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AI ethics in education

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In the research work , an analysis of the AI ethics regulation system was carried out, reviews of foreign experts and international organizations on AI ethics in education were studied, the main risks of AI ethics in education were identified, and universal recommendations were given for the development and systematization of acts in the field of AI ethics in education.

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ABBREVIATIONS

CAF - Development bank of latin America - Andean Development Corporation - Latin American Development Bank

IEEE - Institute of Electrical and Electronics Engineers

AI - artificial intelligence

NPO - non-profit organization

OECD - Organization for Economic Cooperation and Development

Ethics of AI - ethics of artificial intelligence

UNESCO - United Nations Educational, Scientific and Cultural Organization

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Introduction

According to international and domestic studies, the level of implementation of AI technologies in the public sector, business and social processes is steadily growing. So, in «IBM Global AI Adoption Index 2022» says that 35% of companies use AI in their business, and 42% study AI ¹, and «The AI Index 2022 Annual Report » shows that in 2021, 103% more billion dollars were invested in AI and AI startups than in 2020 ²(\$96.5 billion vs. \$46 billion). In Russia, the rating of industries by the value of the AI Index shows the following: 13.6% of start-up organizations use AI, 20% of developing organizations use AI, 53.1% of leading organizations use AI ³.

With the increase in the use of technology, the ethical aspects of the use of AI are exacerbated. [International](#) , [regional](#) and [national organizations](#) are developing AI ethics policies and strategies to address ethical and social concerns and maximize the benefits of using AI.

In addition to the development of general documents, the expert community pays attention to the study of industry norms and principles of AI ethics (AI ethics is a set of values, principles and methods that use generally accepted standards of right and wrong behavior that determine moral behavior in the development and use of AI technologies ⁴) including and in the field of education. In this paper, the author analyzed the AI ethics regulation system , studied reviews on AI ethics in the education of foreign companies, identified the most common risks of AI ethics in education, and provided universal recommendations for the development and systematization of acts in the field of AI ethics in education.

¹IBM Global AI Adoption Index 2022 <https://www.ibm.com/watson/resources/ai-adoption>

²Daniel Zhang, Nestor Maslej , Erik Brynjolfsson , John Etchemendy , Terah Lyons, James Manyika , Helen Ngo, Juan Carlos Niebles , Michael Sellitto , Ellie Sakhaee , Yoav Shoham , Jack Clark, and Raymond Perrault, “The AI Index 2022 Annual Report,” AI Index Steering Committee, Stanford Institute for Human-Centered AI, Stanford University, March 2022.

³Index of readiness of priority sectors of the economy of the Russian Federation for the introduction of artificial intelligence. Analytical report. – Analytical Center under the Government of the Russian Federation; Moscow State University named after M.V. Lomonosov , 2021. - 159 p.

⁴Leslie, D. (2019). Understanding artificial intelligence ethics and safety: A guide for the responsible design and implementation of AI systems in the public sector. The Alan Turing Institute. <https://doi.org/10.5281/zenodo.3240529>

1. AI ethics regulation system

To date, three components can be included in the AI ethics regulation system:

- 1) Norms developed by international organizations;
- 2) soft law;
- 3) Codification of ethical norms and principles at national levels.

At the international level, the ethics of AI are being studied by the OECD (the [Recommendation on Artificial Intelligence has been developed](#) and the [Observatory for Artificial Intelligence Policy has been created](#)), UNESCO (the [Recommendation on the Ethical Aspects of Artificial Intelligence has been developed](#)), the Committee on Artificial Intelligence of the Council of Europe (the study [“AI Ethics Guidelines : European and Global Perspectives ”](#) which is part of the [Feasibility Study](#)).

Soft law approaches include ⁵:

- The work of the IEEE and their «Ethically aligned design. A Vision for Prioritizing Human Well-being with Autonomous and Intelligent Systems»⁶. The document states that the design, development and implementation of technologies must be guided by the principles of human rights, well-being, accountability, transparency and awareness of misuse, and the development of an AI ethics paradigm must be based on the norms of classical ethics, indicators of well-being, programming norms in autonomous systems and methodologies for guidance in ethical research. The IEEE has also developed a number of standards relating to the governance and ethical aspects of AI (for example, [IEEE P7008™ - Standard for Ethically driven Nudging for Robotic , Intelligent , and Automation systems](#));

