2026-yil
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“FAN VA TA’LIM YANGILIKLARI”

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Bosh muharrir:
Shoumarov G‘ayrat Bahromovich, psixologiya fanlari doktori, akademik

Bosh muharrir o‘rinbosari:
Qodirov Umarali Do‘stqobilovich, psixologiya fanlari doktori (DSc), professor

Mas’ul kotib:
Muqimov Alisher

Texnik muharrir:
Qarshiyev Jamshid Murotaliyevich, pedagogika fanlari bo‘yicha falsafa doktori (PhD), dotsent v.b.

TAHRIR HAY’ATI:

01.00.00 – FIZIKA-MATEMATIKA FANLARI
Ayupov Shavkat Abdullayevich, fizika-matematika fanlari doktori, akademik
A’zamov Abdulla, fizika-matematika fanlari doktori, akademik
Zohidov Erkin A’zamovich, fizika-matematika fanlari doktori, professor

02.00.00 – KIMYO FANLARI
Normaxamatov Nodirali Soxobataliyevich, kimyo fanlar doktori, professor
Tojibayev Komiljon Sharobitdinovich, kimyo fanlar doktori, akademik

03.00.00 – BIOLOGIYA FANLARI
Abdurahmonov Ibrohim Yo‘lchiyevich, biologiya fanlari doktori, akademik
Sulaymonov Botirjon Abdushukurovich, biologiya fanlari doktori, akademik

04.00.00 – GEOLOGIYA-MINERALOGIYA FANLARI
Fayziyev Abdulhaq Radjabovich, geologiya-mineralogiya fanlari doktori, professor
Husanov Sultonboy To‘xtayevich, geologiya-mineralogiya fanlari doktori, professor

05.00.00 – TEXNIKA FANLARI
Allayev Qahramon Rahimovich, texnika fanlari doktori, akademik
Majidov Inom Urishevich, texnika fanlari doktori, professor
Turobjonov Sadritdin Maxamatdinovich, texnika fanlari doktori, akademik
Shaumarov Said Sanatovich, texnika fanlari doktori, professor

06.00.00 – QISHLOQ XO‘JALIGI FANLARI
Namozov Shodmon Ergashovich, qishloq xo‘jaligi fanlari doktori, akademik
Shoumarov Hikmat Bahromovich, qishloq xo‘jaligi fanlari nomzodi, professor

07.00.00 – TARIX FANLARI
Ziyo Azamat Hamid o‘g‘li, tarix fanlari doktori, akademik
Sagdullayev Anatoliy Sagdullayevich, tarix fanlari doktori, akademik
Yusupova Diloram Yunusovna, tarix fanlari doktori, akademik

08.00.00 – IQTISODIYOT FANLARI
Abdurahmonov Qalandar Xodjayevich, iqtisod fanlari doktori, akademik
Musayev Behzod Anvarovich, iqtisod fanlari nomzodi
To‘xliyev Nurislom, iqtisod fanlari doktori, akademik
G‘ulomov Saidahror Saidahmedovich, iqtisod fanlari doktori, akademik

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09.00.00 – FALSAFA FANLARI
Nazarov Qiyom Normirzayevich, falsafa fanlari doktori, professor
Saifnazarov Ismoil Saifnazarovich, falsafa fanlari doktori, professor

10.00.00 – FILOLOGIYA FANLARI
Mengliyev Baxtiyor Rajabovich, filologiya fanlari doktori, professor
Sirojiddinov Shuhrat Samariddinovich, filologiya fanlari doktori, akademik
Xidirov Rajab Gulmatovich, filologiya fanlari nomzodi, dotsent (Tojikiston)

11.00.00 – GEOGRAFIYA FANLARI
Nigmatov Asqar Nigmatullayevich, geografiya fanlari doktori, professor
Tojiyeva Zulxumor Nazarovna, geografiya fanlari doktori, professor

