METHODOLOGY OF USING ARTIFICIAL INTELLIGENCE TOOLS (CHATBOTS, ADAPTIVE SYSTEMS, GENERATIVE MODELS) IN TEACHING PEDAGOGICAL DISCIPLINES

Scientific supervisor: p.f.f.d., PhD, v.b dotsent **I.D.Qodirov**
Researcher: Master student of CSPU, **Shavkat Jalilov Shodiyorvich**
Mail: shavkatjalilov6465@gmail.com

Abstract

This article examines the methodology of using artificial intelligence tools - specifically chatbots, adaptive learning systems, and generative AI models - in teaching pedagogical disciplines at higher educational institutions. The rapid development of AI technologies has created both unprecedented opportunities and significant challenges for teacher education. While AI tools are already transforming many sectors of education, their systematic integration into the teaching of pedagogy, didactics, educational psychology, and teaching methodology remains theoretically underdeveloped and practically inconsistent. The purpose of the article is to develop a methodological framework for the purposeful, pedagogically grounded, and ethically responsible use of AI tools in pedagogical disciplines. The research draws on international scholarly literature on AI in education, learning analytics, and human-computer interaction, as well as the works of Uzbek scholars who have studied educational technology, innovative teaching methods, and the modernization of pedagogical preparation. The article classifies AI tools into three functional categories - conversational AI (chatbots and large language models), adaptive learning systems, and generative AI for content creation - and analyses the specific methodological possibilities and limitations of each category in the context of pedagogical disciplines. The main result is a five-component methodological model that defines the goals, content, methods, tools, and assessment approaches for integrating AI into pedagogical courses. The model is organized around the principle that AI should serve as a cognitive partner that enhances pedagogical thinking rather than as a substitute that replaces it. The study concludes that the effective use of AI in teaching pedagogical disciplines requires not only technical literacy but also a new form of methodological competence that includes the ability to design AI-enhanced learning activities, to evaluate AI-generated content critically, and to maintain the primacy of human pedagogical judgement in all educational decisions.

Keywords

artificial intelligence, chatbots, adaptive learning systems, generative AI, pedagogical disciplines, teacher education, methodology, educational technology, large language models, AI literacy

МЕТОДИКА ИСПОЛЬЗОВАНИЯ СРЕДСТВ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА (ЧАТ-БОТОВ, АДАПТИВНЫХ СИСТЕМ, ГЕНЕРАТИВНЫХ МОДЕЛЕЙ) В ПРЕПОДАВАНИИ ПЕДАГОГИЧЕСКИХ ДИСЦИПЛИН

Аннотация

В статье рассматривается методика использования средств искусственного интеллекта - чат-ботов, адаптивных обучающих систем и генеративных моделей ИИ - в преподавании педагогических дисциплин в высших учебных заведениях. Стремительное развитие технологий ИИ создало как беспрецедентные возможности, так и значительные вызовы для педагогического образования. Хотя средства ИИ уже трансформируют многие сектора образования, их систематическая интеграция в преподавание педагогики, дидактики, педагогической психологии и методики обучения остаётся теоретически недостаточно разработанной и практически непоследовательной. Цель статьи - разработать методическую основу для целенаправленного, педагогически обоснованного и этически ответственного использования средств ИИ в педагогических дисциплинах. Исследование опирается на международную научную литературу по ИИ в образовании, учебной аналитике и взаимодействию человека с компьютером, а также на труды узбекских учёных, изучавших образовательные технологии, инновационные методы обучения и модернизацию педагогической подготовки. В статье средства ИИ классифицируются на три функциональные категории - разговорный ИИ, адаптивные обучающие системы и генеративный ИИ для создания контента - и анализируются конкретные методические возможности и ограничения каждой категории в контексте педагогических дисциплин. Основным результатом является пятикомпонентная методическая модель, определяющая цели, содержание, методы, средства и подходы к оценке интеграции ИИ в педагогические курсы. Исследование заключает, что эффективное использование ИИ в преподавании педагогических дисциплин требует не только технической грамотности, но и новой формы методической компетентности.

