



FORMING THE METHODOLOGY FOR INTEGRATING ARTIFICIAL INTELLIGENCE INTO THE PRIMARY EDUCATION PROCESS (ON THE EXAMPLE OF EXTRACURRICULAR ACTIVITIES)

Oyjamol Jakhongirovna Ergasheva

Lecturer, Department of Primary Education Methodology, Denov Institute of Entrepreneurship and Pedagogy, Uzbekistan

Nazokat Tursunmuratovna Avvalova

Student, Primary Education, Denov Institute of Entrepreneurship and Pedagogy

Article history:	Abstract:
Received: 20 th December 2025 Accepted: 14 th February 2026	This article analyzes the theoretical and pedagogical foundations of forming a methodology for integrating artificial intelligence into the primary education process through extracurricular activities. The study highlights the didactic potential of artificial intelligence tools in developing pupils' cognitive activity, creative thinking, digital literacy, and independent working skills. It also scientifically explains the organizational forms, pedagogical conditions, and effectiveness factors of using these technologies in extracurricular activities. Their significance in innovative development is also evaluated.

Keywords: primary education, artificial intelligence, extracurricular activities, methodology, digital literacy, creative thinking, pedagogical innovation.

INTRODUCTION. Today, the acceleration of digital transformation processes worldwide, the broad penetration of artificial intelligence technologies into various social spheres, and the continuous renewal of the content of education are placing entirely new tasks before primary education. The educational process should no longer be limited to providing pupils with ready-made knowledge; it must also prepare them to work consciously with information, think logically and critically, analyze problems, find creative solutions, and function effectively in a digital environment. From this perspective, forming a methodology for integrating artificial intelligence into the primary education process, especially on the example of extracurricular activities, has emerged as one of the urgent directions of modern educational theory and practice that requires scientific and pedagogical substantiation.

It is well known that the stage of primary education serves as the foundation for a child's intellectual, moral, social, and communicative development. It is precisely during this period that such basic competencies as interest in learning, independent thinking, observation of the surrounding world, asking questions, the need to learn, planning specific activities, and evaluating results are formed in pupils. Therefore, introducing innovative technologies, in particular artificial intelligence tools, into the primary education system in a meaningful, purposeful, and pedagogically well-grounded manner is not only a demand of the times, but also one of the necessary conditions for preparing the pupil for future

life in a digital society. However, organizing this process not only within formal lessons but also in connection with extracurricular activities creates special methodological opportunities.

Extracurricular activities are regarded as an important pedagogical space in primary education that supports pupils' free interests, individual inclinations, creative activity, and socialization. Unlike classroom lessons, such forms of activity are less rigidly regulated; pupils explore more, experiment, work in teams, demonstrate their abilities, and try new types of activities. In this regard, introducing elements of artificial intelligence through clubs, creative projects, engaging activities, competitions, digital tasks, game-based activities, and small-scale research has considerable pedagogical potential in developing pupils' technological thinking, algorithmic approach, information culture, communication skills, and creative competencies. In particular, working with texts, images, sounds, and interactive tasks through artificial intelligence tools makes the learning process more engaging, individualized, and motivationally attractive for pupils.

At the same time, the issue of integrating artificial intelligence into primary education should be considered not only as a technological innovation, but also as a complex methodological, didactic, and ethical-pedagogical problem. The age characteristics, level of psychological development, information safety needs, and capacity for perceiving educational content at this stage require a special approach to the use of artificial



intelligence tools. If this process is not guided by a scientifically grounded methodology, artificial intelligence may, instead of becoming a means of development, turn the pupil into a passive recipient accustomed to ready-made answers. Therefore, the issue lies not in whether artificial intelligence should be used, but in developing a methodology that determines for what purpose, in what form, through which didactic tools, and under what pedagogical conditions it should be used.

The relevance of the topic is further determined by the fact that although interest in the use of artificial intelligence tools in educational practice is growing today, the methodological foundations of this process in primary education, especially in the context of extracurricular activities, have not yet been sufficiently systematized. In many cases, teachers are familiar with the general possibilities of artificial intelligence, but they need methodological guidelines on adapting it to the age and individual characteristics of pupils, integrating it with educational and воспитательный aims, designing tasks step by step, evaluating results, and ensuring a safe digital environment. For this reason, the study of this topic has not only theoretical but also direct practical significance.