⁵ Marchant, G. (2019). “Soft Law” Governance of Artificial Intelligence. *UCLA: The Program on Understanding Law, Science, and Evidence (PULSE)* . Retrieved from <https://escholarship.org/uc/item/0jq252ks>

⁶The IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems. Ethically Aligned Design: A Vision for Prioritizing Human Well-being with Autonomous and Intelligent Systems, Version 2. IEEE, 2017. http://standards.ieee.org/develop/indconn/ec/autonomous_systems.html . _ _ _

- Development of ethics initiatives by NGOs and charities (e.g. [Future of Life Institute](#) , [The Institute for Ethical AI & Machine Learning](#) , [Rome Call for AI Ethics](#));

- Establish partnerships on AI regulation issues that include aspects of AI ethics, such as [Partnerships on AI](#) , which includes the largest market players (Microsoft, IBM, Amazon), small and medium-sized enterprises, research centers, academic organizations that research AI issues, professional communities, charitable organizations).

One of the key aspects of the development of the issue of ethics and AI is the consolidation of norms and principles at the state level in the format of codes. Today AI Codes of Ethics are created by:

- 1) In China [The Code](#) was presented to the public on September 25, 2021; it is designed not only for developers of AI products, but for all participants in public relations, including individuals, legal entities and other organizations, and is mandatory for use by everyone involved in activities related to AI;

- 2) In Russia, the [Code](#) was presented to the public on October 26, 2021; The Code is advisory in nature and applies only to civil developments.

On the way to codification - the development of "a unified system of recommendatory principles and rules designed to create an environment for the trusted development of artificial intelligence technologies" ⁷- at the state level, proposals and initiatives on AI ethics are being discussed: for example, in [Saudi Arabia](#) , principles were developed and submitted for discussion ethics of AI, and CAF and UNESCO will [support the establishment of a Regional Council](#) for the Revision of Ethical Criteria for Artificial Intelligence in Latin America and the Caribbean.

⁷AI Code of Ethics <https://a-ai.ru/ethics/index.html>

2. Ethics of AI in education

According to Global market insights global market for AI in education in 2021 amounted to 2 billion dollars, and by 2030. its volume will be more than 80 billion dollars. ⁸According to the «Index of readiness of priority industries for the introduction of artificial intelligence» in the system of general, secondary and secondary vocational education, 8.2% of organizations in the industry use AI, and 11.5% of organizations in the industry (from those that do not use AI) plan to start using AI within 3 years; in the higher education system, 41.6% of industry organizations use AI, and 44.8% of industry organizations (from those not using AI) plan to start using AI within 3 years⁹. The most used technologies are computer vision, intelligent decision support systems, advanced AI methods, natural language processing, speech recognition and synthesis.

In addition to the advantages that the use of AI technologies in the educational process includes (for example, personalization of learning, its adaptation to the needs of the student, the inclusiveness of education), there are ethical aspects of the use of AI technologies in education, which are designed to regulate the ethics of AI in education. When developing principles for the ethics of AI in education, several conditions must be taken into account:

- The openness of the systems and technologies used for parents and students, so that the processes of interaction between the student and the programs are absolutely understandable and transparent;
- The question of the responsibility of the teacher when interacting with the system and accepting or canceling any proposal of the system, as well as open interaction with software developers to eliminate bias from the systems or reprogram the course of interaction with the student;

⁸ AI In Education Market Size & Share Report, 2022-2030
<https://www.gminsights.com/segmentation/detail/artificial-intelligence-ai-in-education-market>

⁹Index of readiness of priority sectors of the economy of the Russian Federation for the introduction of artificial intelligence. Analytical report. – Analytical Center under the Government of the Russian Federation; Moscow State University named after M.V. Lomonosov , 2021. - 159 p.

- Positioning the student in the regulation of AI ethics in education both as a subject of the educational process and as a user of AI technologies.

To increase the transparency and credibility of AI influence, system developers and regulators should be required to ensure that AI systems operate legitimately in the best interests of the student and other participants in the education system. To fulfill this, steps must be taken to involve stakeholders (for example, those representing students and teachers, parents, politicians, business and civil society) in the development, procurement and deployment of AI technologies.¹⁰

3. Review of studies and recommendations of foreign experts

One institution that has made a significant contribution to research on the issue is the Institute for the Ethics of AI in Education (no longer active due to its mission) at Buckingham University. The main objective of the Institute was «to develop an ethical framework that would enable all students to obtain the optimal benefit from AI in education, as well as protect against the known risks that this technology presents»¹¹.