Ключевые слова

искусственный интеллект, чат-боты, адаптивные обучающие системы, генеративный ИИ, педагогические дисциплины, педагогическое образование, методика, образовательные технологии, большие языковые модели, ИИ-грамотность

PEDAGOGIKA FANLARINI O‘QITISHDA SUN’IY INTELLEKT VOSITALARIDAN (CHATBOTLAR, ADAPTIV TIZIMLAR, GENERATIV MODELLAR) FOYDALANISH METODIKASI

Annotatsiya

Ushbu maqolada oliy ta’lim muassasalarida pedagogika fanlarini o‘qitishda sun’iy intellekt vositalaridan - chatbotlar, adaptiv o‘quv tizimlar va generativ AI modellaridan - foydalanish metodikasi o‘rganiladi. Sun’iy intellekt texnologiyalarining jadal rivojlanishi pedagogika ta’limi uchun ham misli ko‘rilmagan imkoniyatlar, ham muhim muammolarni yaratdi. AI vositalari ta’limning ko‘plab sohalarini allaqachon o‘zgartirayotgan bo‘lsa-da, ularni pedagogika, didaktika, pedagogik psixologiya va o‘qitish metodikasi fanlarini o‘qitishga tizimli integratsiya qilish nazariy jihatdan yetarlicha ishlab chiqilmagan va amaliy jihatdan izchil emas. Maqolaning maqsadi pedagogika fanlarida AI vositalaridan maqsadli, pedagogik jihatdan asoslangan va axloqiy jihatdan mas’uliyatli foydalanish uchun metodik asos ishlab chiqishdan iborat. Tadqiqot ta’limda AI, o‘quv analitikasi va inson-kompyuter o‘zaro ta’siri bo‘yicha xalqaro ilmiy adabiyotlarga, shuningdek ta’lim texnologiyalari, innovatsion o‘qitish usullari va pedagogik tayyorgarlikni modernizatsiya qilishni o‘rgangan o‘zbek olimlarining asarlariga tayanadi. Maqolada AI vositalari uchta funksional toifaga bo‘linadi - suhbatdosh AI (chatbotlar va katta til modellari), adaptiv o‘quv tizimlari va kontent yaratish uchun generativ AI - hamda har bir toifaning pedagogika fanlari kontekstidagi aniq metodik imkoniyatlari va cheklovlari tahlil qilinadi. Asosiy natija AI ni pedagogika kurslariga integratsiya qilish uchun maqsadlar, mazmun, metodlar, vositalar va baholash yondashuvlarini belgilaydigan besh komponentli metodik modeldir.

Kalit so‘zlar

sun’iy intellekt, chatbotlar, adaptiv o‘quv tizimlar, generativ AI, pedagogika fanlari, pedagogika ta’limi, metodika, ta’lim texnologiyalari, katta til modellari, AI savodxonlik

Introduction

The emergence of artificial intelligence as a practical tool in education represents one of the most significant technological shifts in the history of pedagogy. Unlike previous educational technologies - from the printed textbook to the overhead projector to the learning management system - AI tools do not merely present or organize information. They generate new content, adapt to individual learners in real time, engage in dialogue, provide personalized feedback, and simulate complex educational scenarios. This qualitative difference makes AI both a powerful resource and a serious challenge for teacher education, because the tools that future teachers will encounter in their professional lives are fundamentally different from the tools their instructors used during their own training.

Three categories of AI tools are particularly relevant for pedagogical disciplines. The first category is conversational AI, which includes chatbots and large language models such as ChatGPT, Claude, and Gemini. These systems can engage in extended dialogue on pedagogical topics, generate lesson plans, explain theoretical concepts, simulate student responses, and provide feedback on written work. The second category is adaptive learning systems, which use algorithms to adjust the difficulty, pace, and content of learning materials based on individual student performance. Examples include platforms that

personalize learning pathways in real time, identify knowledge gaps, and recommend targeted practice. The third category is generative AI for content creation, which includes tools that generate text, images, presentations, assessments, and educational scenarios based on user prompts. These tools can produce a complete lesson plan, a set of differentiated worksheets, or a case study for classroom discussion in minutes.

