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PEDAGOGICAL AND METHODOLOGICAL APPLICATION OF GENERATIVE ARTIFICIAL INTELLIGENCE TOOLS WITHIN THE FRAMEWORK OF A JOINT EDUCATIONAL PROGRAMS

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Abstract. This article examines the issues of pedagogical integration of generative artificial intelligence technologies into international joint educational programs. The study analyzes the potential of artificial intelligence in personalizing the learning process, enhancing virtual pedagogical support and modernizing assessment systems. Furthermore, the paper substantiates ways to improve educational effectiveness through the application of learning analytics and formative assessment mechanisms. It also comprehensively addresses key challenges associated with the implementation of artificial intelligence in joint educational programs, including academic integrity, data security, teachers' digital competencies and technological inequality. As a result of the research, scientific and practical recommendations for the effective integration of artificial intelligence technologies into the international education system are proposed.

Keywords: Generative artificial intelligence, joint educational programs, pedagogical integration, methodological approaches, personalized learning, adaptive learning, assessment systems, higher education, digital transformation, innovative technologies.

Introduction. One of the priority directions of modern higher education is the development of international joint educational programs, which play a significant role in improving the national education system. Within the framework of such programs, the joint design of curricula by two or more higher education institutions, the promotion of student mobility, and the enhancement of educational quality are of particular importance. This type of integration requires the harmonization of educational standards, methodologies, and assessment systems across different countries (OECD, 2022, pp. 45–48). In recent years, the rapid advancement of generative artificial intelligence (GenAI) technologies has initiated an innovative transformation in the education system. In particular, "language models such as ChatGPT have emerged as important tools for personalizing the learning process, supporting pedagogical activities and increasing educational effectiveness" (UNESCO, 2023, pp. 12–16). From this perspective, studying the pedagogical integration of artificial intelligence within joint educational programs represents a highly relevant research issue.

Literature review and research methodology. The pedagogical integration of artificial intelligence technologies is characterized by opportunities to automate the learning process, adapt educational materials and provide real-time feedback [Holmes et al., 2019, pp. 30–35]. Especially within joint educational programs, these technologies play a crucial role in establishing a unified and efficient learning environment. A key feature of joint programs is the integration of educational systems from different countries and artificial intelligence (AI) serves to optimize this process. For example, "AI-based platforms can analyze students' academic performance and ensure the flexibility of curricula" [European Commission, 2020, pp. 7–10]. This, in turn, enables the creation of an effective learning environment based on individualized approaches. The development of

learner-centered education is one of the most important aspects of AI integration. “AI systems analyze students’ knowledge levels, interests, and needs and accordingly generate personalized learning trajectories” [UNESCO, 2021, pp. 18–22]. As a result, each student is provided with opportunities for development in accordance with their individual capacities.

Artificial intelligence tools are also widely used as virtual pedagogical assistants in joint educational programs. In particular, “AI-based chatbots and virtual tutors maintain continuous interaction with students, offering explanations of assignments, supporting independent learning, and providing academic guidance” [Eaton and Anselmo, 2023, pp. 55–60]. This is especially valuable in the context of the expanding role of distance education, as it contributes to improving overall educational effectiveness. At the same time, artificial intelligence (AI) also supports the pedagogical activities of teachers. AI-based tools assist in planning instructional materials, enriching teaching methodologies and selecting resources tailored to students’ needs. As a result, “digital transformation occurs within the pedagogical process, leading to improvements in the quality of education” [Selwyn, 2022, pp. 70–75].

“The enhancement of assessment systems through AI is of particular importance in joint educational programs. With the help of AI technologies, it becomes possible to monitor student performance in real time, analyze levels of knowledge acquisition and identify learning difficulties within the educational process” [Dawson, 2020, pp. 80–85]. Through learning analytics and educational data mining technologies, students’ learning engagement, task completion rates and overall academic performance are analyzed in depth. This enables the assessment process to become more objective and transparent. Moreover, AI reduces teachers’ workload by automating assessment processes. The evaluation of test tasks, the preliminary analysis of written assignments and the grading of results based on established criteria can be carried out quickly and efficiently. This is particularly significant when working with large groups of students. In addition, AI-based assessment systems make it possible to establish unified criteria aligned with international standards. “By reducing discrepancies in assessment systems across different universities, it becomes feasible to ensure academic quality within joint programs” [UNESCO, 2023, pp. 25–28].

