

The article studied the teacher's role evolvement from a traditional lecturer to a strategic guide and mentor, focusing on facilitating students' use of AI tools and providing the crucial emotive component, deeper analysis, and comprehensive support that AI currently lacks, thus forming a new educational triad: teacher-AI-student. It stressed out the paramount importance for language learning

of the access to authentic multimedia and real-world content, exposing students to genuine language use and creating immersive, dynamic learning environments that simulate real-life communication scenarios, thereby enhancing conversational skills and cultural competence.

Keywords: *AI technologies, authentic materials, didactic, individualisation language learning, language skills, personalized learning, student's autonomy.*

(статтю подано мовою оригіналу)

The concept of artificial intelligence (AI) usage in education traces back to the mid-20th century, evolving from theoretical concepts to integral tools in modern digital didactics. Even at this early stage, scientists recognised the potential of computers and software for educational purposes, though initial experiments highlighted the complexity and significant resources required for developing computer programmes for education. The 1990s saw the emergence of the first educational computer games incorporating AI elements for teaching. However, computers at the time were still cumbersome and expensive, limiting the mass adoption of these technologies.

With the advancement of digital technologies and the advent of deep learning, AI in education has become increasingly accessible and effective in recent years. Over just a few years, AI technologies have transformed from theoretical concepts into a dynamic force reshaping classical language education.

The aim of the article is to explore the transformative impact of AI technologies on modern foreign language teaching and learning and to highlight the redefinition of roles within the educational system through AI's potential to create more dynamic, immersive, and effective foreign language learning experiences, moving beyond traditional classroom limitations and empowering both students and educators.

Analysis of previous studies and publications. AI structures and strategies for complex problem solving were defined by G. Luger in his fundamental work explained the structures and strategies of artificial intelligence. D. Brown in his *Principles of English Language Learning and Teaching* outlined the essential principles of language acquisition and pedagogy, which are indispensable for integrating AI tools effectively into language learning. J. Harmer provided a framework for AI tools application into established language teaching practices. H. Gardner completely revised and updated the perspectives on individual learning styles relevant to AI's capacity for creating personalised learning paths [3; 12].

In his practical work J. Mananay used a mixed-method to investigate how educators perceive AI's effectiveness. The study looks at the different types of AI used and how teachers' views vary and touch on challenges like technology limits and how to align AI with teaching goals [14]. O. Chugai and K. Havrylenko investigated the attitudes and experiences of technical university students in Ukraine regarding their use of ChatGPT [5]. The findings underscore the necessity for educators to develop informed strategies for integrating AI tools into teaching, alongside strong policy frameworks to ensure ethical and responsible application. W. Hazaymeh, A. Bouzenoun, and A. Remache mentioned that while teaching experience influenced how instructors viewed the benefits of AI, it did not change

their perception of the challenges [10]. M. Amin studied the multifaceted impact of AI and Chat GPT on EFL education, emphasizing their role in personalized language learning, real-time language practice, and examination techniques [2]. These works stated the role of artificial intelligence integration in foreign language teaching as a tool for personalizing learning, adapting to individual needs, and providing instant feedback to improve student motivation and interactivity.

Results and discussion. The integration of AI technologies necessitates a shift towards digital didactics, which builds upon traditional principles but expands them with digital pedagogical technologies. This transition redefines relationships between teachers, students, the educational environment, and new technologies, allowing for personalised learning and enhanced student autonomy. However, challenges remain, including the imperfections of new technologies, potential risks, ethical considerations like data privacy and algorithmic bias, and the necessity for human judgment and teacher involvement.

Nowadays, AI promotes learning in relevant and personally meaningful contexts, enhancing retention and understanding. Chatbots enable dialogue where students can determine communicative context, ask questions, and receive answers, thereby forming speaking and listening skills. Intelligent tutoring systems and chatbots provide individualized practice and support, helping students address specific weaknesses and build confidence [4]. Digital tools embrace multimodality, offering information through various channels as presentations, videos, and podcasts. AI acts as a full-fledged individual assistant for each student, tailoring content and exercises to their unique needs, interests, pace, and language proficiency. It analyses language level to identify weaknesses and provides targeted support, such as additional grammar rules, explanations with real-world examples, and practice exercises. This individualisation fosters student autonomy and allows for flexible learning paths.

