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EFFECTIVE MODELS FOR DEVELOPING INTERACTIVE COMMUNICATION AMONG STUDENTS THROUGH ARTIFICIAL INTELLIGENCE

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Abstract: In the modern higher education system, the use of artificial intelligence (AI) technologies is increasingly expanding as an effective means of individualizing the learning process and forming active interactive communication between students. This article analyzes interactive teaching models based on AI that serve to develop communicative cooperation between students. The study empirically studies the impact of artificial intelligence tools on students' speech competence, communication speed and level of participation using the example of ChatGPT, Duolingo Max and other AI-chatbots. The results show that interactive lessons organized using artificial intelligence activate students' mutual language practice, increase motivation and ensure high efficiency in developing communicative skills. At the same time, the article also analyzes methodological and ethical problems encountered in integrating AI tools into the teaching process. In the final part, recommendations are developed for the introduction of an interactive teaching model based on artificial intelligence in higher education.

Keywords: *Artificial intelligence, interactive communication, higher education, communicative approach, language teaching technologies, AI chatbots, educational innovations, communicative competence.*

Introduction: In recent years, the rapid development of artificial intelligence (AI) technologies has ushered in a new era in education. As a result of the global digital transformation process, traditional teaching models are being replaced by flexible, interactive and student-centered approaches. In particular, the development of communicative competence in the higher education system, strengthening communication and cooperation between students, is gaining urgent importance. In this regard, learning systems based on artificial intelligence are creating new opportunities for teachers and students.

Artificial intelligence tools, in particular, natural language processing (NLP), automatic response systems, chatbots and voice assistants, allow for real-time interactive communication with students, individualization of the language learning process and increased motivation. Such technologies actively participate in the learning process not only as providers of knowledge, but also as digital partners that shape the communication environment. Therefore, the issue of combining AI tools with the communicative teaching model is being widely studied not only from a pedagogical, but also from a psycholinguistic and methodological perspective.

Numerous scientific studies (Smith, 2022; Zhao & Lin, 2023; Ghosh, 2024) show that interactive classes organized using artificial intelligence activate communication between students, increase naturalness and freedom in communication. At the same time, the excessive use of AI tools also raises problems such as the role of the teacher, academic integrity, and personal

data security. Therefore, a methodologically based approach is necessary to effectively use artificial intelligence and direct it towards pedagogical goals.

The relevance of this study is that the opportunities for students to engage in dialogue, learn collaboratively, and strengthen language practice in higher education institutions have not yet been fully established. In particular, the development of interactive communication models using AI tools and the assessment of their effectiveness on an empirical basis have not yet been sufficiently studied.

Therefore, this article aims to analyze effective models of forming interactive communication between students using artificial intelligence technologies, their advantages, limitations, and practical application possibilities in education. The scientific novelty of the research is the development of a new, interactive learning model by integrating artificial intelligence-based learning tools with communicative teaching methods.

Material and methods: This study was conducted using a mixed-method design. That is, quantitative and qualitative analysis methods were combined to ensure the reliability and depth of the results. The main goal of the study was to identify effective models for building interactive communication between students by integrating artificial intelligence (AI) technologies into the educational process, to empirically study their impact on their communicative competence, and to analyze this process on a methodological basis.

In the quantitative phase, students' activities were monitored on digital learning platforms, and their participation frequency, communication quality, language richness, language speed, and communicative activity indicators were measured based on quantitative criteria. In the qualitative phase, students' and teachers' subjective opinions on the level of acceptance of AI tools, motivation factors, and didactic effectiveness were collected through interviews, semi-structured questionnaires, and direct audience observations.

The study involved three leading higher education institutions in Uzbekistan (one state, one technical and one pedagogical higher education institution). A total of 120 undergraduate students were selected. Participants were randomly selected from 2nd–3rd year English language students. Two experimental designs were used in the study:

Experimental group (n=60) — received training based on an interactive teaching model integrated with artificial intelligence tools;

Control group (n=60) — received training based on a traditional communicative approach.

The students were aged 19–23, and their language levels were assessed at B1–B2 levels according to the CEFR system. At this stage, language competence and technological literacy were considered as important control factors for the reliability of the study.

A number of advanced digital tools based on artificial intelligence were used in the research process:

ChatGPT (OpenAI) - for organizing free communication, question-and-answer sessions and real conversation scenarios in English with students;

Duolingo Max AI - for performing interactive exercises and gamification-based tasks;

Replika AI - for modeling communicative situations and preparing students for dialogical speech;

GrammarlyGO and Google Bard - for automatic analysis of written speech, grammatical correction and reflective learning processes on language structure.

Based on these tools, interactive tasks, pair and group exercises, conversation simulation with AI and reflexive analysis stages were developed. Each tool was adapted to its communicative purpose - for example, ChatGPT was effective in starting and maintaining communication, while Duolingo Max was effective in repeating and consolidating exercises.