The relevance of this topic for Uzbekistan is particularly acute. The country is undergoing a comprehensive modernization of its educational system, with significant attention to digital transformation. The Presidential Decree on measures for the further development of the higher education system (2019) and subsequent policy documents have emphasized the need for innovative educational technologies in university preparation. Uzbek pedagogical scholarship has responded to this imperative from several directions. Ishmuhamedov, Abduqodirov, and Pardayev (2008) developed a framework for innovative pedagogical technologies in Uzbek education that emphasized interactive methods and technology-enhanced learning. Ziyomuhammadov (2006) provided a comprehensive treatment of pedagogical technologies in the context of higher education. Farberman (2000) analysed advanced pedagogical technologies and their role in educational modernization. Muslimov (2014) examined the formation of professional competence in teacher education, including the role of technological tools in developing adaptive, creative teachers. These works establish a tradition of openness to educational innovation that provides a foundation for integrating AI tools into pedagogical preparation.

International research on AI in education has grown rapidly in recent years. Holmes, Bialik, and Fadel (2019) provided a comprehensive overview of AI applications in education, distinguishing between AI as a tool for learners, AI as a tool for teachers, and AI as a tool for the educational system. Luckin, Holmes, Griffiths, and Forcier (2016) examined the potential of AI to transform education and identified key areas where AI could enhance teaching and learning, while also noting significant risks including bias, privacy concerns, and the potential for deprofessionalization of teaching. Zawacki-Richter, Marín, Bond, and Gouverneur (2019) conducted a systematic review of AI applications in higher education and found that most studies focused on AI as a tool for student support rather than as a tool for teacher preparation, revealing a significant gap in the literature. Kasneci, Sessler, Küchemann, and colleagues (2023) analysed the implications of large language models for education, arguing that these tools require new forms of pedagogical literacy and that teacher education must prepare graduates who can use AI critically and purposefully.

The research problem of this article can be formulated as follows: what methodological principles and practical approaches should guide the use of AI tools - chatbots, adaptive systems, and generative models - in teaching pedagogical disciplines so that these tools enhance rather than undermine the development of professional pedagogical competence? The purpose of the study is to develop a methodological framework that defines the goals, content, methods, and assessment approaches for integrating AI into pedagogical courses. The object of the study is the process of teaching pedagogical

disciplines at higher educational institutions. The subject is the methodology of using AI tools in this process.

The hypothesis of the article is that AI tools become effective instruments in teaching pedagogical disciplines when they are used according to a clear methodological framework that includes five components: defined pedagogical goals for AI use, curated content that integrates AI activities with disciplinary learning outcomes, methods that position AI as a cognitive partner rather than an answer machine, appropriate tool selection based on the pedagogical task, and assessment practices that evaluate critical engagement with AI rather than mere reproduction of AI-generated content. Without such a framework, AI use in pedagogical courses risks becoming either superficial - where tools are demonstrated but not integrated into learning - or counterproductive - where students develop dependency on AI rather than independent pedagogical thinking.

Methods

The article employs a theoretical and design-based research methodology. The method includes systematic literature review, comparative analysis of AI applications in education, functional classification of AI tools, and methodological model development. The literature base covers international research on AI in education published between 2016 and 2025, Uzbek scholarly works on educational technology and pedagogical innovation, and technical documentation of major AI platforms relevant to education.

The analytical procedure was organized in four stages. At the first stage, AI tools relevant to education were identified and classified into three functional categories based on their primary mode of interaction with users. At the second stage, the specific methodological possibilities and limitations of each category were analysed in the context of pedagogical disciplines such as general pedagogy, didactics, history of education, educational psychology, and teaching methodology. At the third stage, existing approaches to AI integration in teacher education were reviewed and evaluated. At the fourth stage, a five-component methodological model was developed that synthesizes theoretical insights and practical considerations into a coherent framework for AI-enhanced pedagogical instruction.

The article does not present original experimental data. Its contribution is methodological: it provides a structured framework that can be used by university instructors, curriculum designers, and educational administrators to guide the integration of AI tools into pedagogical courses. This approach is justified because the rapid development of AI technology has outpaced the development of methodological guidance for its educational use, creating a situation where many educators are experimenting with AI without a systematic foundation.

Results

1. Classification and analysis of AI tools for pedagogical disciplines

The first result is a detailed classification and analysis of three categories of AI tools and their specific applications in pedagogical disciplines.