The result of solving this problem was the development by the staff of the Institute of the «Ethical Framework for the Use of AI in Education»¹² and the [Appendix](#) to them. The ethical framework is considered from the position of eight principles, for each of which there is a list of criteria and a list of goals:

- 1) AI should be used to achieve well-defined educational goals based on clear sociological, educational or scientific evidence that it benefits learners.;

¹⁰Wayne Holmes, Jen Persson , Irene-Angelica Chounta , Barbara Wasson, Vania Dimitrova. ARTIFICIAL INTELLIGENCE AND EDUCATION. A critical view through the lens of human rights, democracy and the rule of law. Council of Europe, 2022. <https://rm.coe.int/artificial-intelligence-and-education-a-critical-view-through-the-lens/1680a886bd>

¹¹ The Institute for Ethical AI in Education <https://www.buckingham.ac.uk/research/research-in-applied-computing/the-institute-for-ethical-ai-in-education/>

¹²The Ethical Framework for AI in Education <https://www.buckingham.ac.uk/wp-content/uploads/2021/03/The-Institute-for-Ethical-AI-in-Education-The-Ethical-Framework-for -AI-in-Education.pdf>

- 2) AI should be used to assess and recognize a wider range of student abilities;
- 3) AI should empower organizations while maintaining the importance of human relationships;
- 4) AI systems should be used in a way that promotes equality between different groups of students and not to discriminate against any group of students;
- 5) AI systems should be used to increase students' control over their learning and development;
- 6) A balance needs to be found between privacy and the legitimate use of data for educational purposes;
- 7) Humans are solely responsible for learning outcomes, so they should have an appropriate level of oversight of how AI systems work;
- 8) Students, teachers and other participants in the educational process should have a reasonable understanding of AI and the consequences of its impact;
- 9) The hardware and software of AI systems must be developed by people who understand the impact these resources will have.¹³

The «Ethical Framework for the Use of AI in Education» was widely discussed by the expert community at a series of round tables and at the International Summit on the Use of Ethics of AI in Education, [organized by the Institute for the Ethics of AI in Education in 2020](#).

Researchers from the University of Newcastle (Australia) in the study «Artificial Intelligence and Emerging Technologies in Schools» (2019) proposed the following framework for Education, Ethics and Artificial Intelligence (EEAI - The Education , Ethics and AI). On the left side of the figure, the following is used as a basis:

- human rights, based on the rights enshrined in the Universal Declaration of Human Rights: participation, accountability, non-discrimination, empowerment, legitimacy;

¹³ There same .

- ethical principles that have been adapted from the Australian National Statement on Ethical Conduct in Human Research: integrity, fairness, do good, respect;
- learning: AI technologies, using AI technologies, exploring the potential of AI technologies to improve lives.

On this basis, the ethical development, implementation and management of AI systems in education is based; the above processes are based on five main principles: awareness, explainability, reliability, transparency, accountability. For each of the five principles of AI ethics, experts ask questions for reflection.



Fig . 1 The Education, Ethics and AI (EEAI) framework.¹⁴

In the study «Ethics of AI in Education : Towards a Community - Wide Framework » experts suggest not to reduce the ethics of AI in education only to the issues of working with data, because studying the ethics of AI only from the standpoint of data is not enough. Instead, it is proposed to consider the ethics of AI in education as a two-level model, where at the first level (fundamental) there are ethics of data, education and computational algorithms, and at the second level

¹⁴Southgate, E., Blackmore, K., Pieschl , S., Grimes, S., McGuire, J. & Smithers, K. (2018). Artificial intelligence and emerging technologies (virtual, augmented and mixed reality) in schools: A research report. Newcastle: University of Newcastle, Australia

there are «ethics of data in AI, ethics of data in education and ethics of algorithms used in educational context»¹⁵.

