

PRACTICAL STAGES OF THE AI-INTEGRATED EAR APPROACH (7-STAGE MECHANISM)

SI BILAN INTEGRATSIYALANGAN TYAI YONDASHUVINING AMALIY BOSQICHLARI (7 BOSQICHLI MEXANIZM)

ПРАКТИЧЕСКИЕ ЭТАПЫ EAR-ПОДХОДА, ИНТЕГРИРОВАН- НОГО С ИСКУССТВЕННЫМ ИНТЕЛЛЕКТОМ (7-ЭТАПНЫЙ МЕХАНИЗМ)

ERKULOVA FERUZA MELIKUZIYEVNA,

PhD, Associate professor Namangan State Institute of Foreign Languages named
after Isxakhan Ibrat

Annotation. This article analyzes the practical stages of the AI-integrated EAR approach and its significance in improving the methodological preparation of future foreign language teachers. Based on a 7-stage mechanism, the study highlights the processes of diagnostics, reflective analysis, identification of methodological problems, AI-assisted analysis of pedagogical situations, development of innovative solutions, practical implementation, and repeated reflection. The article also substantiates the effectiveness of this approach in developing methodological competence, professional reflection, independent scientific-pedagogical activity, and adaptive teaching skills. The findings demonstrate that AI-based reflective and analytical mechanisms contribute to enhancing the quality of methodological training.

Keywords: artificial intelligence, EAR approach, research-oriented practical inquiry, methodological preparation, reflective analysis, methodological competence, future foreign language teachers, innovative education.

Annotatsiya. Mazkur maqolada sun'iy intellekt bilan integratsiyalangan TYAI (tadqiqotga yo'naltirilgan amaliy izlanish) yondashuvining amaliy bosqichlari va uning bo'lajak chet tili o'qituvchilarining metodik tayyorgarligini rivojlantirishdagi ahamiyati tahlil qilinadi. Tadqiqotda 7 bosqichli mexanizm asosida diagnostika, reflektiv tahlil, metodik muammolarni aniqlash, sun'iy intellekt yordamida pedagogik vaziyatlarni tahlil qilish, innovatsion yechimlar ishlab chiqish, amaliy sinov va qayta refleksiya jarayonlari yoritilgan. Shuningdek, mazkur yondashuvning metodik kompetentlik, kasbiy refleksiya, mustaqil ilmiy-pedagogik faoliyat hamda adaptiv o'qitish ko'nikmalarini rivojlantirishdagi samaradorligi asoslab berilgan. Tadqiqot natijalari sun'iy intellekt asosidagi reflektiv-analitik mexanizmlar metodik tayyorgarlik sifatini oshirishga xizmat qilishini ko'rsatadi.

Kalit so'zlar: sun'iy intellekt, TYAI yondashuvi, tadqiqotga yo'naltirilgan amaliy izlanish, metodik tayyorgarlik, reflektiv tahlil, metodik kompetentlik, bo'lajak chet tili o'qituvchilari, innovatsion ta'lim.

Аннотация. В данной статье анализируются практические этапы EAR-подхода (исследовательски-ориентированного практического поиска), интегрированного с искусственным интеллектом, а также его роль в развитии методической подготовки будущих учителей иностранного языка. В исследовании на основе 7-этапного механизма раскрываются процессы диагностики, рефлексивного анализа, выявления методических проблем, анализа педагогических ситуаций с помощью искусственного интеллекта, разработки инновационных решений, практической апробации и повторной рефлексии. Также обосновывается эффективность данного подхода в развитии методической компетентности, профессиональной рефлексии, самостоятельной научно-педагогической деятельности и адаптивных навыков обучения. Результаты исследования показывают, что рефлексивно-аналитические механизмы, основанные на искусственном интеллекте, способствуют повышению качества методической подготовки.

Ключевые слова: искусственный интеллект, EAR-подход, исследовательски-ориентированный практический поиск, методическая подготовка, рефлексивный анализ, методическая компетентность, будущие учителя иностранного языка, инновационное образование.