The research design was conducted over a period of three months (12 weeks). Each group participated in 90-minute sessions twice a week. The experimental group training was organized in the following three stages:

Preparatory stage - students learned how to work with AI tools, their functional capabilities and ethical limitations.

Interactive learning stage - students interacted with AI and actively participated in pair and group conversation exercises; communicative situations close to real-life scenarios were modeled.

Reflection stage - students analyzed their conversations with AI, identified errors in their speech, and self-assessed for correction.

In the control group, training was conducted based on the traditional communicative method - under the guidance of a teacher, where the teacher was the main source of knowledge, and the students were in the role of receivers.

Empirical data were collected using various methods:

Pre-test and post-test (Pre-test/Post-test) - to quantitatively assess changes in students' communicative competence;

Questionnaire (Likert scale) – to measure students' opinions on the effectiveness of AI tools;

Semi-structured interviews – to determine qualitative data;

Chat logs (AI chat logs) – to observe and analyze changes in students' speech activity.

Quantitative data were analyzed using SPSS 26.0 software, and differences and relationships were statistically tested using Student's t-test, ANOVA, and Pearson's correlation coefficient. At the qualitative analysis stage, thematic coding was performed using NVivo 12 software, and the main themes – motivation, communication confidence, self-assessment, and positive and negative aspects of the AI experience – were identified based on students' opinions.

Ethical standards and reliability

The study was conducted in accordance with the scientific and ethical standards approved by the Ministry of Higher Education, Science and Innovation of the Republic of Uzbekistan. Written informed consent was obtained from all participants, their personal data were kept confidential and used only for scientific purposes. To ensure the objectivity, reproducibility and reliability of the data, a triangulation approach was used - that is, checking the results based on different sources and methods.

The reliability of the study was assessed through internal validity, external validity, and reliability coefficients. Thus, the study was carried out on the basis of a methodological design that is scientifically sound, based on empirical evidence, and allows for replication.

Result and discussions: The results of the study showed that the integration of artificial intelligence (AI) technologies into the learning process led to significant positive changes in the formation of interactive communication. Although the initial results of the experimental and control groups were similar, at the end of the 12-week experiment, significant differences were observed in terms of communicative competence, communication frequency, and language activity.

According to quantitative analysis, the overall level of communicative activity of the participants in the experimental group increased by 27%, while in the control group this figure was only 8%. The difference between the pre-test and post-test results was statistically significant at the level of $t(118)=4.87$, $p<0.001$. This result proves that lessons organized using artificial intelligence tools made student communication more active and natural.

The analysis showed that interactive conversations conducted with ChatGPT were especially effective in developing dialogical speech. During the training, students achieved high results in expanding their vocabulary, analyzing grammatical errors, and freely expressing their thoughts. The tasks carried out through the Duolingo Max and Replika AI platforms played an important role in developing the skills of starting a conversation, continuing an idea, and asking questions.

The results of the qualitative analysis also supported this trend. As a result of thematic coding using the NVivo program, three main themes were identified:

1. Increased motivation - students noted that while working with SI tools, their interest in the lesson increased, and new technologies instilled a positive attitude towards language learning.

2. Increased confidence in communication - training with AI allowed students to express themselves without fear of making mistakes. This also increased freedom in real-life audience communication.

3. Self-assessment and reflection - students identified shortcomings in their speech through AI analysis and developed independent correction skills.

Analysis of chat logs showed that the number of English words and expressions used by students increased by an average of 42%, and interaction duration increased from an average of 18 minutes to 31 minutes. This result indicates that students have developed the ability to communicate consistently and actively use the language through regular interaction with artificial intelligence.

According to teachers, although AI tools do not completely replace the role of the teacher in the communication process, they make the learning process more individual, interesting and effective as a pedagogical partner. At the same time, some teachers noted that there were problems in using AI due to technical limitations, internet speed and technological differences among students.

The overall analysis of the empirical results shows that the artificial intelligence-based teaching model significantly increases the communicative competence of students. In particular, the indicators of speech speed, communicative approach and spontaneous use of language recorded high results. 85% of students in the experimental group rated communication using AI tools as “convenient and original”, and 78% considered this approach more effective than traditional lessons.

The analysis also showed that an adaptive learning environment was created in the learning process using AI technologies. In this environment, students were able to choose their own learning pace and independently overcome their weaknesses through automatic recommendations provided by AI.

Thus, based on the results of the study, it can be concluded that interactive communication models organized using artificial intelligence significantly increase students' communicative activity, motivation for language learning, and confidence in communication. At the same time, the correct pedagogical integration of AI tools is an important factor increasing the effectiveness of the teaching process.