12.00.00 – YURIDIK FANLAR
Rustamboyev Mirzayusuf Hakimovich, yuridik fanlar doktori, professor
Saidov Akmal Xolmatovich, yuridik fanlar doktori, akademik
Xolmo'minov Jumanazar Toshtemirovich, yuridik fanlar doktori, professor
Qodirov Bobiromon Bekmurodovich, yuridik fanlar doktori, professor

13.00.00 – PEDAGOGIKA FANLARI
Djurayev Risboy Haydarovich, pedagogika fanlari doktori, akademik
Ibraimov Xolboy, pedagogika fanlari doktori, akademik
Musurmonova Oynisa, pedagogika fanlari doktori, professor
Umarov Bahrom Norboyevich, pedagogika fanlari bo'yicha falsafa doktori, dotsent

14.00.00 – TIBBIYOT FANLARI
Akilov Xabibulla Ataullayevich, tibbiyot fanlari doktori, professor
Nazirov Feruz Gafurovich, tibbiyot fanlari doktori, akademik

15.00.00 – FARMATSEVTIKA FANLARI
Abdullabekova Viloyat Nurillabekovna, farmatsevtika fanlari doktori, professor
Tulaganov Abduqodir Abdurahmonovich, farmatsevtika fanlari doktori, professor

16.00.00 – VETERINARIYA FANLARI
Daminov Asadullo Suvonovich, veterinariya fanlari doktori, professor
Jabborov Shuhrat Abdumajidovich, veterinariya fanlari doktori, professor
G'afurov Aktam G'afurovich, veterinariya fanlari doktori, professor

17.00.00 – SAN'ATSHUNOSLIK FANLARI
Ahmedova Nigora Rahimovna, sanatshunoslik fanlari doktori, professor
Hakimov Akbar Abdullayevich, san'atshunoslik fanlari doktori, akademik

18.00.00 – ARXITEKTURA FANLARI
Nozilov Dodo Avazovich, arxitektura fanlari doktori, professor
Uralov Axtam Sindarovich, arxitektura fanlari doktori, professor

19.00.00 – PSIXOLOGIYA FANLARI
Abdusamatov Hasanboy Usmonjon o'g'li, psixologiya fanlari doktori, professor
Barotov Sharif Ramazonovich, psixologiya fanlari doktori, professor
Karimova Vasila Mamanosirovna, psixologiya fanlari doktori, professor
Halimova Mashraboy Vohidovna, psixologiya fanlari doktori, professor
Lazar Drajeta, psixologiya fanlari doktori, professor, Belgrad, Serbiya
Karpinskiy Konstantin Viktorovich, psixologiya fanlari doktori, professor, Grodno, Belarussiya
Suletbayeva Ella Serikbayevna, psixologiya fanlari doktori, dotsent

22.00.00 – SOTSIOLOGIYA FANLARI
Bekmurodov Mansur Bobomurodovich, sotsiologiya fanlari doktori, professor
Toshmuhamedova Dilorom Gafurdjanovna, sotsiologiya fanlari doktori

23.00.00 – SIYOSIY FANLAR
Fayzullayev Alisher Omonullayevich, siyosiy fanlar doktori, professor
Hasanov Otabek Abdurashidovich, siyosiy fanlar doktori
Paxrutdinov Shukritdin Ilyasovich, siyosiy fanlar doktori, professor
Omonov Baxtiyor Axtamovich, siyosiy fanlar doktori, professor
Quronboyev Qahramon Qo'chqorovich, siyosiy fanlar doktori, professor
Avazov Komil Xolliyevich, siyosiy fanlar bo'yicha falsafa doktori

24.00.00 – ISLOMSHUNOSLIK FANLARI
Ibrohimov Ne'matulla, filologiya fanlari doktori, akademik
Islomov Zohidjon Mahmudovich, filologiya fanlari doktori, professor

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Guzal Allabergenova,
Independent Researcher

THE ROLE OF GENERATIVE ARTIFICIAL INTELLIGENCE TOOLS IN DEVELOPING EFL STUDENTS' LEARNING MOTIVATION AND COGNITIVE INDEPENDENCE

Abstract. This article examines the role of generative artificial intelligence (GenAI) tools in developing the learning motivation and cognitive independence of students learning English as a Foreign Language (EFL). Particular attention is given to conversational artificial intelligence systems, intelligent tutoring tools, automated feedback, and writing-support applications in the educational process. The analysis demonstrates that generative artificial intelligence can support students' learning motivation by providing personalized learning experiences, immediate feedback, interactive language practice, and opportunities for self-regulated learning.