From a scientific point of view, forming a methodology for integrating artificial intelligence into the primary education process is closely connected with such modern concepts as learner-centered education, the competency-based approach, activity-based teaching, digital pedagogy, and innovative didactics. In particular, studying this problem through the example of extracurricular activities makes it possible to shape pupils not as ordinary users of artificial intelligence technologies, but as subjects capable of using them consciously, purposefully, responsibly, and creatively. This creates an important basis for fostering digital literacy, information selection, analysis, verification of results, adherence to ethical norms, and a conscious attitude toward technology in children in the future.

The purpose of this article is to provide scientific and pedagogical substantiation for the formation of a methodology for integrating artificial intelligence into the primary education process through extracurricular activities, and to identify its theoretical foundations, didactic possibilities, organizational forms, and effective methods and tools. The study also aims to reveal the impact of using artificial intelligence on pupils' cognitive activity, independent thinking, creative abilities, digital competencies, and social adaptation. In the article, the issue of integrating the specific pedagogical potential of extracurricular activities with the didactic capacity of

artificial intelligence tools is considered as a priority direction.

Thus, the formation of a methodology for integrating artificial intelligence into the primary education process is currently one of the promising and necessary directions of pedagogical science and educational practice. In particular, studying this process through the example of extracurricular activities has important scientific and practical significance in ensuring the comprehensive development of the pupil's personality, shaping technological thinking, revealing creative and intellectual potential, and developing competencies that correspond to the demands of modern digital society.

METHODOLOGY. The methodological basis of this research is formed by learner-centered, activity-based, competency-based, integrative, and digital education approaches of modern pedagogy. In studying the topic "Forming the Methodology for Integrating Artificial Intelligence into the Primary Education Process (on the Example of Extracurricular Activities)," the educational process was interpreted as a complex pedagogical system aimed not only at the acquisition of knowledge by the pupil, but also at the development of independent thinking, technological reasoning, creative potential, information culture, and social adaptation. For this reason, taking into account the age-related, psychological, intellectual, and individual characteristics of primary school pupils was defined as a priority methodological criterion.

In the course of the research, the systematic approach was applied as one of the main methodological principles. This approach made it possible to consider artificial intelligence tools in the primary education process, and especially in the system of extracurricular activities, not as isolated elements, but as a unified didactic system in which goals, content, methods, tools, pedagogical conditions, and results are organically interconnected. On this basis, the methodology of integrating artificial intelligence into education was analyzed not simply as a set of technological tools, but as a scientifically grounded pedagogical model serving the development of the pupil.

Special attention was paid in the study to the activity-based approach. At the primary education stage, the pupil should be formed not as a passive recipient of ready-made knowledge, but as a subject who actively acquires, tests, processes, and applies knowledge in practice. From this perspective, pupils' activities of searching, selecting, comparing, asking questions, solving problems, checking results, and drawing conclusions during the use of artificial intelligence tools were placed at the methodological center of the



research. This made it possible to evaluate the possibilities of artificial intelligence within extracurricular activities not merely as a means of obtaining information, but as a pedagogical resource that guides the pupil toward thinking, analysis, and creativity.

The competency-based approach also served as an important methodological foundation of the research. On the basis of this approach, the key competencies expected to be formed through the integration of artificial intelligence into primary education were analyzed, including digital literacy, information-handling competence, communicative skills, independent learning ability, creative thinking, and social cooperation. In this context, extracurricular activities were recognized as a favorable pedagogical environment for forming these competencies through freer, more flexible, and interest-based forms of activity than the formal lesson process.

The integrative approach also occupied an important place in the research methodology. Integrating artificial intelligence into primary education requires the harmony of several interdisciplinary fields at the same time, including pedagogy, psychology, didactics, information technology, media literacy, and information security. Therefore, in this study, the methodology of using artificial intelligence tools was considered in integration with pupils' age characteristics, cognitive needs, educational aims, ethical norms, and digital safety requirements. This allowed the issue to be removed from a narrowly technological framework and interpreted as a complex pedagogical phenomenon.