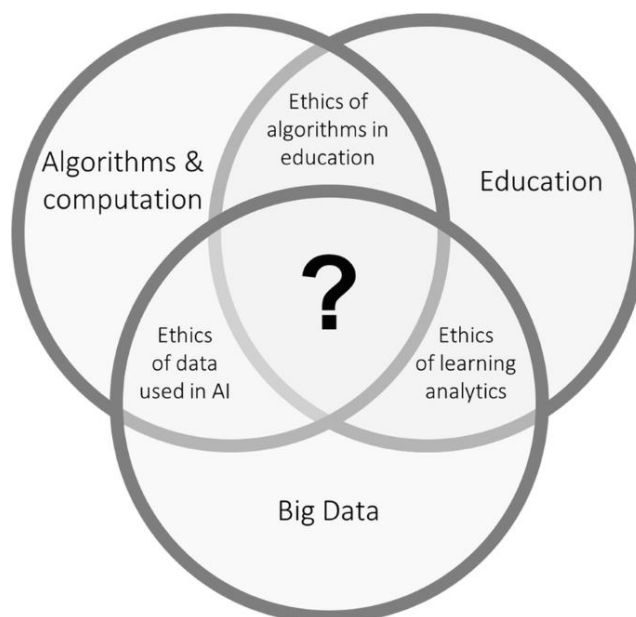


Figure 2 A "strawman" draft framework for the ethics of AIED¹⁶

Researchers are also developing competencies that the student should master as a result of teaching the ethics of AI. The University of Quebec at Montreal has developed a system of competencies for the higher education system. It is based on the concept of ethical competence, which is characterized by the characteristics of «anti-fundamentalism, anti-dualism, anti-skepticism»¹⁷, and the structural components include ethical confidentiality, analytical skills, dialogic skills. Among the competencies in the field of AI ethics, four areas are distinguished: technical aspects of AI systems, socio-technical context of AI systems, moral issues in the context of AI systems, additional regulatory framework.

In 2022, the European Commission released the Ethical Guidelines on the Use of Artificial Intelligence (AI) and Data in Teaching and Learning for Educators, which were developed as part of the implementation [of the Education Digitalization Action Plan](#) 2021-2027. The Recommendations provide for 4

¹⁵ Holmes, W., Porayska-Pomsta, K., Holstein, K. et al. Ethics of AI in Education: Towards a Community-Wide Framework. *Int J Artif Intel Educ* 32, 504–526 (2022). <https://doi.org/10.1007/s40593-021-00239-1>

¹⁶ There same .

¹⁷ Bruneault, F., Laflamme, AS, & Mondoux, A. (2022, March 2). AI Ethics Training in Higher Education: Competency Framework. <https://doi.org/10.31235/osf.io/x5nck>

options for using AI technologies and data in the learning process: for teaching and supporting students, for supporting teachers, and for supporting the system.

The ethical use of AI in the developed recommendations is based on the human factor, justice, humanism and reasonable (justified) choice. Key requirements for robust AI (requirements based on [AI HLEG Ethics Guidelines for Trustworthy AI](#)) are:

- «human factors and control, including fundamental rights, children's rights, freedom of action and control over human activities;
- transparency, including traceability , explainability, and information sharing;
- diversity, non-discrimination and fairness, including accessibility, universal design, non-bias, participation of all stakeholders;
- social and environmental well-being, including sustainability, environmental friendliness, social impact, society and democracy;
- confidentiality and data management, including respect for confidentiality, quality and reliability of data, access to data;
- technical reliability and security, including attack resistance, security settings and general security, validity, reliability and reproducibility;
- accountability, including accountability, mitigation and reporting on adverse impacts, compromises and redress»¹⁸.

4. Ethical risks of introducing AI technologies in education

When developing norms of AI ethics, it is necessary to take into account the approach to all subjects of the educational process, as well as to provide for as many risks as possible, which should be avoided when using AI technologies in the educational process.

¹⁸ European Commission, Directorate-General for Education, Youth, Sport and Culture, Ethical guidelines on the use of artificial intelligence (AI) and data in teaching and learning for educators , Publications Office of the European Union, 2022, <https://data.europa.eu/doi/10.2766/153756>