AI category	Examples	Pedagogical possibilities	Key limitations

AI category	Examples	Pedagogical possibilities	Key limitations
Conversational AI (chatbots, LLMs)	ChatGPT, Claude, Gemini, Copilot, educational chatbots	Socratic dialogue on pedagogical concepts; lesson plan generation and critique; simulation of student questions; feedback on written assignments; translation of theory into practical examples	Factual inaccuracies (hallucinations); lack of real pedagogical experience; potential for superficial engagement; dependency risk; ethical concerns about academic integrity
Adaptive learning systems	Knewton, DreamBox, Smart Sparrow, custom LMS-integrated adaptive modules	Personalized learning pathways for mastering pedagogical theory; identification of individual knowledge gaps; differentiated practice; real-time progress monitoring	Limited availability for pedagogical content in Uzbek language; high development costs; risk of reducing pedagogy to testable knowledge; limited scope for creative and reflective tasks
Generative AI for content creation	AI image generators, presentation builders, assessment generators, scenario creators	Rapid creation of case studies and pedagogical scenarios; generation of differentiated learning materials; visual content for demonstrations; draft assessments for refinement	Quality control challenges; risk of generic content; copyright and attribution uncertainties; need for human editorial judgement; cultural appropriateness concerns

Conversational AI presents the most transformative possibilities for pedagogical disciplines. A chatbot powered by a large language model can serve as a dialogue partner for exploring complex pedagogical concepts. For example, a student studying the theory of developmental learning can engage in a structured dialogue with the AI, asking it to explain the concept, provide examples, present counterarguments, and compare it with alternative theories. The AI does not replace the instructor but provides an additional interlocutor that is available at any time, patient with repeated questions, and capable of adapting its explanations to the student’s level of understanding. However, the AI’s responses must always be treated as starting points for critical analysis rather than as authoritative answers. The AI may present plausible but inaccurate information, oversimplify complex pedagogical debates, or fail to account for the specific cultural and institutional context of Uzbek education.

Adaptive learning systems offer possibilities for personalizing the mastery of pedagogical theory. Students enter a pedagogical course with different levels of prior knowledge, different learning speeds, and different areas of difficulty. An adaptive system can diagnose each student’s current level of understanding, recommend appropriate learning

activities, and adjust the difficulty and content of practice tasks in real time. For example, a student who struggles with the classification of teaching methods might receive additional explanations, examples, and practice exercises, while a student who has already mastered this topic might be directed to more advanced material on the selection of methods for specific learning contexts. The limitation is that adaptive systems work best for well-structured knowledge that can be assessed through discrete tasks, while pedagogical competence also includes creative, reflective, and interpersonal dimensions that resist algorithmic assessment.

Generative AI for content creation enables rapid production of educational materials. An instructor preparing a seminar on classroom management can use generative AI to create a set of realistic pedagogical scenarios, each describing a different classroom situation that requires a management decision. Students can then analyse these scenarios, propose solutions, and discuss alternative approaches. The efficiency gain is significant: creating ten detailed, varied scenarios manually might take several hours, while an AI can generate initial drafts in minutes. However, the generated content requires careful review for accuracy, cultural appropriateness, and pedagogical relevance. Farberman (2000) noted that the effectiveness of any pedagogical technology depends on the quality of its content, and AI-generated content is no exception.

2. Five-component methodological model

The second result is a five-component methodological model for integrating AI tools into pedagogical disciplines.

Component 1: Pedagogical goals of AI use.

The first component defines why AI tools are used in a specific pedagogical course. Goals should be explicit, measurable, and connected to the course learning outcomes. AI use without clear pedagogical goals leads to technological decoration: tools are demonstrated but do not contribute to professional competence development. Five categories of goals are proposed. First, conceptual deepening: using AI dialogue to explore pedagogical theories at greater depth than lectures alone allow. Second, practical application: using AI to generate realistic pedagogical scenarios and materials for analysis and practice. Third, critical thinking development: using AI outputs as objects for critical evaluation, helping students develop the ability to assess the quality, accuracy, and appropriateness of information. Fourth, individualization: using adaptive systems to personalize the learning pathway according to each student’s needs. Fifth, digital professional competence: developing students’ ability to use AI tools purposefully in their future professional work as teachers.

Component 2: Content integration.