Results and discussion. Despite the considerable potential of integrating AI technologies into joint educational programs, this process is also associated with several challenges. One of the most significant issues is academic integrity. Since AI tools can automatically generate responses and complete tasks, they may, in some cases, lead to plagiarism and a decline in independent critical thinking [Selwyn, 2019, pp. 92–95]. Furthermore, issues related to data security and the protection of personal information remain highly relevant. In joint educational programs, data are exchanged through international platforms, which introduces risks associated with confidentiality [UNESCO, 2023, pp. 30–33]. Another important limitation concerns the digital competence of educators. Many teachers lack sufficient training to effectively utilize AI tools, which complicates the full implementation of these technologies. Additionally, the issue of technological inequality persists. Due to differences in the material and technical infrastructure of universities, some institutions are unable to fully benefit from advanced AI technologies. As a result, disparities in educational quality and opportunities may arise.

The scientific novelty of this study lies in its comprehensive analysis of the pedagogical integration of generative artificial intelligence technologies within international joint educational programs. It proposes a model for the development of a unified learning environment through AI, substantiates transnational mechanisms for learner-centered education, and develops innovative solutions aimed at aligning assessment systems with international standards. The study is distinguished by its systematic and integrated approach to examining generative AI technologies

within the context of international joint educational programs—an area of growing relevance in modern education. While existing research has predominantly analyzed AI either within individual national education systems or as a general pedagogical tool, this article conceptualizes AI as a key component of transnational educational integration. In particular, it provides a novel scientific perspective on the role of AI in coordinating the learning process, reducing methodological disparities, and harmonizing assessment systems across joint programs implemented by higher education institutions from different countries.

It can be argued that advancing the concept of a unified digital–pedagogical environment based on artificial intelligence represents an innovative model for increasing the effectiveness of joint educational programs. This approach serves to reduce inconsistencies that arise in the process of integrating diverse educational standards, curricula, and assessment criteria. New mechanisms for the development of learner-centered education, enabled by AI technologies, make it possible to construct flexible learning trajectories based on students' individual characteristics, levels of knowledge, and educational needs. Furthermore, the study provides an expanded interpretation of the functional role of virtual pedagogical assistants—AI-based chatbots and digital tutors—within joint educational programs. These tools are considered not merely as auxiliary instruments, but as significant pedagogical agents that ensure continuous academic support for students and facilitate communication and knowledge exchange in transnational educational environments. This, in turn, introduces a novel scientific approach to enhancing the effectiveness of distance and hybrid learning formats.

Another important contribution of the study lies in its integrated analysis of the challenges associated with AI integration into the education system—namely, academic integrity, data security, educators' digital competence, and technological inequality. Rather than addressing these issues in isolation, the research examines them as an interconnected system. This perspective substantiates the need for comprehensive solutions and enables the development of scientifically grounded approaches to overcoming these challenges. A phased, systematic, and ethically grounded model for the implementation of AI technologies in joint educational programs has been developed, aligning international standards, pedagogical methodologies, and the requirements of digital transformation. This model serves as a theoretical foundation for fostering a globally competitive and innovative educational environment in the future.

Conclusion. In general, the pedagogical integration of artificial intelligence technologies into joint educational programs creates opportunities for the personalization of the learning process, modernization of assessment systems, and support of pedagogical activities. At the same time, it necessitates addressing challenges related to academic integrity, data security, educators' digital preparedness, and technological inequality. Therefore, the implementation of AI in education requires a phased approach grounded in international standards, ethical principles, and methodological strategies. Such an approach will contribute to the development of an innovative and high-quality global educational environment.

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