Artificial intelligence enhances modern foreign language teaching by enabling personalized learning, adaptive feedback, and increased student engagement by using authentic multimedia are fundamentally transforming foreign language learning environments into dynamic, personalised, and highly interactive spaces, moving beyond traditional classroom limitations. It also can free teachers from the labour-intensive task of checking written work, significantly reducing assessment time. Furthermore, AI evaluation can be less subjective and prone to error compared to human teachers, who may exhibit bias or make mistakes in assessment. AI automates various tasks such as planning, content selection, providing feedback, correcting errors, and assessing learning outcomes. This intensification of the educational process can help overcome challenges like the high cost of language courses and the shortage of qualified teachers. AI-powered tools often incorporate gamification techniques, where students earn points, advance through levels, receive rewards, and compete with peers, significantly increasing motivation and engagement. Immediate and non-threatening feedback from AI can also reduce anxiety associated with making mistakes. AI-driven applications, such as gamified platforms and conversational agents, make learning

more interactive and enjoyable, boosting motivation and reducing anxiety [1; 15].

The synergy between AI and authentic multimedia creates foreign language learning environments that are highly dynamic, responsive, and deeply immersive. AI enables the efficient delivery of authentic materials tailored to individual needs, provides immediate and actionable feedback on interactions with these materials, and facilitates the creation of new, realistic communicative scenarios, which allows students to practice speaking, listening, reading, and writing with real-world content in a low-risk, highly supportive digital space. Immersive technologies simulate real-life communication scenarios, enhancing conversational skills and cultural competence [7; 9].

The learning process becomes more student-centred, promoting autonomy and critical thinking, while the teacher's role evolves into that of a strategic guide and mentor. AI systems can tailor content, pace, and difficulty to individual learners' needs, supporting more effective and efficient language acquisition. Adaptive platforms analyze student performance and adjust exercises accordingly, promoting mastery and retention [6; 7; 19].

In the development of specific language skills AI tools support developing all language skills. It helps expand writing skill providing evaluative feedback on the content, organisation, structure, argumentation, vocabulary, and grammar of written creative works. ChatGPT can even provide recommendations for refining essays. In practicing listening skills voice recognition software offers real-time feedback on pronunciation, intonation, and stress patterns, aiding in their refinement. Chatbots and virtual assistants facilitate natural language conversations and role-playing, creating opportunities for interactive speaking practice in developing speaking skills. AI assists in developing vocabulary acquisition identifying unknown words, generating dialogues at different language levels, explaining terms in the student's first language, and correcting grammatical and spelling errors. AI tools offer immediate, detailed feedback on pronunciation, grammar, and vocabulary, allowing students to correct errors in real time and accelerate progress [7; 13]. Automated assessment systems can evaluate written and spoken language, freeing teachers from repetitive grading tasks and enabling more frequent formative assessment [17].

The role of the teacher shifts from a traditional lecturer to a moderator, coordinator, and facilitator, where the teacher's responsibilities include guiding students in effectively using AI tools and providing the emotive component, deeper analysis, and comprehensive support that AI currently lacks which forms a new educational triad of teacher-artificial intelligence-student. Access to real-world content provides unparalleled access to vast amounts of authentic foreign language material, including texts, tables, graphics, audio, and video recordings, which exposes to genuine language use is crucial for language acquisition. AI assists teachers by generating materials, suggesting teaching strategies, and handling routine tasks, allowing educators to focus on higher-level instructional design and student support [3; 17].

Immersive Environments Virtual Reality and Augmented Reality applications,

powered by AI, create simulated environments that allow students to immerse in the target language's cultural context, where they can practice communicative skills in realistic scenarios or engaging in communicative situations generated by applications. Contextual learning authentic multimedia fosters contextual learning, where new information is presented in relevant and personally meaningful contexts, often within simulated communicative situations created or facilitated by AI.