Keywords: generative artificial intelligence, EFL students, learning motivation, cognitive independence, learner autonomy, AI-assisted language learning, personalized learning, self-regulated learning.

GENERATIV SUN'IY INTELLEKT VOSITALARINING EFL TALABALARINING O'QUV MOTIVATSIYASI VA KOGNITIV MUSTAQILLIGINI RIVOJLANTIRISHDAGI ROLI

Annotatsiya. Mazkur maqolada generativ sun'iy intellekt (GenAI) vositalarining ingliz tilini xorijiy til sifatida o'rganayotgan (EFL) talabalarning o'quv motivatsiyasi va kognitiv mustaqilligini rivojlantirishdagi roli tahlil qilinadi. Unda suhbatga asoslangan sun'iy intellekt tizimlari, intellektual repetitorlik vositalari, avtomatlashtirilgan fikr-mulohaza va yozuvni qo'llab-quvvatlash vositalarining ta'lim jarayonidagi imkoniyatlariga alohida e'tibor qaratiladi. Tahlil natijalari generativ sun'iy intellektning individuallashtirilgan ta'lim, tezkor fikr-mulohaza, interaktiv til amaliyoti va o'z-o'zini boshqarishga asoslangan ta'lim imkoniyatlarini kengaytirish orqali talabalarning o'quv motivatsiyasini qo'llab-quvvatlashi mumkinligini ko'rsatadi.

Kalit so'zlar: generativ sun'iy intellekt, EFL talabalari, o'quv motivatsiyasi, kognitiv mustaqillik, o'quvchi avtonomiyasi, sun'iy intellekt yordamida til o'rganish, individuallashtirilgan ta'lim, o'z-o'zini boshqarishga asoslangan ta'lim.

РОЛЬ ИНСТРУМЕНТОВ ГЕНЕРАТИВНОГО ИСКУССТВЕННОГО ИНТЕЛЛЕКТА В РАЗВИТИИ УЧЕБНОЙ МОТИВАЦИИ И КОГНИТИВНОЙ САМОСТОЯТЕЛЬНОСТИ СТУДЕНТОВ EFL

Аннотация. В статье анализируется роль инструментов генеративного искусственного интеллекта (GenAI) в развитии учебной мотивации и когнитивной самостоятельности студентов, изучающих английский язык как иностранный (EFL). Особое внимание уделяется возможностям диалоговых систем искусственного интеллекта, интеллектуальных обучающих инструментов, автоматизированной обратной связи и средств поддержки письменной речи в образовательном процессе. Результаты анализа показывают, что генеративный искусственный интеллект может поддерживать учебную мотивацию студентов посредством персонализации обучения, предоставления оперативной обратной связи, интерактивной языковой практики и расширения возможностей саморегулируемого обучения.

Ключевые слова: генеративный искусственный интеллект, студенты EFL, учебная мотивация, когнитивная самостоятельность, автономия обучающегося, изучение языка с использованием искусственного интеллекта, персонализированное обучение, саморегулируемое обучение.

Introduction. The integration of artificial intelligence technologies into education has become a significant development in contemporary pedagogical research. In particular, the rapid advancement of generative artificial intelligence (GenAI) has created new opportunities for foreign language education by providing personalized, interactive, and adaptive learning experiences. Generative AI systems can produce texts, explanations, exercises, and conversational responses, provide immediate feedback, and adapt learning materials to individual needs.

In English as a Foreign Language (EFL) education, learning motivation and cognitive independence are essential for effective language acquisition. Learning motivation influences students' willingness to participate, sustain effort, and overcome difficulties, while cognitive independence refers to the ability to analyze information, make decisions, solve problems, evaluate alternatives, and regulate learning without excessive external support.

