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Artificial Intelligence as a Subject of Study in Higher Education: Global Standards and the Paradox of Ukrainian Educational Programmes

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1 Introduction

Researchers identify five key areas of application for AI tools in higher education: (1) Assessment/Evaluation, (2) Predicting, (3) AI Assistant, (4) Intelligent Tutoring System (ITS), and (5) Managing Student Learning [1-3]. Modern higher education faces an unprecedented challenge, which can be described as the 'educational paradox of artificial intelligence' (AI). The essence of the paradox lies in a sharp conflict of speeds: AI is the discipline with the fastest-evolving toolset, whilst the university remains one of the most inertial systems for updating educational programmes [4]. The discourse on the integration of AI into higher education highlights a growing global gap between curricula and the practical skills required by industry [5].

To gain a comprehensive understanding of this issue, it is important to consider artificial intelligence in two dimensions: as a separate academic discipline and as a holistic educational programme (EP), as well as to compare global practices with local Ukrainian realities [6]. In the Ukrainian context, this paradox is compounded by the fact that current higher education standards for IT specialisms (mostly approved in 2020–2024, i.e. prior to the global boom in generative AI) do not include AI as a mandatory component. The aim of this study is to analyse how Ukrainian higher education institutions (HEIs) are adapting their educational programmes (EPs) to industry requirements amidst strict regulatory constraints, and to identify ways to overcome the identified educational paradox.

2 Methods and results

The study sample comprised the total population of accredited bachelor's degree programmes (240 ECTS credits) at six leading technical universities in Ukraine (including Lutsk National Technical University) the titles of which explicitly include the term 'Artificial Intelligence'. The programmes were divided into two groups according to their core specialisations: F1 'Applied Mathematics' and F3 'Computer Science'. All subjects were semantically grouped into blocks, after which their average proportion was calculated. The data were compared with the recommendations of the international standard ACM/IEEE Computer Science Curricula 2023 (CS2023) [7]. As

CS2023 does not specify fixed percentages for subject blocks, but instead adopts a competence-based approach and flexible curriculum design, the table provides an indicative breakdown, summarised on the basis of the Knowledge Areas structure and recommendations for AI integration.

The results of the analysis of the distribution of ECTS credits across subject areas are presented in Table 1. As the empirical data show, the approach to AI education in Ukraine depends entirely on the underlying degree programme (a maths-driven approach in programme F1 versus an engineering-driven approach in programme F3). However, common to both groups is a critically low percentage of disciplines that directly study AI (Machine Learning, neural networks, Data Mining) – on average around 13–15% of the total volume.

Table 1. A comparative analysis of the structure of AI education programmes in Ukraine and global recommendations

Subject module	F1 'Applied Mathematics'	F3 'Computer Science'	Recommendations ACM/IEEE CS2023 [7]
1. Humanitarian / Soft Skills	~ 10 %	~ 12 %	~10–15% (ethics, communication, teamwork, social aspects of IT)
2. Fundamental (Mathematics)	~ 32 %	~ 18 %	~15–20 % (discrete mathematics, statistics, linear algebra for AI and data analysis)
3. Basic IT (Programming)	~ 25 %	~ 42 %	~35–40% (programming, algorithms, systems architecture, software development)
4. Specialised (Proprietary AI)	~ 15 %	~ 13 %	~20–25% (AI, ML, Data Science, intelligent systems, integrated into various courses)
5. Practical Experience / Projects	~ 18 %	~ 15 %	15–20% (project-based learning, team projects, development and implementation of AI solutions)

According to the ACM/IEEE CS2023 document, AI (Knowledge Areas: AL-AI and AL-ML) has attained the status of a fundamental discipline that should be integrated across the curriculum, accounting for up to a quarter of the core curriculum [7]. In Ukraine, however, AI is largely treated as an isolated 'add-on' in the final years of study.

3 Conclusion

The low proportion of specialist AI subjects clearly illustrates the bureaucratic aspect of the Ukrainian education paradox. As higher education standards for the 2022–2024 period do not include AI competencies, higher education institutions are forced to devote up to 85% of their curriculum to meeting regulatory requirements, learning outcomes and core subjects [8]. Universities simply do not have 'free credits' to introduce a sufficient number of modern courses.

Furthermore, the rapid development of generative AI (such as ChatGPT) calls for an immediate response regarding academic integrity and changes to teaching approaches [9–10]. As one solution to overcoming this barrier within the framework of current

standards, a shift towards the creation of hybrid specialised disciplines is proposed. Instead of mechanically adding separate AI courses, higher education institutions should integrate AI into existing core subjects (for example, transforming a traditional discipline into 'Probability Theory in Machine Learning Tasks' or 'Designing Information Systems using LLM'). This will simultaneously meet the requirements of the national standard and provide students with up-to-date skills.

The modernisation of traditional disciplines through the cross-cutting implementation of AI technologies (in line with the ACM/IEEE CS2023 vision) is the most viable adaptation strategy for universities until the official update of state standards for higher education.

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