Integrating artificial intelligence into language education offers numerous advantages, fundamentally transforming the learning process, but also brings forth several ethical considerations and challenges that require careful attention. AI technologies are not perfect and pose potential risks and challenges when used in practice including data privacy, algorithmic bias, and the potential for overreliance on AI without adequate critical thinking and human judgment [5].

For instance, AI feedback, unlike that from a human teacher, often lacks the emotional component of communication, deep analysis, and comprehensive student support. Critics argue that AI can replace human interaction and may not fully consider students' individual characteristics. The integration of AI necessitates a shift in the teacher's role from a lecturer to a moderator, coordinator, and facilitator. However, there is a technological gap between teachers and students, with many educators having low competence in AI tools despite students' high motivation to use them.

Some AI tools may not adequately assess the depth of content in creative writing or provide sufficient recommendations for structural changes, beyond merely identifying errors and AI can have a limited ability to process the broader context and meaning of language. While advanced models show promise in understanding content, they may still struggle with the nuanced assessment of content depth compared to a human teacher. There is a concern about students using AI-generated text without proper attribution or for unauthorised purposes, necessitating discussions on authorial ethics and plagiarism.

Current research on AI in language education demonstrates that it may have limitations such as small sample sizes, limited data reliability, and a lack of longitudinal studies, which affect the language learning [5, 18].

Despite AI's capabilities, students still emphasise the indispensability of an instructor in AI-infused lessons, particularly for complex skills and adapting to diverse situations. Teachers remain crucial for emotional support, deeper analysis, and critical guidance. Generally, AI serves as a powerful instrument, offering tailored support and efficiency in language learning, much like a digital personal trainer adapting exercises and providing instant feedback. However, it requires a human coach to interpret complex nuances, offer emotional encouragement, and ensure ethical practice, creating a dynamic partnership for optimal educational outcomes.

Conclusions. In conclusion, the integration of AI technologies represents a significant paradigm shift in foreign language education, beginning in an era of digital didactics that enhances traditional pedagogical approaches with powerful digital tools. The benefits are substantial as AI fosters personalized learning, empowering students with greater autonomy and tailoring educational experiences

to individual needs, paces, and proficiency levels. Tools like chatbots and intelligent tutoring systems offer invaluable support, immediate feedback, and engaging practice, thereby boosting motivation and reducing learning anxiety. Furthermore, AI streamlines administrative tasks for educators, such as assessment, and provides access to a wealth of authentic, immersive learning materials.

AI significantly improves foreign language teaching by personalizing instruction, providing instant feedback, and increasing student engagement. While it cannot fully replace human teachers, its integration offers substantial benefits when combined with thoughtful pedagogical strategies and ongoing teacher involvement.

However, this technological advancement is not without its challenges. The inherent imperfections of new technologies, potential risks, and critical ethical considerations, including data privacy and algorithmic bias, necessitate careful navigation. The indispensable role of human judgment, empathy, and deeper analytical support from teachers remains paramount.

The educational landscape is increasingly defined by a synergistic triad of teacher-AI-student. The teacher's role evolves from a dispenser of knowledge to a strategic guide and facilitator, crucial for helping students harness AI's potential effectively while providing the essential human elements that AI cannot replicate. Embracing AI thoughtfully, while mitigating its risks and valuing human connection, promises to unlock unprecedented opportunities for effective and engaging foreign language acquisition. Ultimately, AI in education is a powerful tool for increasing effectiveness and accessibility, but a harmonious balance between technology and human pedagogical support is crucial.

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ГАВРИЛЕНКО К. М., ПРИХОДЬКО Д. С. Роль штучного інтелекту у навчанні іноземних мов.

Інтеграція штучного інтелекту в освіту, зокрема у вивчення іноземних мов, означає перехід до цифрової дидактики й поєднання традиційних методів з новими технологіями, які сприяють покращенню персоналізованого навчання та автономії студентів, дозволяючи AI виступати в ролі індивідуального помічника, адаптуючи контент, темп та вправи до особистих потреб, рівня володіння мовою та інтересів кожного студента. Інструменти AI, такі як чат-боти та інтелектуальні системи навчання, пропонують діалоги, практичну індивідуальну підтримку, допомагаючи студентам подолати слабкі місця та підвищити їх впевненість.