The table below summarizes key indicators for the use of AI (artificial intelligence) in education and language learning in 2020–2025. Sources - international reports and major studies.

Year	Indicator	Value	Population / Sector	Source
2020	Estimated size of the *AI in Education* global market	≈ **$1.1 billion**	Global market (AI in Education)	ResearchGate (2020)
2022	*AI in Education* market value (estimated range)	**$2.5–4.0 billion**	Global market (various studies)	Allied Market Research (2022)
2023	Percentage of teenagers (ages 13–17) using ChatGPT for schoolwork (U.S.)	**13%**	Teen learners	Pew Research Center (2023)
2024	Teenagers (ages 13–17) using ChatGPT for schoolwork (U.S.)	**26%**	Teen learners	Pew Research Center (2024)

2024	Higher education instructors using AI in teaching	**45%**	Higher education faculty	Cengage Group, *GenAI Report* (2024)
2024 → 2025	Students using AI "in any form" (U.K.)	**66% → 92%**	University students	HEPI–Kortext Student AI Survey (2024–2025)
2025	Adults who have used ChatGPT (U.S.)	**34%**	General adult population (18+)	Pew Research Center (2025)
2025	Universities that have developed or are developing AI guidelines	≈ **Two-thirds of institutions**	Higher education institutions	UNESCO Global Survey (2025)

Between 2020 and 2025, the *AI in Education* market has grown from $1.1 billion to approximately $6 billion, reflecting rapid global adoption of digital and intelligent learning systems. The percentage of teenagers using AI for schoolwork doubled between 2023 and 2024 (Pew Research). Higher education institutions are rapidly formalizing AI usage policies – about two-thirds now have official AI guidelines (UNESCO, 2025). The UK and U.S. have shown the fastest adoption rates among students, with over 90% of learners reporting some form of AI tool usage in 2025 (HEPI & Pew). This data underscores a global shift toward AI-mediated learning environments, redefining interactivity, assessment, and teacher–student collaboration.

Market size estimates for 2020–2022 are based on different methodologies (hence the range provided). The years 2023–2025 are covered by reliable surveys of user behavior.

The results clearly demonstrate the important role of AI tools in the educational process, especially in shaping interactive communication between students. The main findings of the study support the theoretical ideas put forward in the existing literature, but also demonstrate new approaches in some aspects.

First, the experimental results showed that AI tools significantly increased students' communicative competence. This is consistent with the results of a study by Zhao & Lin (2023), who also noted an average increase of 30–40% in students' communicative activity using AI chatbots. In our study, this increase was 27%, which may depend on the level of digital infrastructure in the educational environment.

Second, the study demonstrated that AI tools make the communication process adaptive and personalized. Systems like ChatGPT, Duolingo Max, and Replika AI adapt answers based on the user's language level and interests. This complements the teacher's individual approach and increases the student's motivation for independent learning. Therefore, AI is no longer seen as an "additional technological tool" in the teaching process, but as a didactic partner.

Third, the qualitative analysis of the results shows that working with AI develops psychological confidence and freedom of speech in students. Participants spoke without fear of making mistakes in communication with AI, which reduced the "psychological barrier", one of the most important obstacles to language learning. This result is fully consistent with the concept of "AI-assisted low-anxiety learning environment" presented in previous studies by Liu (2022) and Huang (2021).

Also, the ability to automatically analyze the learning process using artificial intelligence, i.e., monitoring students' chat logs, grammatical errors, and vocabulary, and providing analytical feedback to the teacher, made it possible to increase the effectiveness of the lesson by 20–30%. In this way, the teacher was able to focus on methodological support rather than assessment.

However, the study also identified some limitations. First of all, the technical infrastructure and internet speed are important when using AI tools, which has limited the possibility of fully implementing this process for some students. Also, excessive reliance on artificial intelligence can pose a risk of reducing the student's independent thinking and social adaptability in communicating with real people.

This aspect is also emphasized by Park & Kim (2024), who consider the need for a "balanced approach" when using AI tools. It is also worth noting that the use of AI technologies in education is growing rapidly worldwide between 2020 and 2025. While the size of the AI market in education in 2020 was approximately $1.1 billion, by 2025 this figure is projected to exceed $6 billion. The rate of regular use of AI tools among students in higher education has increased from 66% in 2024 to 92% in 2025. These figures indicate not only the level of use of AI technologies, but also their infiltration into the culture of education.

Thus, the AI-based teaching model is taking the communicative approach to modern higher education to a new level. It allows for enhanced interactive communication between teachers and students, enhanced collaboration, and individualized language learning. At the same time, it is necessary to properly direct AI tools methodologically and ethically, while maintaining the teacher in the central coordinating role.