Traditional foreign language instruction may face challenges related to different proficiency levels, large classes, limited instructional time, and insufficient individualized feedback. Generative AI can help address some of these challenges by creating flexible learning environments where students can practice language skills, receive immediate feedback, explore materials, and organize aspects of their learning independently.

Conversational AI assistants, intelligent tutoring systems, writing-support tools, and automated feedback applications can also contribute to learner autonomy. Through interaction with AI systems, learners can identify weaknesses, revise their work, explore alternative solutions, and develop reflective learning strategies.

However, excessive reliance on AI-generated answers may reduce opportunities for independent thinking, creativity, and problem-solving. Therefore, effective AI integration requires a balanced pedagogical approach in which technology serves as cognitive support rather than a substitute for learners' intellectual efforts. Teachers remain essential in designing activities that require students to analyze, evaluate, modify, and critically reflect on AI-generated content.

The relevance of this study lies in the need for pedagogically grounded approaches to using generative AI in EFL education. The aim of the article is to analyze the role of GenAI in developing EFL students' learning motivation and cognitive independence and to identify methodological principles for its effective integration into foreign language education.

Research Methodology. The study employs a theoretical and analytical research design based on the analysis, comparison, systematization, and generalization of relevant academic literature on artificial intelligence in education, learning motivation, learner autonomy, self-regulated learning, digital competence, and foreign language education.

The theoretical framework draws upon research on artificial intelligence in education, Self-Determination Theory, self-regulated learning, digital competence, and AI-assisted language learning. The analysis focuses on two interconnected dimensions: the motivational functions of GenAI, including personalization, immediate feedback, interaction, and support for self-regulated learning; and cognitive independence, including critical analysis, problem-solving, decision-making, metacognition, and evaluation of AI-generated information.

The study also considers potential risks associated with excessive AI dependence, including reduced cognitive effort, uncritical acceptance of generated information, academic integrity concerns, and weakened independent problem-solving skills. Based on this analysis, methodological principles for the responsible and pedagogically meaningful integration of GenAI into EFL education are identified.

Literature Review. The role of artificial intelligence in education has received increasing scholarly attention, particularly with the development of generative AI. Existing research shows that AI technologies can support personalized learning, automated feedback, student engagement, and educational interaction, while also raising concerns about academic integrity, critical thinking, information reliability, and the changing role of teachers.

Kasneci et al. [1] examine the opportunities and challenges of large language models in education, highlighting their potential for personalized learning support and feedback while emphasizing concerns about generated content, academic integrity, and critical thinking.

Tlili et al. [2] analyze ChatGPT as a case of chatbot use in education and emphasize its potential for interactive learning, individualized assistance, and student engagement. Similarly, UNESCO [3] stresses the importance of human-

centered, inclusive, safe, and responsible approaches to generative AI, emphasizing the preservation of human agency in education.

Zawacki-Richter et al. [4] identify various applications of artificial intelligence in higher education and emphasize the importance of educators' pedagogical roles in AI-supported learning. Godwin-Jones [10] specifically discusses the potential of ChatGPT for language learning, including interaction, writing support, feedback, and learner autonomy.

The motivational dimension of the study is informed by Ryan and Deci's Self-Determination Theory [5], which identifies autonomy, competence, and relatedness as important conditions for intrinsic motivation. Personalized support and immediate feedback provided by GenAI may contribute to learners' sense of autonomy and competence.

Zimmerman's work on self-regulated learning [6] provides another theoretical foundation, emphasizing goal setting, planning, monitoring, self-evaluation, and reflection. GenAI can support these processes by helping learners identify weaknesses, receive feedback, and organize learning activities, while final decisions remain the responsibility of the learner.

Redecker [7] emphasizes the importance of educators' digital competence for effective technology-enhanced teaching. This is particularly relevant to generative AI because its effective use requires both technical understanding and the pedagogical ability to design meaningful AI-supported activities.

