

ΟΡΙΝΙΟΝ

ON

The artificial intelligence applications in the Greek school



March 2025

NATIONAL COMMISSION FOR BIOETHICS & TECHNOETHICS

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I. Introduction

In various meetings, the National Commission for Bioethics and Technoethics has deliberated on the introduction of Artificial Intelligence (AI) applications in education. According to the definition proposed by the OECD in 2019, which is adopted in Article 2 of the Framework Convention on Artificial Intelligence and Human Rights, Democracy, and the Rule of Law of the Council of Europe (2024), as well as Article 3 (1) of Regulation (EU) 2024/1689 dated 13 June 2024 establishing harmonised rules on AI, "an AI system is a machine-based system designed to operate with varying levels of autonomy and may exhibit adaptiveness after deployment, and that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions influencing real or virtual environments".

The objectives of this Opinion are: a) to examine the impact of AI applications currently utilised in educational systems or being developed for potential integration into the educational process, particularly in Greek schools, and b) to assess these impacts from ethical and social perspectives while formulating relevant recommendations for the State.

To address this issue, the Commission organised hearings with relevant organisations and scientists from Greece and abroad (see Annex).

II. Reference data

AI can be employed in various ways and for different purposes within the educational environment, offering both advantages and disadvantages for the learning process, teachers, and students. Examples of AI applications include the development of lesson plans for teachers, the generation of educational content tailored to student performance, and student assessment and feedback.

III. General Considerations for Implementing AI Applications in School Education

Integrating AI applications into the education system must be recognised as a tangible reality. While official educational policies have yet to incorporate such applications at any level, using AI for curriculum-based data searching and automated text generation is already common among teachers and students. The State must continually assess this evolving landscape, primarily

regarding the primary goals and principles of education. Fragmented initiatives for the implementation of AI applications should be approached with caution, ensuring that their impact on primary educational goals and principles is thoroughly assessed before adoption.

According to the Commission, there is a fundamental core to the social function of education that must remain unquestioned. This entails equipping learners—regardless of age— with the ability to critically analyse knowledge across various domains of the natural world and human activity. Such a capacity is grounded in the transmission of essential knowledge and methodologies, which form the basis for its development. No matter how advanced AI applications may become, even if they acquire a degree of autonomy or critical data-processing capability, replacing this human faculty could foster conditions of heteronomy among students. This, in turn, would undermine the principle of their free and responsible personal development, ultimately infringing upon their inherent human value."

Education extends far beyond the mere transmission of knowledge, as schools also play a crucial role in developing students' social skills. Within the school environment, students learn to collaborate, think both creatively and critically, and become responsible members of society. Furthermore, learning is an interactive process in which knowledge is constructed through socio-emotional engagement and collaboration, making interpersonal interactions between students and teachers indispensable. Teachers possess qualities such as critical thinking, creativity, social experience, and emotional intelligence—attributes that AI tools cannot replicate.

In addition to safeguarding the core of the educational process, it is essential to evaluate whether AI applications in education today can serve as reliable or complementary tools for learning, considering the following factors: a) the existing spatial structure of educational institutions, which necessitates the mandatory co-presence of individuals for a designated period, b) the face-to-face interaction between educators and learners, c) the use of standardised conventional educational materials (such as a single prescribed textbook or structured educational workshops), and d) the centrally predetermined educational curricula.

Finally, it is essential to consider specific elements that characterise AI applications in general and raise ethical and legal concerns regarding their use, such as:

- The need to process users' personal data (including sensitive information) presents serious ethical and legal challenges, particularly in light of the General Data Protection Regulation (GDPR),
- the opacity or challenges in explaining AI-generated outputs, particularly in machine learning systems, create uncertainty regarding the reliability of results—be it in knowledge retrieval or text generation,
- the challenge of embedding ethical considerations, logical reasoning, and inference capabilities into algorithm design,
- the requirement for big data to train AI algorithms may be linked to restrictions imposed by intellectual and industrial property rights,
- the potential financial burden of implementing AI applications raises questions about their prioritisation in public resource allocation for education, as well as concerns regarding equal access for teachers and learners, such as disparities between public and private education.