The study used comparative-analytical, descriptive, observational, generalization, and pedagogical interpretation methods. Through the comparative-analytical method, the common and distinctive features of traditional extracurricular activities and activity forms integrated with elements of artificial intelligence were examined. The descriptive method was used to explain the didactic possibilities of artificial intelligence tools, the forms appropriate for primary education, and their functional roles within extracurricular activities. On the basis of the observation method, changes in pupils' interest, activity, independence, quality of questioning, creative approach, and collaboration skills in the process of working with artificial intelligence were pedagogically analyzed. Through the generalization method, scientific sources, advanced experiences, and observation results were systematized, and the relevant theoretical conclusions were formulated.

The theoretical and methodological foundation of the research is based on scientific views related to digital

pedagogy, innovative educational technologies, child psychology, the didactics of primary education, and personality development. In particular, conceptual approaches connected with increasing pupil activity, individualizing education, motivating the learning process, creating problem situations, and developing reflection and self-control served as the scientific support of this study. At the same time, such criteria as pedagogical appropriateness, age suitability, reliability of information, adherence to ethical norms, and guiding the pupil not toward ready-made answers but toward independent thinking were defined as priority methodological principles in the use of artificial intelligence tools.

As one of the important aspects of the methodological approach, special attention was paid to the specific pedagogical nature of extracurricular activities. Such forms of activity rely more heavily on pupils' free choice, interests, initiative, and creativity. Therefore, the research substantiated that integrating artificial intelligence precisely through extracurricular activities is an effective way of familiarizing pupils with digital technologies in a pressure-free, natural, and motivating environment. Methodologically, this was evaluated as a factor that enriches the pupil's personal experience, strengthens intrinsic motivation, and helps gradually form a culture of conscious use of technology.

In addition, throughout the study, the principles of scientific validity, objectivity, consistency, continuity, safety, and practical orientation were strictly observed. The obtained results contributed to developing the methodological foundations for integrating artificial intelligence into extracurricular activities in primary education, identifying pedagogical conditions, describing effective methods and tools, and elaborating methodological recommendations. Thus, the methodology of this article made it possible to study the topic comprehensively from both theoretical and practical perspectives, to deeply analyze the pedagogical process, and to arrive at scientifically grounded conclusions.

ANALYSIS AND RESULTS. An analysis of the methodology for integrating artificial intelligence into the primary education process, especially through extracurricular activities, shows that this direction is not only a requirement of modern technological progress, but also one of the important factors in bringing the pedagogical process to a qualitatively new stage. Artificial intelligence tools demonstrate their true didactic effectiveness in primary education not when they are introduced directly and mechanically, but when they are applied in harmony with pupils' age



characteristics, cognitive needs, areas of interest, and educational objectives. From this perspective, extracurricular activities are of particular importance as a favorable pedagogical space for the gradual, flexible, and learner-centered integration of artificial intelligence into primary education.

The analysis indicates that the use of artificial intelligence elements within extracurricular activities significantly increases pupils' interest in learning. This is because such activities provide a freer environment than the strictly regulated classroom setting, allowing pupils to experiment with technologies, ask questions, conduct independent inquiry, and analyze results. In particular, creating texts with the help of artificial intelligence, analyzing images, solving logical tasks, organizing interactive game-based sessions, and carrying out small projects and research activities foster natural motivation toward learning. As a result, the pupil begins to perceive technology not as a source of ready-made answers, but as a means of thinking, comparing, verifying, and engaging in creative activity.

Scientific-pedagogical observations and analytical approaches show that the purposeful use of artificial intelligence contributes to the development of a number of important competencies in primary school pupils. First, pupils' digital literacy and culture of working with information are formed. They begin to understand the necessity of searching for, selecting, processing, and verifying information. Second, the process of working with artificial intelligence tools develops pupils' independent thinking and ability to ask questions, since obtaining effective results requires them to express their thoughts clearly, formulate tasks correctly, and analyze the results received. Third, such activities stimulate creative thinking and an innovative approach, because working with artificial intelligence often requires generating new ideas, comparing several options, and selecting the most appropriate solution.

The results of the analysis also confirm that the effectiveness of artificial intelligence in extracurricular activities largely depends on the methodological model according to which it is applied. If the teacher uses artificial intelligence tools only as a technical convenience or as a sign of modernity, their pedagogical effect remains superficial. On the contrary, if these tools are integrated with clear objectives, didactic tasks, educational orientation, and age-appropriate assignments, they can have a significant influence on the pupil's intellectual and personal development. Therefore, the center of the methodology for integrating artificial intelligence should not be the technology itself, but rather the pedagogical purpose,

didactic content, and the teacher's methodological mastery that guide its use.