Ouyang, Zheng, and Jiao [8] review empirical research on AI in online higher education, while Holmes, Bialik, and Fadel [9] discuss its transformative potential alongside the continuing importance of human creativity and critical thinking.

Overall, the literature suggests that generative AI can support motivation, learner autonomy, interaction, and cognitive engagement. At the same time, effective implementation requires carefully designed pedagogical frameworks that prevent passive dependence on AI and maintain students' active cognitive participation.

Results. The analysis demonstrates that generative AI tools can contribute to the development of EFL students' learning motivation through several interconnected mechanisms. First, GenAI expands opportunities for personalized learning by providing differentiated exercises, explanations, examples, and feedback according to individual learner needs. Such personalization may increase students' sense of control and awareness of progress.

Second, immediate feedback can support motivation by helping learners recognize and correct errors in grammar, vocabulary, writing, and selected aspects of pronunciation. This allows students to identify areas for improvement and maintain continuous engagement with learning activities.

Third, conversational AI provides additional opportunities for meaningful language practice. Students can engage in simulated conversations, practice

communicative situations, ask questions, and experiment with different linguistic forms beyond the traditional classroom environment.

Fourth, GenAI can support self-regulated learning by helping students formulate learning objectives, identify weaknesses, generate practice activities, and reflect on their progress. However, these benefits depend on how AI is integrated into learning. When students use AI mainly to obtain ready-made answers, it may encourage passive learning. Therefore, tasks should require learners to analyze, modify, evaluate, and justify AI-generated responses.

GenAI can also contribute to cognitive independence by enabling students to compare explanations, examine alternative solutions, evaluate generated content, and make independent decisions. For example, in AI-supported writing, students can compare their original text with AI suggestions, identify differences, evaluate proposed changes, and decide which revisions to accept.

AI can further support independent problem-solving in areas such as vocabulary selection, sentence construction, text interpretation, and communication. By considering several possible solutions and evaluating their relevance, learners can develop independent decision-making skills.

Another important aspect is metacognitive development. Generative AI can help students identify learning goals, review their performance, analyze recurring errors, and plan subsequent practice. Personalized AI support can also provide tasks of varying complexity, allowing learners to progress according to their proficiency levels.

Nevertheless, cognitive independence requires pedagogical guidance. Students should not accept AI-generated information without evaluation; instead, they should verify information, compare sources, identify possible errors, and justify their conclusions.

Discussion. The role of generative AI in EFL education should be considered within a broader pedagogical framework. Its educational value lies not only in generating answers but also in expanding opportunities for personalized learning, interaction, feedback, reflection, and independent exploration.

From the perspective of learning motivation, GenAI can provide individualized learning experiences and immediate feedback, potentially supporting learners' perceptions of competence and autonomy [5]. However, technology alone cannot ensure sustained motivation; meaningful learning goals, active participation, and personal relevance remain essential.

Regarding cognitive independence, the key issue is how learners interact with AI-generated content. Simply copying an AI-generated text does not promote independent thinking, whereas analyzing, evaluating, revising, and justifying AI-generated content requires substantially greater cognitive engagement. Thus, AI-supported EFL activities should move beyond the "ask and receive" model toward "generate, examine, evaluate, and improve."

The reliability of AI-generated content also requires attention. AI systems may produce inaccurate or contextually inappropriate information. Therefore, AI literacy should be an essential component of contemporary EFL education, enabling students to evaluate AI-generated responses critically.

Teachers remain essential in AI-supported learning environments. Their role includes designing learning activities, determining appropriate uses of AI, monitoring students' progress, and helping learners interpret AI-generated information.

Based on the analysis, effective integration of GenAI should follow several methodological principles: learner-centeredness, purposeful integration, cognitive engagement, teacher mediation, AI literacy, process-oriented assessment, and academic responsibility. AI-supported activities should correspond to learners' needs and educational objectives while requiring them to analyze, compare, evaluate, and justify AI-generated content.

Process-oriented assessment is particularly relevant because final products alone may not demonstrate students' individual contribution in AI-supported environments. Reflection journals, portfolios, projects, self-assessment, oral defense, and process documentation can provide additional evidence of independent learning.