The second component defines what content is taught through AI-enhanced activities. AI tools should not be used for all content equally. They are most effective for content that benefits from dialogue, personalization, scenario analysis, or rapid material generation. In a course on general pedagogy, for example, AI-enhanced activities might include dialogue-based exploration of different pedagogical paradigms, scenario analysis of educational

situations requiring pedagogical decisions, personalized review of foundational concepts, and critical evaluation of AI-generated lesson plans. In a course on teaching methodology, AI activities might include generating and refining lesson plans for specific topics, creating differentiated materials for diverse learner groups, and comparing AI-suggested methodological approaches with established professional practices. Ishmuhamedov, Abduqodirov, and Pardayev (2008) emphasized that innovative technologies must be integrated into the content structure of the course rather than added as supplementary activities.

Component 3: Methods of AI-enhanced instruction.

The third component defines how AI tools are used in the learning process. Six methods are proposed. The dialogue method involves students engaging in structured conversations with conversational AI on pedagogical topics, using prepared question sequences that guide exploration from basic understanding to critical analysis. The scenario analysis method involves students analysing AI-generated pedagogical scenarios, identifying problems, proposing solutions, and comparing their analyses with those of classmates. The comparative evaluation method involves students comparing AI-generated outputs (lesson plans, explanations, assessments) with expert-created alternatives, identifying strengths and weaknesses of each. The design-and-refine method involves students using generative AI to create initial drafts of pedagogical materials and then refining them through professional judgement and peer review. The adaptive practice method involves students using adaptive systems for personalized mastery of theoretical content, with the instructor monitoring progress and providing targeted support. The ethical analysis method involves students examining the ethical implications of AI use in education, including issues of bias, privacy, academic integrity, and the boundaries of human and machine roles in teaching.

Component 4: Tool selection criteria.

The fourth component defines which AI tools are selected for specific pedagogical tasks. Tool selection should be guided by four criteria. Pedagogical alignment: the tool must serve the defined learning goal. Accessibility: the tool must be available to all students, considering infrastructure, cost, and language constraints. Quality of output: the tool must produce outputs of sufficient quality to support meaningful learning activities. Ethical compliance: the tool must respect data privacy, intellectual property, and academic integrity standards. In the Uzbek context, accessibility is a particularly important criterion, because not all students have equal access to high-speed internet, modern devices, or paid AI platforms. The methodology should include strategies for ensuring equitable access, such as using free-tier AI tools, organizing AI activities in computer laboratories, or providing shared access through institutional subscriptions.

Component 5: Assessment of AI-enhanced learning.

The fifth component defines how student learning is assessed in AI-enhanced pedagogical courses. Traditional assessment approaches are insufficient because they cannot distinguish between knowledge that the student has genuinely acquired and content that has

been generated by AI. The methodology proposes three assessment strategies. Process-oriented assessment evaluates the quality of the student’s interaction with AI: the specificity of prompts, the depth of critical analysis, the quality of revisions to AI-generated content, and the sophistication of reflective commentary. Product-with-documentation assessment requires students to submit both their final work and a documented record of their AI interactions, enabling the instructor to evaluate the student’s contribution to the final product. Integrative performance assessment evaluates students’ ability to apply pedagogical knowledge in situations where AI tools are not available - for example, in live microteaching sessions, oral examinations, or improvised pedagogical problem-solving - thereby ensuring that AI-enhanced learning has produced genuine competence rather than tool dependency.

Component	**Key question**	**Core principle**
Pedagogical goals	Why are AI tools being used in this course?	Every AI activity must serve an explicit, measurable learning outcome
Content integration	What content is taught through AI-enhanced activities?	AI activities are embedded in the content structure, not added as supplements
Methods	How are AI tools used in the learning process?	AI serves as a cognitive partner that enhances thinking, not a substitute that replaces it
Tool selection	Which AI tools are appropriate for specific tasks?	Selection is guided by pedagogical alignment, accessibility, quality, and ethics
Assessment	How is student learning evaluated in AI-enhanced courses?	Assessment focuses on critical engagement and genuine competence, not AI-generated output

3. Practical applications across pedagogical disciplines

The third result is a set of specific practical applications organized by pedagogical discipline.