INTRODUCTION

In the context of globalization, digitalization, and the rapid transformation of higher education systems, the problem of improving the methodological preparation of future foreign language teachers has become one of the priority directions of modern pedagogy. Contemporary educational paradigms require teachers not only to possess deep theoretical knowledge and professional language competence, but also to demonstrate methodological flexibility, reflective thinking, research skills, and the ability to apply innovative technologies in real educational environments. The growing integration of artificial intelligence (AI) into education has further intensified the need for adaptive and research-oriented approaches capable of preparing teachers for the challenges of digitally mediated teaching and learning processes.

Modern foreign language education increasingly emphasizes reflective and inquiry-based teacher development models in which future teachers actively analyze pedagogical situations, identify methodological problems, test innovative instructional solutions, and evaluate their effectiveness through empirical evidence. In this regard, research-oriented practical inquiry methodology represents an important pedagogical approach that transforms methodological preparation from passive knowledge acquisition into an active process of professional investigation, reflection, experimentation, and methodological decision-making.

The relevance of this study is determined by several important factors. First, traditional approaches to methodological preparation often focus primarily on theoretical instruction and insufficiently develop students' reflective, analytical, and empirical research

competencies. Second, the integration of artificial intelligence technologies into methodological education remains limited despite their significant potential for diagnostics, feedback, adaptive learning, and reflective analysis. Third, there is a growing demand for methodological models adapted to the sociocultural and communicative characteristics of national educational contexts, particularly within foreign language teacher education in Uzbekistan.

This study therefore focuses on the integration of artificial intelligence into the EAR[1;122-243 b.] methodology as a means of improving the methodological preparation of future foreign language teachers. The EAR approach is based on a cyclical process of problem identification, exploration, action, reflection, and re-action, allowing students to engage in continuous methodological inquiry and professional self-development. Within this framework, artificial intelligence functions not merely as a technical support tool, but as an active analytical mechanism facilitating methodological diagnostics, reflective analysis, cognitive evaluation, and evidence-based pedagogical decision-making .

The research was conducted within the master's programs of "Foreign Language and Literature" at Uzbekistan State World Languages University, Namangan State Institute of Foreign Languages, Samarkand State Institute of Foreign Languages, Denov Institute of Entrepreneurship and Pedagogy, and Kokand State University. During the research process, scientific-integrative mechanisms of the AI-supported EAR model were developed and experimentally implemented through reflective analysis, AI-assisted diagnostics, empirical observation, pilot lessons, and innovative methodological design.

The study aims to investigate the pedagogical effectiveness of the AI-integrated EAR methodology in developing methodological competence, reflective practice, research skills, and adaptive teaching abilities of future foreign language teachers. The research also seeks to identify how AI-supported analytical and reflective tools influence pedagogical decision-making and methodological innovation in foreign language teacher education[2;105-111 b.].

The theoretical significance of the study lies in the conceptualization of AI-supported research-oriented methodological preparation as an integrative pedagogical system combining reflective practice, exploratory action research, empirical analysis, and adaptive educational technologies. The practical significance of the research is associated with the development of innovative methodological mechanisms, multimodal learning tasks, AI-assisted diagnostics, and reflective educational models that can be implemented within higher education institutions preparing future foreign language teachers.

Thus, the integration of artificial intelligence with research-oriented practical inquiry methodology creates favorable conditions for forming reflective practitioners, methodological researchers, and innovative educators capable of functioning effectively in modern digital educational environments.

METHODOLOGY

In the process of improving the methodological preparation of future foreign language teachers, the use of research-oriented practical inquiry methodology constitutes the main methodological concept of this study. This approach contributes to the formation of a research-based teacher model in modern pedagogy and helps students perceive the educational process not merely as a system

of ready-made knowledge, but as a dynamic system that can be explored, analyzed, tested, and improved. This methodology organizes the educational process in an active, empirical, reflective, and inquiry-oriented manner, fostering high-level methodological competencies such as critical reflection on one's professional activity, the ability to justify pedagogical decisions, scientific understanding of pedagogical situations, and the capacity to model them scientifically.