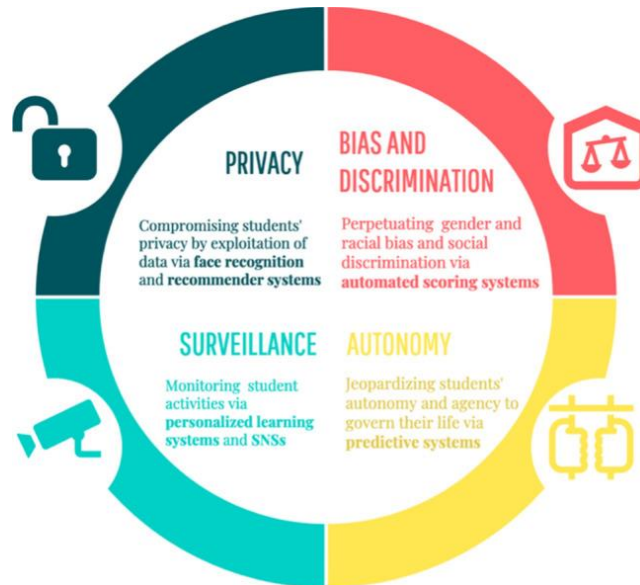


Fig.3 Potential ethical and societal risks of AI applications in education¹⁹

One of the main risks that needs to be considered when developing AI ethics for education is the work with data, especially when a minor is involved in this work. Thus, ethical criteria should be based on the principle of confidentiality of information, data security and informed consent. The amount of data that is collected about a student should be kept to a minimum and should only be collected after the student has given consent to the processing of personal data. To do this, students need to gain knowledge about responsible data management and read the details of the user agreement of the program that requests access to data. Before working with AI-based software, students and teachers need to be familiar with the basics of information privacy, which includes privacy, anonymity, proof of access, autonomy, non-discrimination, ownership of information ²⁰. While working with programs, students and teachers should have an understanding of where data is collected, where data will be processed and stored (only on the servers of an educational institution or information will be transferred to

¹⁹ Akgun S, Greenhow C. Artificial intelligence in education: Addressing ethical challenges in K-12 settings. *AI Ethics*. 2022;2(3):431-440. doi : 10.1007/s43681-021-00096-7. Epub 2021 Sep 22. PMID: 34790956; PMCID: PMC8455229.

²⁰ Brown, B., Roberts, V., Jacobsen, M., Hurrell, C. (Eds.). (2020). *Ethical use of technology in digital learning environments: Graduate student perspectives* . University of Calgary. <https://doi.org/10.11575/ant1-kb38>

companies that develop and maintain software). Thus, the principle of transparency regarding data handling will be respected.

Along with the issue of data comes the issue of tracking user actions when programs collect information about the actions of teachers and students (when they work in programs during the educational process). Based on the information collected, programs can predict student performance, their strengths and weaknesses (which is a plus for both the student and the teacher). However, such monitoring systems can collect student biometric data (record voice, face recognition, read fingerprints), which raises a number of questions: where will this data be stored? By whom will they be used? How will they defend themselves? What actions will be taken in case of leakage or sale of data?

Among the ethical risks is the issue of human autonomy, i.e. «a person's ability to act in accordance with their own interests and values»²¹. The researchers put forward the assumption that when using forecasting algorithms, it will be possible to manipulate and control people, which indicates the lack of freedom of a person as a whole and the impossibility of expressing his will.

One of the risks of AI ethics in education is discrimination, where a person is subjected to prejudice from the AI system based on gender, race, or social status. Bias and prejudice can also be attributed to this risk: «is the quality of education reduced for certain groups, are systems biased towards certain groups of students and are other groups ignored». Equal access to education in this case should be for all students, regardless of "subject areas, classes, demographic origin." Examples of discrimination are:

- video surveillance systems and facial recognition technologies that discriminate against people based on skin color. When using such systems, learners may be misidentified and incorrect data will be transferred from one system to another;

²¹ There same .

- recruitment systems that favor males over females in certain positions, thereby perpetuating gender inequalities and "prejudices in society becoming technologically advanced" ²²;
- Personalized learning software that adapts to student responses. For example, language learning software adapts to the speech of students who are born in the US and treats other dialects and accents as incorrect ²³.

5. Universal recommendations based on the analysis of the studied materials

Based on the studied materials and studies of foreign practitioners, the author proposes the following approach to systematization of materials on the ethics of AI in education:

1) It is necessary to develop technical and ethical regulations for a) developers, testers, regulators who will be directly involved in the development and configuration of AI systems in the field of education, and b) the operation of AI systems in the field of education, in which ethical principles will be programmed for subsequent work with the student. When developing regulations for AI systems, situations that cause risks should be worked out and excluded;

2) It is necessary to develop an industry code of ethics for artificial intelligence in the field of education (based on the existing AI Code of Ethics) with the involvement of interested parties: students and their parents, teachers, heads of educational organizations, business, the scientific community, representatives of the legislative and executive authorities at the federal and subject levels;

3) A number of activities are needed, primarily for students and their parents and/or legal representatives, in order to increase the level of literacy in the study, explanation and exchange of information on the ethics of AI. These can be