In general pedagogy, conversational AI can be used to create dialogic explorations of fundamental concepts such as the relationship between education and upbringing, the nature of the pedagogical process, and the comparative analysis of educational paradigms. Students can formulate questions to the AI, evaluate its responses against textbook definitions and scholarly articles, and identify areas where the AI’s explanations are incomplete or misleading. This activity develops both conceptual understanding and critical evaluation skills simultaneously.

In didactics, generative AI can produce lesson plan drafts that students then analyse, critique, and redesign. For example, the AI might generate a lesson plan for teaching the concept of photosynthesis to seventh-grade students. The student’s task is not to accept this plan but to evaluate it: Does the plan reflect sound didactic principles? Are the methods appropriate for the stated objectives? Is the sequence logical? Are the visual aids effective? What would the student change and why? This methodology transforms AI output from a finished product into a learning stimulus.

In educational psychology, adaptive learning systems can personalize the mastery of theoretical content such as Piaget’s stages of cognitive development, Vygotsky’s zone of proximal development, or Erikson’s psychosocial stages. Students who have already mastered foundational concepts can be directed toward application tasks, while students who need additional support receive targeted explanations and practice. The instructor’s role shifts from delivering content to monitoring individual progress and facilitating deeper discussions.

In teaching methodology, the design-and-refine method is particularly powerful. Students use generative AI to create initial versions of methodological materials - lesson plans, assessment rubrics, differentiated worksheets, classroom management scenarios - and then refine these materials through professional analysis and peer review. Ziyomuhammadov (2006) argued that methodological competence develops through the cycle of design, implementation, analysis, and refinement. AI tools accelerate the design phase, freeing more time for the analytically more valuable phases of implementation and refinement.

4. Risks and ethical considerations

The fourth result is an analysis of the risks and ethical considerations associated with AI use in pedagogical disciplines. The first risk is cognitive dependency. When students routinely rely on AI to generate ideas, explanations, and materials, they may fail to develop the independent thinking skills that are essential for professional teaching. A teacher who cannot design a lesson without AI assistance, or who cannot explain a concept without consulting a chatbot, has not achieved genuine professional competence. The methodology addresses this risk by positioning AI as a starting point for critical analysis rather than an endpoint, and by including assessment activities that evaluate competence without AI support.

The second risk is the erosion of academic integrity. Generative AI makes it possible for students to produce written assignments, reflective journals, and even research papers with minimal personal intellectual effort. If pedagogical courses assess only the final product without attention to the process, the educational value of assignments is undermined. The assessment strategies proposed in this article - particularly process-oriented and product-with-documentation approaches - are designed to address this risk.

The third risk is bias and cultural inappropriateness. AI systems are trained on large datasets that reflect the perspectives, values, and educational traditions of the cultures that produced them - predominantly English-speaking, Western, and technologically developed

societies. When these systems generate content about pedagogical theory, classroom management, or educational values, they may reflect assumptions that do not align with Uzbek educational traditions, cultural norms, or institutional realities. Muslimov (2014) emphasized that professional competence formation must be grounded in the specific context of the national educational system. AI-generated content must therefore be evaluated not only for accuracy but also for cultural and contextual appropriateness.

The fourth risk is the digital divide. Not all students and not all educational institutions have equal access to AI tools. Requiring AI-enhanced activities without ensuring equitable access creates disadvantages for students from less resourced backgrounds or institutions. The methodology must include strategies for mitigating this inequality, such as institutional provision of AI access, design of activities that can be completed with free-tier tools, and alternative pathways for students who cannot access specific platforms.

The fifth risk is the deprofessionalization of teaching. If AI tools are presented as capable of performing core teaching functions - planning lessons, assessing students, managing classrooms - future teachers may develop a diminished sense of their own professional value and agency. The methodology must consistently communicate the message that AI is a tool that serves human pedagogical judgement, not a system that replaces it. The ethical analysis method proposed in the model ensures that students engage critically with questions about the appropriate boundaries between human and machine roles in education.