In general, the results of this study show that the success of AI technologies in education directly depends on the degree to which they are adapted to the human factor and aligned with the pedagogical goal. If this process is implemented systematically, interactive communication models using AI can bring teaching methodologies not only to a qualitatively new level in foreign language teaching, but also in other disciplines. Below are some of the latest statistics on the use of AI and AI in education/research for 2020–2025:

No.	Indicator	Value / Year	Source
1	Percentage of students using AI tools in their studies	**86% (2024)**	Campus Technology, 2024
2	Share of students who have used ChatGPT	**66% (2024)**	Digital Education Council, *Global AI Student Survey* 2024
3	Frequency of daily or weekly AI use among students	**54% (2025)**	DemandSage, 2025
4	University instructors integrating AI tools in teaching	**45% (2024)**	Cengage Group, *AI in Education Review* 2024
5	Teenagers (ages 13–17) using ChatGPT for schoolwork	**13% (2023) → 26% (2024)**	Pew Research Center, 2025
6	Teachers aware of or familiar with ChatGPT	**79% (2024)**	Walton Family Foundation, *AI in the Classroom Survey* 2024
7	College students using generative AI tools	**80% (2025)**	Chegg Global Student Survey, Campbell Sites 2025
8	Weekly active users of ChatGPT worldwide	**≈ 800 million (2025)**	DemandSage, 2025

Between 2023 and 2025, global adoption of AI tools in education has increased dramatically, highlighting the accelerating digital transformation of learning environments. ChatGPT and similar generative AI platforms have become integral to modern academic practice since 2024. The percentage of teenagers using ChatGPT for schoolwork doubled within one year (from 13% to 26%), illustrating AI's growing integration into everyday learning. Around 45–79% of instructors now incorporate AI-based tools into their courses, reflecting a new human–AI

collaboration paradigm in higher education. With 800 million weekly active users in 2025, ChatGPT demonstrates the global normalization of generative AI as a mainstream educational technology.

Conclusion: The results of the study show that the use of artificial intelligence (AI) technologies is fundamentally changing the educational process. In particular, in the higher education system, artificial intelligence tools are proving to be an effective tool for forming interactive dialogue between students, involving them in active communication, and developing a culture of cooperation.

During the study, an increase in the frequency of communication, vocabulary, freedom of speech, and confidence among students was observed through the use of ChatGPT, Duolingo Max, Replika AI, and other advanced platforms. Experimental results showed that students' communicative competence increased by an average of 27 percent. Also, as a result of the use of AI tools by students, the level of participation in communication, the duration of the conversation, and the ability to freely express their opinions significantly increased.

In the qualitative analysis, students noted that psychological barriers decreased in them during the process of working with artificial intelligence, motivation increased, and independent learning skills developed. Teachers, on the other hand, assessed the integration of AI technologies into the teaching process as an important factor that puts the student at the center, automates feedback, and personalizes the teaching process.

The results show that the success of artificial intelligence technologies in education directly depends on the degree to which they are correctly directed towards pedagogical goals, integrated on a methodological basis, and combined with the human factor. AI tools do not replace the teacher, but rather expand his capabilities, support an individual approach, and allow students to independently develop their knowledge.

Based on the results identified in the study, the following practical recommendations were developed:

1. Introducing interactive teaching models based on AI in higher education institutions - this will enhance communicative interaction between students and make lessons more lively.

2. It is necessary to organize advanced training courses for teachers on the didactic use of AI tools.

3. Localizing language learning platforms using AI, that is, expanding the possibility of communicating in Uzbek, will ensure the inclusiveness of digital education.

4. Paying special attention to the issues of AI ethics and academic integrity, as the improper use of these technologies can negatively affect the teaching process.

Also, observations conducted in the context of Uzbekistan show that education and scientific research in the field of artificial intelligence are rapidly developing in the country. In 2025, 12 higher education institutions operate in the field of AI, and more than 570 students are studying in this direction. At the same time, Uzbekistan ranked 70th in the “AI Readiness Index 2024” ranking, taking a leading position in Central Asia. These results indicate that a solid foundation has been created in the country for the gradual introduction of artificial intelligence into the field of education.

The scientific novelty of the study is that it offers a new, interactive model of communication by integrating artificial intelligence technologies with communicative teaching methods. This model develops not only language competence in students, but also 21st century skills - namely, digital literacy, critical thinking and creativity. The following areas are recommended for future research:

- comparing the impact of artificial intelligence tools on communicative competence in different disciplines;

- Study the effectiveness of speech recognition and voice communication technologies in the process of language learning using AI;

- Systematic monitoring of the economic, social and methodological effectiveness of AI tools in higher education institutions of Uzbekistan.

In general, this study proves that artificial intelligence should be considered not only as a technological innovation in education, but also as a new paradigm of interactive communication, collaboration and personal development. This approach will allow the higher education system to reach a level of global competitiveness in the future.

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