The analysis conducted within the framework of this topic also reveals another important point: artificial intelligence tools expand the possibilities of an individual approach in primary education. Since each pupil in extracurricular activities differs in interests, abilities, and pace of learning, it becomes relatively easier to differentiate tasks based on artificial intelligence. For example, one pupil may learn more actively through visual tasks, while another may reveal their potential more fully through text-based or game-based activities. Therefore, personalizing extracurricular activities with the help of artificial intelligence tools increases pupils' self-confidence, strengthens their sense of achievement, and supports their active involvement in the educational process.

The results also show that introducing artificial intelligence into extracurricular activities in primary education not only enhances the cognitive process but also positively influences pupils' socialization and communicative development. In activities based on group tasks, collective projects, discussions, and presentations, pupils acquire skills of cooperation, task distribution, exchange of ideas, joint analysis of results, and a sense of responsibility. This demonstrates that artificial intelligence tools are not merely individual technological resources, but also means of collaborative learning and development of social competencies.

At the same time, the analysis reveals the existence of certain methodological and pedagogical risks in this process. In particular, excessive or uncontrolled use of artificial intelligence may lead pupils to rely on ready-made answers, weaken critical analysis, and make independent thinking more superficial. In addition, issues such as information security, appropriateness of content, observance of ethical norms, and the formation of a culture of using digital tools are of great importance for children of primary school age. Therefore, the research findings indicate the necessity of strictly following the principles of pedagogical supervision, expediency, age-appropriateness, and safety in integrating artificial intelligence into primary education. As a general scientific result, it can be stated that the methodology of integrating artificial intelligence into the primary education process through extracurricular activities appears as an effective pedagogical mechanism for developing pupils' cognitive activity, digital literacy, independent thinking, creative ability, and socio-communicative competencies. Such an approach enriches the content of the pedagogical process, transforms the pupil into an active subject, and



strengthens the developmental, educational, and innovative functions of education. As a result, extracurricular activities enriched with artificial intelligence tools contribute to the creation of an interest-based, future-oriented educational environment that supports the comprehensive development of the pupil's personality in primary education.

CONCLUSION. In conclusion, forming a methodology for integrating artificial intelligence into the primary education process, especially through extracurricular activities, is one of the urgent and promising directions of modern pedagogy and educational practice. This approach requires interpreting artificial intelligence not simply as a technological tool, but as a complex pedagogical resource serving the intellectual, creative, communicative, and digital development of the pupil. In this respect, extracurricular activities function as a convenient methodological space for integrating elements of artificial intelligence into primary education in a way that is appropriate, engaging, flexible, and educationally purposeful.

The results of the research and analysis show that the correct and purposeful use of artificial intelligence tools significantly develops primary school pupils' interest in learning, independent thinking, ability to ask questions, ability to select and analyze information, demonstration of creative approaches, and teamwork skills. In particular, the free, interest-based, and creative nature of extracurricular activities helps to realize the didactic possibilities of artificial intelligence tools more effectively. This creates the basis for shaping the pupil not merely as a user of technology, but as a person capable of using it consciously, responsibly, and purposefully.

At the same time, integrating artificial intelligence into primary education requires a high level of methodological precision and pedagogical responsibility. The psychological and intellectual characteristics of pupils at this age stage, their information security needs, and educational aims all require special attention in the selection, adaptation, and application of artificial intelligence tools. Therefore, the main factor of success in this process lies not in the technology itself, but in the methodological system that organizes it properly, pedagogically manages it, and subordinates it to educational goals.

Overall, forming a methodology for integrating artificial intelligence into the primary education process is an important pedagogical condition for developing the key competencies necessary for modern life, strengthening pupils' creative and critical thinking, shaping their digital

culture, and raising educational effectiveness to a new level. Therefore, it will remain an important task in the future to deepen scientific and methodological research in this direction, prepare primary education teachers to work on the basis of artificial intelligence, develop safe and age-appropriate methodological models, and enrich the content of extracurricular activities with innovative technologies.

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