²² Discrimination Through AI: To What Extent Libraries are Affected and how Staff can Find the Right Mindset <https://www.zbw-mediatalk.eu/2022/03/discrimination-through-ai-to-what-extent-libraries-are-affected-and-how-staff-can-find-the-right-mindset/>

²³ Benjamin Herold . Why Schools Need to Talk About Racial Bias in AI-Powered Technologies. 2022. <https://www.edweek.org/leadership/why-schools-need-to-talk-about-racial-bias-in-ai-powered-technologies/2022/04>

forums, round tables, podcasts, release of brief memos or instructions (for example, [AI ethics camp](#) hosted by the Massachusetts Institute of Technology). For educators, events should be held to improve their skills on the ethics of AI. The advanced training program should include the issues of the influence of the AI system on the role of the teacher in the educational process, the regulation of the procedure for monitoring and intervention of the teacher in the work of AI systems, the methods and functions of AI systems that operate in an educational institution, the impact of AI systems on the well-being of students and teachers, etc. .d.;

4) For the higher education system, it is recommended to develop the «AI Ethics» module (similar to the " [AI Systems " module](#)), including the development of general professional competencies, and for the general education system, to expand the Federal State Educational Standards for basic general and secondary general education and, along with the norms of information ethics and law and ethical aspects of digital technologies to study the norms of AI ethics;

5) necessary to analyze the Federal State Educational Standards of higher education and modernize educational standards in order to update the education of students in pedagogical universities. «Modern graduates of pedagogical universities should have digital competencies, know how to build the learning process and use innovative teaching and learning methods, use all the possibilities of the digital educational environment» (Doctor of Biology, Doctor of Philology, T.V. Chernihiv);

6) When evaluating the “Index of readiness of priority sectors of the economy of the Russian Federation for the introduction of artificial intelligence”, in terms of the sections “Higher education” and “General, secondary and secondary vocational education”, it is recommended to add the question “Use of AI ethics standards and / or plans for their implementation”, t .to. according to the 2021 analytical report 74% of the surveyed institutions of higher education and 75% of the surveyed institutions of general, secondary and secondary vocational

education, " implementing or planning to implement AI, consider it important to comply with the principles of the AI Code of Ethics " ²⁴.

Conclusion

Formalization of AI ethics norms in recommendations, regulations, codes, etc. is an integral stage in the development of AI technologies and their implementation in the spheres of public life. The development of industry norms of AI ethics in education is a logical and natural development of the "system of recommendatory principles and rules" ²⁵, because the developed Code of Ethics in the field of AI, although it is a breakthrough and innovative document for the state, developers, business, representatives of science and ordinary users, but it cannot foresee and close the specific issues and tasks that government agencies, educational institutions and their employees face, students and their parents in the implementation and use of AI technologies in the educational process.

At the same time, it is necessary to consider the ethics of AI in education not only in preventive measures to prevent unethical (wrong from the point of view of morality and morality) actions by AI systems, but also in terms of the potential of AI technologies and the benefits that technologies will bring to students, educators, educational institutions and society in general. This requires an analysis of legislation and existing educational standards and the subsequent development of recommendations and regulations for the ethical functioning of AI technologies in the education system, which will protect all aspects of the educational process and help ensure that learning using AI technologies is based on the principles of the rule of student rights, inadmissibility of discrimination, non-harm, data security, human oversight of technology, and full disclosure to parents and teachers about how AI systems work

²⁴Index of readiness of priority sectors of the economy of the Russian Federation for the introduction of artificial intelligence. Analytical report. – Analytical Center under the Government of the Russian Federation; Moscow State University named after M.V. Lomonosov , 2021. - 159 p.

²⁵AI Code of Ethics <https://a-ai.ru/ethics/index.html>

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MGIMO Centre for AI was established to enhance international cooperation and support collaboration with all the actors of digital economy both at national and international levels. Our multidisciplinary research is focused on international cooperation agenda, national policies for AI and business opportunities. International trade and trade policy (prioritising digital trade), sustainable development, AI ethics are the key areas of our activities.

On the basis of MGIMO-University we promote an international AI expert platform with regular conferences and round tables, peer-reviewed articles and research papers. Our enlarging network of strategic partnerships makes it possible to provide AI consulting and policy solutions both for business and government agencies.

The Centre was founded in October, 2021

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