У статті підкреслюється, що AI значно покращує викладання іноземних мов, забезпечуючи зворотний зв'язок, підвищує залученість студентів через гейміфікацію та використання автентичних мультимедійних матеріалів, миттєвий зворотний зв'язок. Крім того, AI автоматизує такі завдання, як вибір контенту, зворотний зв'язок та оцінювання, звільняючи викладачів від трудомісткого оцінювання та потенційно зменшуючи суб'єктивність та помилки, пов'язані з людським оцінюванням, що може допомогти вирішити такі проблеми, як висока вартість мовного навчання та нестачу викладацьких кадрів.

Інструменти AI підтримують розвиток мовленнєвих навичок, надаючи оцінювальний зворотний зв'язок з письма, сприяє розвитку усного мовлення в реальному часі за допомогою розпізнавання голосу та інтерактивну практику говоріння через чат-боти та віртуальних помічників. Вони також допомагають у вивченні лексики, визначаючи невідомі слова та надаючи контекстуальні пояснення.

В роботі досліджується еволюція ролі викладача від традиційного ментора до помічника і наставника, зосереджуючись на допомозі у використанні студентами інструментів AI та забезпеченні емоційного компоненту, глибшого аналізу та всебічної підтримки, яких наразі не вистачає AI, таким чином формуючи нову освітню тріаду: викладач-AI-студент. Також наголошується, що доступ до автентичних мультимедійних матеріалів та реального контенту має першорядне значення для ознайомлення студентів зі реальним використанням мовних компонентів та створення динамічного навчального середовища, яке імітує реальні сценарії спілкування, тим самим покращуючи навички спілкування та культурну компетентність.

Ключові слова: AI технології, автентичність, дидактичні навички, мовне навчання, індивідуалізація навчання, мовленнєві навички, самостійне навчання, самореалізація.

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THE ORETICAL PRINCIPLES OF TRAINING FUTURE MUSICAL ART TEACHERS FOR PROJECT ACTIVITIES IN OUT-OF-SCHOOL EDUCATION INSTITUTIONS OF THE PEOPLE'S REPUBLIC OF CHINA

The present theoretical paper explores the underlying foundations of project-based learning (PBL) in the teacher preparation of prospective music teachers in extracurricular teaching institutions of the People's Republic of China. Based on the latest Chinese and overseas scholarship, the paper analyzes in a structured way the commitment of PBL to constructivist and inquiry-oriented pedagogic paradigms with emphasis on student-centered, collaborative, and creative teaching strategies. The paper identifies the main pedagogic requirements for the effective application of PBL through integrated curricula, teacher preparation, and computing support. It further clarifies key terminological correspondence between Western education concepts and Ukrainian pedagogic discourse with the intention of offering conceptual access for Ukrainian researchers and methodologists.

Through the aggregation of the most recent literature by a synthesis method, the paper determines the specific profession-related skills that PBL develops in future music teachers in terms of critical thinking, communication, reflective practice, and information and communication technology literacy. Specific focus is put on the extracurricular education system of China's cultural and institutional context, in which collective learning, discipline, and performance-related activities highly determine the development of pedagogic strategies. These factors are considered in the implementation of the PBL models in other country contexts.

The paper is structured in a fashion that it unfolds the very core of Ukrainian scholarship tradition – conceptual foundations, execution conditions, and competency-based outcomes – so that it is beneficial for foreign and domestic teaching-related researches alike. Last but not least, the paper outlines a whole theoretical concept that contributes to improving music teacher education with the aid of original, task-related teaching strategies, and that becomes a basis for other empirical analyses and applied studies in teacher education systems internationally.

Keywords: project-based learning, project activities, training of future teachers of music, extracurricular education in the China, constructivist pedagogy, research-based learning.