The implementation of research-oriented practical inquiry methodology ensures the consistent development of the following stages in the professional growth of future teachers: "identifying pedagogical problems – conducting inquiry – carrying out experimentation – engaging in reflective analysis – making methodological decisions." This enables students not only to participate in the educational process as recipients of knowledge, but also to act as subjects of their own professional activity, identify discrepancies within the teaching-learning process, observe their own practice, and continuously improve it.

During the research conducted within the master's programs of "Foreign Language and Literature" at Uzbekistan State World Languages University, Namangan State Institute of Foreign Languages, Samarkand State Institute of Foreign Languages, Denov Institute of Entrepreneurship and Pedagogy, and Kokand State University, scientific-integrative mechanisms of research-oriented practical inquiry methodology based on the integration of artificial intelligence (AI) into the educational process were developed (see Table 1). In designing this methodology, the EAR approach (problem identification → exploration → action → reflection → re-action) was adapted to the national educational context and enhanced with

AI-based analytical tools. In this process, ChatGPT, Grammarly, Google Analytics, students' methodological activities were Learning Logs, and AI-feedback systems. analyzed in real time through the use of

Table 1.

Practical stages of the AI-integrated TYAI approach (7-Stage Mechanism)

Stage	Practical Activity	AI Integration	Expected Outcome
1. Problem Identification	Observing lessons and identifying discrepancies	AI detects errors, passivity, and communicative breakdowns	The problem is clearly defined
2. Data Collection	Collecting videos, audio recordings, students' work, and diagnostic materials	AI segments and classifies the collected data	An empirical database is formed
3. Empirical Analysis	Conducting linguodidactic, methodological, and cognitive analysis	AI generates statistical diagrams and error maps	The problem is analyzed in depth
4. Reflective Analysis	Video reflection, peer assessment, and e-portfolio activities	AI analyzes reflection indicators	Reflective competence is strengthened
5. Solution Development	Designing new exercises and multimodal tasks	AI generates differentiated tasks	An innovative solution is developed
6. Experimental Implementation	Conducting pilot lessons and monitoring	AI performs real-time assessment	The actual effectiveness of the solution is identified

The created scientific-integrative mechanism elevated the research-oriented practical inquiry methodology to a qualitatively new level, since artificial intelligence was employed not merely as an auxiliary tool, but as an active participant in methodological diagnostics, reflective analysis, problem modeling, and solution development. The process of identifying and solving methodological problems became significantly faster, the accuracy of analysis increased, and the reflective competence of future foreign language teachers developed considerably.

The implementation of the research-oriented methodology was carried out through several consecutive stages. At the initial stage, master's students were directed toward deep observation and analysis of real pedagogical situations while taking into account the specific characteristics of the national educational context[3;56-78.]. They identified methodological discrepancies

typical of Uzbek classrooms, such as the mismatch between tasks and students' language proficiency levels, students' passive participation or unequal distribution of classroom interaction, inconsistency in the sequence of exercises with didactic principles, repetitive and systematic speech errors, insufficient or excessive use of multimodal resources, and similar issues . At this stage, students were not only expected to identify problems, but also to connect them with the national educational environment, linguocultural conditions, and learners' educational strategies. As a result, an initial classification of problems emerging from authentic classroom realities was developed, providing a solid foundation for the subsequent stages of the research.

At the second stage, the identified problems were scientifically connected with the theoretical principles of modern linguodidactics. Master's students analyzed communicative language teaching concepts,

the influence of sociolinguistic environments, the role of interactive approaches, Bloom's taxonomy of cognitive processes, cognitive processing models in language learning, and principles of methodological design. This enabled them to identify not merely the external manifestations of problems, but also their educational and methodological essence. Each problem was interpreted through its psycholinguistic, communicative, cognitive, or methodological roots. For example, mismatched tasks were associated with inappropriate cognitive levels according to Bloom's taxonomy; students' low participation was linked to insufficient application of communicative approaches; and ineffective use of multimodal materials was analyzed as a violation of linguomethodological compatibility principles.