IV. Specific Issues Regarding the Application of AI in School Education

A fundamental principle of a new educational policy in Greece should be that AI tools are not adopted in education merely because they are available but because they are deemed effective and appropriate. The first step is to identify educational needs and clarify learning objectives. Only then should we evaluate whether existing AI applications can address some of these objectives. In other words, we must first ask, *"Why should AI be used in education?"* before considering *"Which AI applications should be implemented, and how?"*. In conclusion, AI applications should be tailored to educational needs—not the other way around.

A crucial distinction must be made between *education in AI* and *education for AI*. Education in AI involves integrating AI into educational programs as part of digital and algorithmic literacy, treating AI as content within computer science curricula. However, while necessary, this approach has limited long-term value, as the rapid pace of technological advancements will quickly outdate textbooks. Instead, education for AI should be prioritised familiarising students with the ethical, social, and legal challenges posed by AI. The ultimate goal is to prepare students for responsible and constructive interaction with AI systems, which are becoming increasingly embedded in everyday life.

Furthermore, AI in education should be leveraged to foster critical thinking, collaborative knowledge exploration, creative curiosity, and imagination among both students and teachers. It should also support the development of essential social skills. From this perspective, the integration of AI into education should contribute to the formation of a human-centred pedagogical model that prioritises meaningful learning experiences over mere technological adoption.

Given the relative novelty of AI systems in education, sufficient time has not yet elapsed to conduct extensive experimental research on their impact on students' cognitive and other skills. In other words, many applications of AI in education remain largely hypothetical, and there is no conclusive evidence that these tools are more effective than existing methods or technologies. Therefore, it is crucial to empirically evaluate the actual outcomes of AI applications in education to confirm or challenge current expectations and concerns.

AI technologies also present significant risks to privacy and personal data protection for students and teachers. Upholding the core principle of the General Data Protection Regulation (GDPR) to minimise the collection and use of personal data when developing and implementing AI systems in education is essential.

Furthermore, Generative AI relies on existing content and knowledge created by human activity, raising concerns about potential intellectual property law violations. This leads to a critical question: Who bears responsibility for infringement—the user operating the AI tool to generate content or the developer/programmer of the AI system?

V. The framework of ethical principles and values

Given the above, the Commission believes that the implementation of AI applications in Greek schools must take into consideration the following essential ethical principles:

*Respect for human dignity.*¹ This principle calls for excluding AI applications from the educational system when they are used to manipulate student behaviour. In a democratic society, education must prioritise the development of the student's personality above all else. Practices such as monitoring students' behaviour inside or outside of school, implementing 'social scoring' systems, or leaking data about their actions or opinions expressed in class to third parties via AI tools fundamentally violate the integrity of the student's personality. These practices cannot be justified by claims that they improve educational 'effectiveness.' For the same reasons, AI systems used to determine access to education, evaluate learning outcomes, assign educational levels, or detect prohibited behaviour during exams are considered 'high-risk'² as they may have a decisive and undue impact on the professional future of students or trainees even after they have completed their education.

The principle of autonomy.³ According to this principle—an essential aspect of respecting human dignity-the free development of a pupil's personality through education is achieved by fostering their capacity for responsible self-determination in all areas of personal and social life. All educational tools and methods, including AI applications, must, therefore, be evaluated based on whether they support the development of these capacities. Specifically, they should enhance critical thinking rather than replace it. If an AI application offers "ready-made solutions" that discourages independent thought, it risks becoming a manipulative and addictive substitute for genuine learning, thereby undermining the pupil's ability to develop genuine autonomy.

The use of AI in education should uphold the *principles of benefit and non-harm*⁴, *meaning* it should maximise benefits while mitigating or eliminating potential risks of harm.

¹ This principle is legally enshrined in Article 7 of the Framework Convention on AI and Human Rights, Democracy and the Rule of Law of the Council of Europe and in Recitals 27, 31, 48, 58, 80 of Regulation (EU) 2024/1689 of 13 June 2024 on harmonised rules on AI.

² See Article 6 §2 and Annex III, item 3 of Regulation (EU) 2024/1689).

