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INTEGRATION OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES INTO THE PROCESS OF LEARNING HIGHER MATHEMATICS IN ECONOMIC UNIVERSITIES

Advanced artificial intelligence (AI) technologies are becoming more and more deeply integrated into the lives of modern people every day, and as a result, their significant impact has not bypassed the higher education system. The rapid growth of this development trend opens up new opportunities for higher education institutions, but at the same time, it creates a number of problems for them. Today, we are seeing how AI-based tools are gradually but surely changing approaches to higher education, teaching methods and even the principles of university functioning. This raises the question of analyzing the results of AI integration into higher education, both in theory and in practice.

These processes have also affected economic universities. The use of AI in training future economists contributes to significantly expanding the opportunities and prospects for improving the effectiveness of the educational process and scientific research. AI allows for better training of specialists in the field of economics, as it provides access to automated analysis of financial and statistical data, modelling of economic processes, forecasting of market trends, and intelligent management decision support systems. At the same time, AI helps to create personalized educational trajectories that take into account the individual characteristics, pace and level of assimilation of material of each higher education applicant. This makes learning deeper and more effective, promoting the acquisition of theoretical knowledge and the development of analytical, critical and practical skills necessary for a modern economist. The result is a new approach to training specialists who are able to operate effectively in the context of the digital transformation of society and the economy.



Modern training of economists is impossible without digital technologies. Higher mathematics is a mandatory discipline for applicants of economic universities, as it forms the basis for mastering both general education and professional courses, and provides powerful analytical tools for solving complex economic problems. The combination of mathematical knowledge with the capabilities of AI opens up broad prospects: from modelling economic processes and forecasting market dynamics to optimizing resource use, analyzing risks and improving management decisions. The use of AI makes it possible to perform in-depth statistical analysis and interpretation of large amounts of economic data, optimize the use of financial and material resources, improve logistics and production processes, and increase the overall efficiency of enterprises and economic systems. Thus, the integration of mathematical tools and methods and AI technologies is becoming a key factor in shaping the competencies needed by future economists in the digital age.

The introduction of AI into the teaching of mathematical disciplines opens up new opportunities for significantly improving the effectiveness of the educational process. Then learning can be personalized, taking into account the individual needs and level of preparation of each applicant. One of the main advantages of using AI is the ability to visualize abstract mathematical concepts: applicants can clearly see how theoretical principles are applied in practice, which helps them to better understand complex ideas and learn difficult topics faster, more deeply and more effectively [1].

Today, a number of intelligent platforms based on AI technologies have been created for automated solving of mathematical problems. These platforms not only provide the ability to quickly obtain solutions, but also contribute to a deeper understanding of the calculation process, making it more understandable and convenient for users. Such platforms combine theoretical mathematical concepts with real-world applied problems, helping to make computational tools more accessible to users of all skill levels.

The list of the best AI platforms, depending on the part of higher mathematics to which the task belongs, includes the following: linear and vector algebra, analytical geometry (ChatGPT-4o, Claude, Gemini, MathGPTPro, Symbolab, Microsoft MathSolver, Mathway); mathematical analysis (Wolfram Alpha, Wolfram Calculus, MathGPTPro, Symbolab, Mathway, ChatGPT-4o, Claude, Mathos), etc. It is also important to consider the variety of ways to enter information into such platforms: text, handwriting, voice input, or a combination thereof [1].

The main functions of these platforms are as follows: ChatGPT-4o generates solutions to problems, explains algorithms and modelling approaches; Claude has the ability to work with large amounts of data and conduct various studies, and its answers are more transparent and understandable to users; Gemini has the ability to generate texts, visualize them, analyze tasks presented in the form of images, and conduct



analytical research in the economic sphere; Wolfram Alpha is one of the most powerful mathematical assistants, allowing users to broaden their horizons in mathematics and the exact sciences, making learning more interactive and interesting; Google Bard interprets formulas, provides theoretical explanations, and offers approaches to building models in an applied context; Microsoft MathSolver recognises mathematical expressions and text problems, determines the sequence of actions, and provides step-by-step solutions; MathGPTPro solves problems of varying complexity, explaining each step of the calculation for a better understanding of the solution logic; Mathway instantly calculates expressions and provides step-by-step solutions to models; Wolfram Calculus performs analytical calculations, differentiation, and graphing of models; Symbolab solves equations, systems, and integrals with step-by-step explanations; Mathos supports rapid calculation and verification of mathematical expressions; and other platforms expand interactive learning opportunities and practical applications of mathematical methods.

To perform the necessary calculations, applicants have the opportunity to use the AI tools listed above. However, they must first master the basics of the relevant theoretical and practical material on their own. Only then is it advisable to resort to using the relevant AI systems. It is also worth remembering that AI does not always perform calculations correctly, because, like humans, it can make mistakes.

In addition, a number of risks associated with the use of AI should be taken into account, such as a decline in critical thinking among higher education applicants, excessive reliance on algorithms, superficial assimilation of material without understanding its essence, and violations of academic integrity. Added to this are technical limitations, possible inaccuracies, and sometimes ethical issues related to the protection of personal data. Over-reliance on AI can lead to a decline in applicants' ability to think independently, solve even simple problems, and analyze information.

The use of AI has great potential to improve the effectiveness of the educational process and promote the development of an individual approach to each applicant. However, this development is accompanied by numerous ethical issues that require comprehensive consideration. Some of the important aspects are data confidentiality, equal access to technology, and potential dependence on new technologies [2].

So, AI has significant potential for the development of education, particularly mathematics. Its effective use in teaching higher mathematics is possible if a balance is maintained between technological assistance and the formation of independent, logical and creative thinking among higher education applicants. AI should play a supporting role in the learning process, rather than completely replacing it.

Thus, the introduction of AI into the higher education system requires a balanced, ethically sound and conscious approach to its integration into the educational process when studying higher mathematics in economic universities and equal



opportunities for all participants. Therefore, it is necessary not only to use the capabilities of AI, but also to form a culture of its safe and responsible use. Only under such conditions can AI technologies become a real tool for improving the quality of economic education and developing the professional competencies of higher education applicants.

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