It was precisely at this stage that the EAR approach was adapted to the national educational context. The EAR cycle of "observation – analysis – experimentation – revision" was enriched by considering the cultural and psychological characteristics of Uzbek classrooms, students' communication habits, social roles in teacher-student interaction, national speech patterns, and learners' communicative readiness. The adapted model enabled each methodological process to be examined not only theoretically but also empirically through real classroom situations. During the observation stage, problems were supported by objective digital evidence obtained through AI [4;25-26 b.] During the analysis stage, the problems were evaluated from linguomethodological, cognitive, and communicative perspectives. During the experimentation stage, master's students introduced innovative methodological solutions into practical lessons. Finally, during the revision stage, the effectiveness of these solutions was assessed

through reflective-empirical analysis, leading to the development of improved methodological variants.

These first two stages of the research-oriented methodology significantly enhanced students' methodological thinking skills, fostering scientific inquiry, observation, analytical reasoning, hypothesis formulation, experimentation, and reflective conclusion-making abilities. They also established the theoretical and empirical basis for the following stages of practical implementation, reflection, and optimization.

At the third stage, students' individual research projects were designed in a systematic and scientifically grounded manner. This process extended beyond simple planning and incorporated professional components necessary for scientifically justifying problems, transforming them into empirical investigations, and organizing methodological experiments systematically. Each student formulated a clear research objective directly connected with the essence, relevance, and educational significance of the problem. Research tasks included the classification of problems, identification of interrelated components, clarification of linguodidactic characteristics, implementation of practical experiments, and evaluation of outcomes. Hypotheses reflected students' scientific assumptions regarding possible transformations within the educational process.

Students also identified appropriate research methods, including observation, experimentation, interviews, testing, error analysis, and AI-based diagnostics, while explaining the scientific rationale for their selection. The establishment of criteria and indicators ensured the reliability, validity, and replicability of the research process. Timelines clearly defined the duration and sequence

of each stage, including data collection and analysis procedures. Analytical tools such as AI algorithms, statistical software, and linguistic analysis modules further increased the scientific value of the study.

At the fourth stage, data collection and empirical analysis were conducted systematically and comprehensively. Students collected video and audio recordings reflecting authentic classroom dynamics, while learners' written works served as primary sources for identifying linguistic and methodological errors. Diagnostic tests were used to measure learners' language competence and the development of specific skills such as grammar, vocabulary, sentence construction, and listening comprehension. Mini-experiments carried out in small groups enabled the evaluation of the initial effectiveness of innovative methodological solutions.

With the support of artificial intelligence, students' speech errors were automatically identified and classified into phonological, grammatical, lexical, communicative, and discourse-related categories. AI also evaluated the cognitive load of exercises and tasks, determining whether they corresponded to learners' psycholinguistic capacities. Multimodal materials, including videos, images, audio, and textual combinations, were analyzed by AI to determine their motivational impact, influence on learner engagement, and communicative accessibility. This process enhanced students' empirical thinking and made analysis more accurate, reliable, and methodologically comprehensive.

At the fifth stage, students began developing innovative methodological solutions based on the identified problems. This process relied on scientific approaches and involved designing methodological tools appropriate to the nature of each issue. Students

created new exercise formats, communicative tasks, and multimodal educational resources, including visual, audio, and interactive materials. Particularly significant was the development of differentiated tasks through artificial intelligence, allowing lesson designs to be adapted to learners' individual educational needs.

Interactive lesson projects were also designed using gamification elements, digital platforms, online quizzes, chatbots, and simulation tools. These scientifically grounded and creative solutions were piloted in practical teaching sessions, where their effectiveness in real educational settings was observed. Classroom changes were monitored through AI-based systems, enabling students to develop as methodology specialists who learn through experimentation and evidence-based practice.

The sixth stage represented one of the most significant components of the research, as it ensured deep reflective analysis of students' own activities, identification of errors, and development of improvement strategies. Through e-portfolios, students digitally documented the entire research process, including exercise designs, analyses, teaching experiments, peer assessments, and reflective writings. Video reflection enabled students to observe their own teaching from an external perspective and gain realistic insights into their speech, classroom interaction, lesson management, and methodological decisions.