³ This principle is enshrined in Article 7 of the Framework Convention on AI and Human Rights, Democracy and the Rule of Law of the Council of Europe. See also, by way of example, Recitals 27, 29 of Regulation (EU) 2024/1689 of 13 June 2024 laying down harmonised rules on AI.

⁴ This principle is enshrined in Article 13 of the Framework Convention on AI and Human Rights, Democracy and the Rule of Law of the Council of Europe. See also, by way of example, Recitals 5 and 20 of Regulation (EU) 2024/1689 of 13 June 2024, laying down harmonised rules on AI.

The principle of equal access, which requires that all students be able to use AI applications deemed suitable for educational purposes without discrimination. However, even when access appears equal for both students and teachers, disparities can still arise due to differences in how these technologies are used—often influenced by social factors. For example, students from higher socio-economic backgrounds may use AI tools in more advanced and creative ways, while others may engage with them only in basic or mechanical ways. The ultimate goal of integrating AI applications into education should be to reduce existing inequalities—whether economic, social, geographic, or otherwise—promote equity in learning outcomes and bridge the performance gap of different groups of learners. If not implemented with this goal in mind, there is a significant risk that AI will instead deepen existing educational disparities.⁵

The principle of complementarity, which holds that AI applications in education should support—but never replace—the student-teacher relationship or the interpersonal bonds within the educational community. Face-to-face interaction must remain at the heart of the educational process for two key reasons: a) As of now, AI lacks the ability to accurately understand and respond to the unique learning needs of individual students in the nuanced context of their school and family environments—something that a human teacher, using their intellectual and emotional insight, is far better equipped to do, and b) interpersonal interaction within a *shared physical space*, such as a school, plays a vital role in student socialisation. While new technologies may contribute to this process in certain ways, they cannot fully replace the value of real-world human contact.

The principle of transparency,⁶ according to which the introduction of new technologies into the educational process must be based on a clear understanding—by those directly involved, such as schools, teachers, and parents—of how these applications work, the benefits they offer, and the potential risks they pose to the quality of education. This principle also demands that teachers supervise the use of AI applications at all times and have the right to request information about the design of the algorithms. While it may be unrealistic to expect non-experts to grasp

⁵ In violation of Article 10 of the Framework Convention on AI and Human Rights, Democracy and the Rule of Law of the Council of Europe. See also Recital 56 of Regulation (EU) 2024/1689 of 13 June 2024 laying down harmonised rules on AI.

⁶ This principle is legally enshrined in Article 8 of the Framework Convention on AI and Human Rights, Democracy and the Rule of Law of the Council of Europe and Article 1 §2 (d) of Regulation (EU) 2024/1689 of 13 June 2024 on harmonised rules on AI.

complex technical details, they must at least understand the core cognitive assumptions behind the algorithm—such as the sources of data it uses and whether its evaluation criteria are objective or potentially biased. To make this possible, digital and algorithmic literacy must become integral to school curricula. The goal is to equip future generations with the fundamental knowledge needed to understand how AI works in its most common applications, regardless of whether they choose to work in the field professionally.

The Principle of Sustainability: AI and cloud computing require substantial energy and natural resources. Although it is currently challenging to fully quantify AI's environmental impact, considerations of sustainability must be integrated into the planning and implementation of AI applications in education.

Finally, the use of AI should prioritise *augmentation* over *automation* and *ingenuity* over *repetition*. The ethical use of AI in education is not about promoting mechanical, repetitive learning but rather about enhancing students' and teachers' creativity and capabilities. When guided by these values, augmentation becomes not just a design goal but an ethical principle that should shape how AI-based educational policies are developed and applied.

VI. Recommendations

- The school group, classroom, and broader school community must remain central to developing students' social identity and skills. Physical, in-person interaction should continue to be at the heart of the learning experience. AI tools should not be designed to replace or diminish the role of teachers or traditional face-to-face teaching. Instead, their purpose should be to creatively support and enhance the work of educators, reinforcing rather than undermining the human-centred nature of education.
- The application of AI in school education should not be driven solely by technical or technological ambitions lacking a foundation in educational values. Instead, it should be grounded in the fundamental principles of pedagogy and human development. Technology should serve the goals of education—not dictate them. It is education that must guide the use of technology, not the other way around.

