

A THEORITICAL AND PRACTICAL REVIEW OF AI-ADAPTIVE LEARNING TECHNOLOGIES AND INTERACTIVE PLATFORMS IN TEACHING ENGLISH

ТЕОРЕТИКО-ПРАКТИЧНИЙ ОГЛЯД ШІ-АДАПТИВНИХ ТЕХНОЛОГІЙ НАВЧАННЯ ТА ІНТЕРАКТИВНИХ ПЛАТФОРМ У ВИКЛАДАННІ АНГЛІЙСЬКОЇ МОВИ

This article explores the integration of artificial intelligence (AI)-driven adaptive learning systems into the process of teaching English as a second or foreign language, emphasizing the increasing significance of interactive technologies in contemporary language education. Recent progress in artificial intelligence has significantly transformed educational approaches, particularly in English language instruction, by facilitating more flexible and learner-centered learning environments.

AI-based adaptive learning systems employ machine learning, natural language processing, and data analytics to monitor learner performance and personalize content, pacing, and feedback. By determining the specific strengths and challenges of each student these systems provide targeted support that enhances the effectiveness of language learning. Interactive technologies such as virtual classrooms, digital simulations, gamified platforms, and AI-driven conversational agents promote learner engagement, active participation, and real-time communicative practice.

The integration of adaptive AI systems with interactive technologies facilitates authentic language use through simulated real-world scenarios and collaborative activities. This approach promotes the development of linguistic accuracy and communicative competence while fostering learner autonomy in virtual learning environments. The study examines the theoretical foundations of adaptive learning within learner-centered and constructivist pedagogical frameworks and reviews international research on the application of AI and interactive technologies in English language education. Special focus is placed on intelligent tutoring systems, automated feedback mechanisms, AI-based assessment tools, and interactive platforms that support the acquisition of grammar, vocabulary, pronunciation, and communicative skills. Empirical evidence from international studies demonstrates that AI-driven adaptive and interactive learning environments enhance learner motivation, increase engagement, and lead to improved learning outcomes compared to traditional instructional methods.

Key words: artificial intelligence, AI-driven adaptive learning systems, tools, language skill development, English language teaching, professional development, learning environment, interactive technologies.

У статті досліджено інтеграцію адаптивних навчальних систем на основі штучного інтелекту (ШІ) у процес навчання англійської мови як другої або іноземної з акцентом на зростаючу роль інтерактивних техноло-

гій у сучасній освіті. Останні досягнення у сфері штучного інтелекту суттєво трансформували освітні підходи, зокрема у викладанні англійської мови, сприяючи створенню більш гнучких та орієнтованих на здобувача освіти навчальних середовищ.

Адаптивні навчальні системи на базі ШІ використовують алгоритми машинного навчання, обробку природної мови та аналітику даних для моніторингу навчальних досягнень здобувачів освіти й персоналізації навчального контенту, темпу опрацювання матеріалу та зворотного зв'язку. Завдяки виявленню індивідуальних сильних і слабких сторін такі системи забезпечують цілеспрямовану педагогічну підтримку, що підвищує ефективність вивчення іноземної мови. Інтерактивні технології, зокрема віртуальні класи, гейміфіковані платформи та розмовні асистенти на основі ШІ, сприяють активному залученню здобувачів освіти в навчальний процес, їх участі в навчальному процесі та розвитку комунікативної компетентності в режимі реального часу.

Поєднання адаптивних ШІ-систем з інтерактивними технологіями забезпечує автентичне використання мови через моделювання реальних комунікативних ситуацій і виконання колективних навчальних завдань. Такий підхід сприяє розвитку мовної точності та комунікативної компетентності, а також формуванню навчальної автономії здобувачів освіти у віртуальному освітньому середовищі. У дослідженні проаналізовано теоретичні засади адаптивного навчання в межах студентоцентрированої та конструктивістської педагогічних парадигм, а також здійснено огляд міжнародних наукових праць, присвячених застосуванню ШІ й інтерактивних технологій у викладанні англійської мови. Особливу увагу приділено інтелектуальним навчальним системам, автоматизованим механізмам зворотного зв'язку, інструментам оцінювання на основі ШІ та інтерактивним платформам, що забезпечують розвиток граматичних, лексичних, фонетичних і комунікативних умінь. Емпіричні результати міжнародних досліджень засвідчують, що адаптивні та інтерактивні навчальні середовища на основі ШІ підвищують навчальну мотивацію, рівень залученості здобувачів освіти та сприяють покращенню результатів навчання порівняно з традиційними методами викладання.