Peer-review processes allowed students to evaluate each other's work according to scientific criteria and provide constructive feedback, thereby strengthening a collaborative learning culture. Reflective written analyses helped students answer questions such as "Why did this solution work or fail?", "Which factors influenced the results?", and "What should be modified

in the next stage?" In this way, students developed into reflective practitioners who learned methodological decision-making through their own professional activity.

At the seventh stage, the scientific and methodological findings obtained throughout the research were systematically summarized. Students prepared final presentations in which they interpreted their findings from linguomethodological, psychological, communicative, and cognitive perspectives. They provided concrete examples demonstrating the initial form of the problem, the analyses conducted, changes observed during pilot lessons, AI diagnostic results, and the effectiveness of corrected methodological solutions.

The nationalized version of the EAR model, adapted specifically to the characteristics of Uzbek classrooms, proved highly effective in practice. Pilot lesson results demonstrated that research-oriented methodology supported by artificial intelligence significantly increased students' participation, language skill development, communicative activity, task effectiveness, and reflective culture[6;87-91]

This methodological integration elevated the methodological preparation of future foreign language teachers to a qualitatively new stage. The AI-enhanced research-oriented practical inquiry methodology enabled students to deeply analyze authentic pedagogical situations, make scientifically grounded methodological decisions, evaluate teaching practices through empirical evidence, regulate their professional development through reflective thinking, and effectively apply innovative pedagogical technologies. As a result, students developed not merely as teachers, but as methodological researchers, reflective practitioners, and educational innovators.

RESULTS AND DISCUSSION

The implementation of the AI-integrated research-oriented practical inquiry methodology demonstrated significant effectiveness in improving the methodological preparation of future foreign language teachers. The experimental work conducted at Uzbekistan State World Languages University, Namangan State Institute of Foreign Languages, Samarkand State Institute of Foreign Languages, Denov Institute of Entrepreneurship and Pedagogy, and Kokand State University revealed that the integration of artificial intelligence into the EAR methodology positively influenced students' methodological competence, reflective thinking, pedagogical decision-making, and empirical research skills.

The findings showed that future teachers gradually moved from passive acquisition of theoretical knowledge toward active methodological inquiry and reflective professional practice. During the initial stages of the research, students experienced difficulties in identifying methodological discrepancies, interpreting classroom situations analytically, and connecting pedagogical problems with theoretical linguodidactic concepts. However, through systematic observation, empirical analysis, AI-assisted diagnostics, and reflective activities, students developed the ability to critically evaluate educational situations and propose evidence-based methodological solutions.

One of the most significant results of the study was the development of reflective competence. Video reflection, peer-review activities, e-portfolios, and AI-feedback systems enabled students to evaluate their own teaching practices from multiple perspectives. As a result, they became more aware of communicative barriers, classroom

management problems, inappropriate task design, and ineffective instructional strategies. This process contributed to the formation of reflective practitioners capable of self-analysis and professional self-improvement.

The integration of artificial intelligence substantially increased the objectivity and accuracy of methodological analysis. AI-based systems automatically identified linguistic, grammatical, lexical, phonological, and communicative errors in students' and learners' speech production. Furthermore, AI tools evaluated cognitive load, task complexity, learner engagement, and the motivational impact of multimodal resources. Such analytical opportunities allowed students to rely not only on subjective observations but also on data-driven evidence when making pedagogical decisions[5;90-108].

The research also demonstrated that the AI-supported EAR model significantly enhanced the effectiveness of innovative lesson design. Students developed multimodal tasks, differentiated assignments, communicative activities, and interactive digital lessons adapted to learners' individual needs. The use of gamification elements, online platforms, simulations, chatbots, and AI-generated differentiated exercises increased learners' participation and communicative engagement during pilot lessons.