Discussion

The results of the theoretical analysis confirm that AI tools offer significant methodological possibilities for teaching pedagogical disciplines, but that these possibilities can only be realized through a structured, purposeful, and critically informed approach. The five-component methodological model proposed in this article provides such a structure. Its design is consistent with international research on AI in education: Holmes, Bialik, and Fadel (2019) argued that the educational value of AI depends not on the technology itself but on the pedagogical design within which it is used. Kasneci et al. (2023) emphasized that the arrival of large language models in education requires new forms of AI literacy for both teachers and students. Zawacki-Richter et al. (2019) identified the need for more systematic research on AI in teacher education specifically, noting that most existing work focuses on AI as a tool for student learning rather than as a component of teacher preparation.

The Uzbek scholarly tradition provides important contextual grounding for the proposed methodology. The emphasis on interactive and innovative pedagogical technologies (Ishmuhamedov et al., 2008), on the systematic design of educational processes (Ziyomuhammadov, 2006), on the quality of pedagogical content (Farberman, 2000), and on the integration of technological tools with professional competence development (Muslimov, 2014) establishes a foundation on which AI-enhanced pedagogy can be built. The methodology proposed in this article extends this tradition by incorporating the specific challenges and opportunities created by AI technologies that were not available when these foundational works were written.

The central principle of the methodology - that AI should serve as a cognitive partner that enhances pedagogical thinking rather than a substitute that replaces it - has important implications for instructional design. Activities should be structured so that AI generates starting material that students must then analyse, evaluate, modify, and improve. The intellectual work of pedagogical judgement remains with the student. The AI provides raw material, alternative perspectives, and rapid feedback, but the student makes the professional decisions. This principle distinguishes educational AI use from consumer AI use, where the goal is to obtain a finished product with minimum effort.

Several limitations of the study should be acknowledged. First, the methodology is theoretical and has not been empirically tested in specific pedagogical courses. While the model is grounded in established theoretical frameworks and international evidence, its effectiveness in Uzbek pedagogical universities requires empirical validation. Second, AI technology is developing rapidly, and specific tools and platforms referenced in this article may change significantly in the near future. The methodology is designed to be tool-agnostic at the level of principles, but specific practical recommendations may need updating as technology evolves. Third, the linguistic dimension requires attention: most advanced AI tools perform best in English, and their performance in Uzbek may be limited. The development of AI tools with strong Uzbek language support is an important infrastructure challenge that lies beyond the scope of this article but significantly affects the practical implementation of the proposed methodology.

For curriculum design in pedagogical universities, the discussion suggests several recommendations. First, AI literacy should be included as an explicit learning outcome in pedagogical courses, not left to individual instructor discretion. Second, faculty development programmes should prepare university instructors to use AI tools in their teaching and to guide students in critical AI engagement. Third, institutional policies on AI use in academic work should be developed that are clear, fair, and educationally productive - neither prohibiting AI use entirely nor allowing unrestricted use without accountability. Fourth, pilot implementations of the proposed methodology should be organized in selected courses, with systematic evaluation of their effects on student learning outcomes, engagement, and professional competence development.

Conclusion

The methodology of using artificial intelligence tools in teaching pedagogical disciplines can be organized through a five-component model that addresses pedagogical goals, content integration, instructional methods, tool selection, and assessment practices. This model provides a systematic foundation for integrating chatbots, adaptive learning systems, and generative AI into the teaching of pedagogy, didactics, educational psychology, and teaching methodology in ways that enhance rather than undermine the development of professional pedagogical competence.

The main conclusion of the study is that the effective use of AI in pedagogical disciplines requires a new form of methodological competence that goes beyond technical literacy. This competence includes the ability to design AI-enhanced learning activities that

serve explicit pedagogical goals, to evaluate AI-generated content critically against professional standards and cultural context, to guide students in developing their own critical engagement with AI, and to maintain the primacy of human pedagogical judgement in all educational decisions. AI tools are powerful, versatile, and rapidly improving, but they are tools - instruments that serve educational purposes defined by human professionals. Pedagogical universities have the responsibility to prepare future teachers who can use these tools wisely, critically, and purposefully, contributing to the quality of education in Uzbekistan and beyond.

Further research should focus on empirical testing of the proposed five-component model in specific pedagogical courses at Uzbek universities, development of AI literacy curricula adapted to the Uzbek educational context, comparative studies of AI-enhanced and traditional approaches to teaching pedagogical disciplines, investigation of the long-term effects of AI-enhanced teacher preparation on graduates’ professional competence, and the development of AI tools with robust support for the Uzbek language.

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