Ключові слова: штучний інтелект, адаптивні системи навчання на основі штучного інтелекту, інструменти, розвиток мовленнєвих навичок, викладання англійської мови, професійний розвиток, навчальне середовище, інтерактивні технології.

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Problem statement. As education becomes more global and English continues to serve as a key international means of communication, there is a stronger requirement for flexible, student-oriented approaches

to language instruction. Conventional models, which typically depend on curricula and a set teaching pace, often fail to recognize the varied competence levels among students, learning speed, cognitive

preferences, and motivational factors. In this context, interactive platforms—such as virtual classrooms, AI-powered conversational agents, gamified environments, and collaborative digital tools—serve as essential complements to AI-adaptive systems. They enable active engagement, real-time communication, authentic practice, and immediate feedback, thereby enhancing motivation and communicative competence. By integrating interactive platforms with AI-adaptive technologies, English instruction can be personalized while preserving social and collaborative learning opportunities often lacking in conventional approaches.

Analysis of recent research and publications.

As noted by Dede [3], uniform instructional designs are increasingly misaligned with the needs of modern learners operating in digitally mediated educational contexts. Contemporary students require learning environments that are flexible, immersive, and designed to accommodate individualized learning progressions. In this regard, interactive platforms—such as virtual learning environments, digital simulations, and collaborative online spaces—play a crucial role in supporting active learner engagement and experiential learning. Dede emphasizes that interactive technologies allow learners to progress beyond passive content consumption toward participatory and context-rich learning experiences, which is particularly relevant for language education, where outcomes are strongly influenced by interaction and communication.

New AI innovations have enhanced the instructional benefits of these learning settings by introducing adaptive learning systems capable of dynamically modifying instructional content and responses using insights from learner data. Researchers highlight that AI-driven personalization represents a paradigm shift from static curricula toward learner-centered educational models [1, p. 38]. When integrated into interactive platforms, adaptive systems enable the individualization of learning trajectories while simultaneously supporting real-time interaction, collaboration, and communicative practice. This integration allows learners to interact with content that is both personalized and socially meaningful.

Within English language education, machine learning and natural language processing-based adaptive systems provide fresh opportunities for tailored grammar practice, vocabulary development, pronunciation training, and the strengthening of communicative competence [10]. Interactive platforms further expand these possibilities by enabling dialogue, role-playing, realistic communication scenarios, and collaborative tasks. Intelligent tutoring systems and AI-based conversational agents integrated into interactive environments help learners rehearse language skills in a low-pressure atmosphere, which is especially valuable in virtual and blended learning contexts.

Nevertheless, despite growing research highlighting the potential benefits of AI-powered adaptive learning systems and interactive platforms, their effective implementation in English language education remains a complex and unresolved challenge. Studies indicate that many institutions face difficulties related to pedagogical integration, teacher readiness, ethical concerns, and data privacy issues [4]. In addition, while adaptive technologies and interactive platforms can provide real-time automated responses and extended opportunities for practice, excessive reliance on AI tools risks diminishing meaningful human interaction, which remains a critical component of language learning [8].

Another significant issue identified in international research is the lack of comprehensive methodological frameworks that guide educators in the systematic integration of AI-based adaptive systems and interactive platforms within constructivist and communicative teaching paradigms [6]. As a result, these technologies are frequently used independently or only as add-ons rather than as fundamental components of instructional design, which limits their pedagogical influence and sustainability. Therefore, the main issue discussed in this paper is the necessity to develop and substantiate a pedagogically sound approach for integrating AI-driven adaptive learning systems together with interactive platforms in English language teaching.