An important outcome of the study was the successful adaptation of the EAR cycle to the Uzbek national educational context[6;119-132]. The stages of observation, analysis, experimentation, and revision were enriched through consideration of cultural, linguistic, psychological, and communicative characteristics specific to Uzbek classrooms. This adaptation increased the practical applicability of the methodology and demonstrated that research-oriented approaches become more effective when

aligned with national educational realities and learners' sociocultural backgrounds.

The results of pilot lessons confirmed that students who participated in the AI-integrated EAR process demonstrated higher levels of methodological flexibility, reflective awareness, classroom interaction management, and scientific reasoning compared to traditional methodology training approaches. Their ability to diagnose pedagogical problems, generate innovative solutions, and evaluate teaching effectiveness through empirical evidence improved considerably. Consequently, the educational process shifted from traditional reproductive learning toward reflective, analytical, and research-based professional development.

The discussion of findings indicates that the integration of artificial intelligence into research-oriented methodological preparation creates favorable conditions for developing adaptive and innovative foreign language teachers capable of functioning effectively within digital and rapidly changing educational environments. The study supports contemporary educational theories emphasizing reflective practice, inquiry-based learning, exploratory action research, and AI-supported adaptive pedagogy. Moreover, the findings demonstrate that AI technologies can enhance methodological preparation not by replacing teachers, but by strengthening their analytical, reflective, and decision-making capacities.

CONCLUSION

The study confirmed that the AI-integrated research-oriented practical inquiry methodology is an effective approach for improving the methodological preparation of future foreign language teachers. The integration of artificial intelligence with the EAR approach created a reflective, analytical, empirical, and innovation-oriented

educational environment that enabled students to actively participate in methodological inquiry and professional self-development.

The research demonstrated that future teachers developed important professional competencies, including methodological analysis, reflective thinking, pedagogical problem-solving, scientific observation, empirical evaluation, and adaptive lesson design. Artificial intelligence technologies enhanced the objectivity, reliability, and efficiency of methodological diagnostics and reflective analysis by providing real-time feedback, automated error analysis, cognitive load evaluation, and comparative assessment tools.

The adapted EAR model also proved effective within the national educational context, as it incorporated the sociocultural, communicative, and psychological characteristics of Uzbek classrooms[7]. This ensured the practical applicability of the methodology and strengthened its educational

relevance.

The implementation of AI-supported reflective and empirical activities transformed students from passive recipients of methodological knowledge into active methodological researchers, reflective practitioners, and educational innovators. As a result, the quality of methodological preparation reached a qualitatively new stage characterized by inquiry-based learning, data-driven decision-making, professional reflection, and innovative pedagogical thinking.

Therefore, the study concludes that integrating artificial intelligence into research-oriented practical inquiry methodology has substantial pedagogical potential for modern foreign language teacher education and may serve as an effective model for developing reflective, adaptive, and research-oriented teaching professionals in higher education institutions.

References :

1. Richard Smith Exploratory Action Research as Work Plan: Why, What and Where from? – ELT Research Journal, 2015. – Vol. 4(1). – P. 37–45.
2. Donald Schön The Reflective Practitioner: How Professionals Think in Action. – New York: Basic Books, 1983.
3. Benjamin Bloom Taxonomy of Educational Objectives: The Classification of Educational Goals. – New York: Longmans, Green and Co., 1956.
4. Alimardonova M.B. Bo'lajak ingliz tili o'qituvchilarining yozuv malakalarini takomillashtirishda baholash xususiyatlari: Pedagogika fanlari bo'yicha falsafa doktori (PhD) diss. avtoref. – Toshkent: O'zDJTU, 2023. – 68 b.
5. Anne Burns Doing Action Research in English Language Teaching: A Guide for Practitioners. – New York: Routledge, 2010.
6. Council of Europe Common European Framework of Reference for Languages: Learning, Teaching, Assessment (CEFR). – Cambridge: Cambridge University Press, 2020.
7. O'zbekiston Respublikasi Prezidentining 2022-yil 28-yanvardagi PF-60-son Farmoni "2022–2026-yillarga mo'ljallangan Yangi O'zbekistonning taraqqiyot strategiyasi to'g'risida".