- The educational needs, digital literacy, and empowerment of both students and teachers must remain central to AI's selection, use, and evaluation in education. Beyond basic digital literacy, learners should be equipped with a wider range of contemporary competencies, including knowledge of digital ethics, an understanding of digital citizenship, and the ability to navigate the social and civic dimensions of the digital world. Furthermore, complementary skills such as future-planning, sustainability awareness, and social and emotional intelligence should be actively cultivated to prepare students for a complex, rapidly evolving world.
- In this context, it is recommended that teaching programmes be enriched with courses in which teachers responsible for technological subjects and those responsible for ethical, social, and legal subjects collaborate.
- It is recommended that teachers at all levels, special education teachers, and students be involved in designing AI tools that accommodate diverse learning styles (visual, auditory, kinesthetic, reading/writing) and abilities (linguistic, logical/mathematical, spatial, emotional, etc.), as well as a broad spectrum of learning difficulties, including visual and auditory impairments.
- The use of AI tools should be viewed as an opportunity for creatively redesigning teaching and administrative processes rather than merely as a means of digitising existing school bureaucracy.
- To address the risk of deepening educational inequalities, it is essential to implement targeted education policies that ensure equal access for all learners. This includes securing the necessary technological infrastructure, offering dedicated digital education programmes, and establishing an appropriate regulatory framework to guarantee inclusive access to these technologies. In particular, institutional measures to protect linguistic and cultural specificities are recommended to prevent the intentional and unintentional neglect of these aspects by those who design, develop, and supply AI systems.
- For the training of future teachers, it is proposed that all Higher Education Faculties curricula be enriched by including courses in Technoethics. These courses shall aim to familiarise future educators with the ethical, social, and legal implications of AI applications in education. Given the rapid and exponential development of science and technology, with AI playing a central role, it is further recommended that expert working

groups within each scientific field be established with a strategic foresight approach to explore AI's future prospects and potential implications in education over the next decade.

Finally, a structured national programme for the experimental identification and documentation of the impact of AI applications is necessary, evolving in parallel with the gradual integration of these technologies into the educational system. In any case, it is advised that the integration of AI into education be implemented on a pilot or trial basis. Research on AI's educational, ethical, and social impact should be multidisciplinary, evidence-based, and ongoing.

ANNEX

Scientists and representatives of institutions invited to the hearing

At the hearing on January 26, the following participants were present (in alphabetical order):

- Nikolaos Avouris, Professor and Director of the Interactive Technologies Laboratory at the Electrical and Computer Engineering Department, University of Patras,
- Panagiotis Anastasiadis, Professor of the Department of Primary Education, University of Crete,
- Spyridon Doukakis, Chair of the Hellenic Institute of Educational Policy,
- Dimitris Koutsogiannis, Professor of Educational Linguistics at the Department of Linguistics, Faculty of Philosophy (Aristotle University of Thessaloniki),
- Diomidis Spinellis, Professor of the Department of Management Science and Technology, Athens University of Economics and Business and Delf Technical School.

At the hearing on March 26[,] the following participants were present (*in alphabetical order*):

- Achilleas Kameas, Professor of Pervasive and Mobile Systems, Hellenic Open University,
- Ioannis Katsaros, Secretary General for Primary, Secondary and Special Education, Ministry of Education,
- Vassilis Katsouros, Director of the Institute for Language and Speech Processing, Athena Research Centre,
- Petros Tzelepidis, Professor of Artificial Intelligence at the Medical School, University of Crete,
- Konstantinos Champidis, Director at the Office of the Minister of Education, Mr. Kyriakos Pierrakakis,
- George Christopoulos, President of the Federation of Private School Teachers of Greece.

Memoranda were submitted by:

- Homo Digitalis Non-Profit Organization, "Artificial Intelligence and Education, Homo Digitalis' contribution to the National Commission for Bioethics and Technoethics" (20.06.2024),
 - Ana Perona-Fjeldstad, Executive Director of the European Wergeland Centre, "*Ethical issues arising from the use of AI in the educational sector, its potential benefits and possible risks*" (19.08.2024).