The purpose of the article. The purpose of this article is to substantiate the pedagogical potential of AI-powered adaptive learning systems and interactive platforms in the teaching of English as a second or foreign language and to conceptualize their effective implementation within contemporary educational contexts. Specifically, this paper investigates how combining AI-powered adaptive learning systems with interactive platforms can support individualized instruction, increase learner motivation, and improve key language abilities—grammar, vocabulary, pronunciation, and communicative competence.

Interactive platforms—such as virtual classrooms, AI-driven conversational agents, gamified learning environments, and collaborative digital tools—play a critical role in facilitating authentic language practice, real-time interaction, and learner participation. They complement AI-adaptive technologies by fostering social and communicative learning elements that are essential for language acquisition.

Another important goal of the study is to identify the teaching conditions that allow adaptive AI technologies and interactive platforms to be incorporated into English language instruction while balancing automated learning, interactive participation, and meaningful human support.

Presentation of the main material. The integration of artificial intelligence into education has led to the development of AI-powered adaptive learning

systems which, together with interactive platforms, are reshaping English language teaching. These technologies collect and analyze real-time student performance data, enabling the personalization of instructional content, learning paths, and feedback. Interactive platforms—such as virtual classrooms, AI conversational agents, gamified environments, and collaborative digital tools—promote active participation, authentic communication, and collaborative practice. While AI systems rely on machine learning, natural language processing, and learning analytics, interactive platforms provide real-time opportunities for speaking, writing, and comprehension practice, supporting the development of core language skills [10].

In university-level instruction, AI-adaptive systems are often implemented through personalized grammar and vocabulary modules on platforms such as Duolingo or Lingvist, which identify learner difficulties and adjust tasks accordingly. Interactive platforms complement these systems by enabling communicative practice through virtual classrooms (Zoom, Teams), gamified tools (Kahoot!, Quizlet Live), and collaborative environments (Padlet, Google Docs). These tools allow students to transfer their learned skills into authentic academic communication contexts.

Research findings demonstrate that the combined use of AI-adaptive and interactive technologies enhances learner motivation and engagement. Personalization and learner autonomy, identified by Dörnyei, a British scientist, as key motivational factors, are reinforced through adaptive systems, while interactive platforms enable significant collaboration among learners. Compared to traditional instruction, learners demonstrate higher levels of grammar accuracy, vocabulary retention, pronunciation, and overall communicative competence [5].

Despite technological advancements, the teacher's role remains central. Educators are essential for interpreting system-generated data, scaffolding learning, guiding interaction, and maintaining meaningful human engagement. Effective integration of AI-adaptive systems and interactive platforms therefore requires a holistic pedagogical approach grounded in learner-centered and constructivist principles, combining technological innovation with informed instructional design to support flexible, inclusive, and effective English language learning [1; 10].

Based on theoretical and empirical research, the following recommendations are offered for integrating AI-enabled technologies:

1. *Combine AI and interactive platforms:* Use AI-adaptive systems alongside virtual classrooms, gamified environments, and conversational agents to provide personalized practice while enabling authentic communication and collaboration.

2. *Align with curriculum and standards:* Select technologies that develop all key language skills and align with proficiency standards (e.g., CEFR), using realistic tasks that reinforce classroom learning.

3. *Provide professional development:* Train teachers in both technical use and pedagogical integration of AI and interactive tools, emphasizing meaningful communication and collaboration.

4. *Ensure ethical use and data security:* Maintain transparency, protect learner data, and inform users about collection and privacy policies.

5. *Promote learner autonomy:* Encourage self-regulated learning through system feedback, personal goal setting, and interactive tasks to promote motivational engagement.

6. *Evaluate effectiveness continuously:* Use performance data, feedback, and observations to refine strategies and ensure technology supports learning outcomes.

7. *Foster collaboration and communication:* Integrate adaptive personalization with interactive engagement to develop social, collaborative, and communicative competencies.

Conclusions. The study demonstrates that the integration of AI-powered adaptive learning systems and interactive platforms holds significant pedagogical potential for teaching English as a second or foreign language. Traditional instructional models, often reliant on standardized curricula and uniform pacing, do not sufficiently respond to differing needs, cognitive styles, and learners' motivational factors. AI-adaptive technologies address these limitations by providing personalized content, real-time feedback, and data-driven learning pathways, while interactive platforms enhance engagement, collaboration, and authentic communicative practice.

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