Thus, the educational potential of generative AI depends primarily on pedagogical design. When students remain active participants, AI can function as a supportive cognitive and linguistic resource; when they rely on it without reflection or evaluation, opportunities for independent cognitive development may be reduced.

Conclusion. The analysis indicates that generative artificial intelligence tools can support the development of EFL students' learning motivation and cognitive independence through personalized learning, immediate feedback, conversational interaction, independent practice, and self-regulated learning opportunities.

The cognitive value of GenAI becomes particularly evident when students use AI-generated information as material for analysis rather than as a substitute for their own thinking. Comparing responses, evaluating generated information, identifying errors, solving language-related problems, and making independent decisions can transform AI-supported learning into a cognitively engaging process.

At the same time, excessive dependence on AI-generated answers may reduce students' cognitive effort, creativity, and independent problem-solving. Therefore, the effectiveness of GenAI depends on the pedagogical framework in which it is used.

Effective integration should be based on learner-centeredness, purposeful technology use, cognitive engagement, teacher mediation, AI literacy, process-oriented assessment, and academic responsibility. Within such a framework, generative AI can function as a supportive pedagogical instrument rather than a replacement for teachers or learners' intellectual efforts.

Future research should empirically examine the influence of specific generative AI tools on EFL students' motivation and cognitive independence, as well as explore effective AI-supported instructional models and assessment strategies that preserve students' independent cognitive activity.

References:

1. Kasneci E., Sessler K., Küchemann S., Bannert M., Dementieva D., Fischer F., Gasser U., Groh G., Günnemann S., Hüllermeier E., et al. ChatGPT for good? On opportunities and challenges of large language models for education // Learning and Individual Differences. – 2023. – Vol. 103. – Article 102274.
2. Tlili A., Shehata B., Burgos D., et al. What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education // Smart Learning Environments. – 2023. – Vol. 10. – Article 15.
3. UNESCO. Guidance for Generative AI in Education and Research. – Paris: UNESCO, 2023.
4. Zawacki-Richter O., Marín V.I., Bond M., Gouverneur F. Systematic review of research on artificial intelligence applications in higher education – where are the educators? // International Journal of Educational Technology in Higher Education. – 2019. – Vol. 16. – Article 39.
5. Ryan R.M., Deci E.L. Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being // American Psychologist. – 2000. – Vol. 55, No. 1. – P. 68–78.
6. Zimmerman B.J. Becoming a self-regulated learner: An overview // *Theory Into Practice*. – 2002. – Vol. 41, No. 2. – P. 64–70.
7. Redecker C. European Framework for the Digital Competence of Educators: DigCompEdu. – Luxembourg: Publications Office of the European Union, 2017.
8. Ouyang F., Zheng L., Jiao P. Artificial intelligence in online higher education: A systematic review of empirical research from 2011 to 2020 // Education and Information Technologies. – 2022. – Vol. 27. – P. 7893–7925.
9. Holmes W., Bialik M., Fadel C. Artificial Intelligence in Education: Promises and Implications for Teaching and Learning. – Boston: Center for Curriculum Redesign, 2019.
10. Godwin-Jones R. Emerging technologies: ChatGPT and language learning: A potential paradigm shift? // Language Learning & Technology. – 2023. – Vol. 27, No. 1. – P. 3–8.

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Jurnal hamkori - «PROFI UNIVERSITY»

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Maqolada keltirilgan fakt va ma'lumotlarning to'g'riligi uchun mualliflar mas'uldirlar.

"Fan va ta'lim yangiliklari" ilmiy-amaliy jurnali Oliy attestatsiya komissiyasi Rayosatining qarori (25.08.2025 y., №374/5) bilan pedagogika va psixologiya fanlari bo'yicha falsafa doktori (PhD) va fan doktori (DSc) ilmiy darajasiga talabgorlarning dissertatsiyalari asosiy ilmiy natijalarini chop etish tavsiya etilgan milliy ilmiy nashrlar ro'yxatiga kiritilgan.

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