



TE_REG Report WP2a1 / University of Montenegro

GenAI and its implications for teacher education in Montenegro: exploratory report

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Current situation and relevant documents

Government representatives and media in Montenegro have heavily discussed AI (Artificial Intelligence), cybersecurity, and digitalization processes, especially in the last few years. It is important to note that even though these topics are becoming part of everyday discussions, there are not enough comprehensive educational programs and media coverage that would demystify terminology and bring it closer to citizens. This part works in our favor and results in overall good familiarity with the term AI, and almost 60% of Montenegrins have, at least, heard this terminology (AI 2024 <https://practiceguides.chambers.com/practice-guides/artificial-intelligence-2024/montenegro/trends-and-developments>).

The population in Montenegro is classified as mid-age, and more and more younger people leaving the country (https://www.monstat.org/uploads/files/popis%202021/saopstenja/SAOPSTENJE_Popis%20stanovnistva%202023%20I_cg.pdf).

Mentioned technologies, their usage, and promotion usually start among the younger population. Having the previous information in mind, it is not surprising that regular citizens are not familiar enough with AI and therefore have resistance and fear about applications of these technologies. (<https://standard.co.me/zivot/evo-kako-gradjani-crne-gore-percipiraju-vjestacku-inteligenciju>) This is the first barrier that needs to be addressed so that, one day, we can have real usage of AI in everyday life, including education.

The second problem that can be perceived is that, at this moment most Balkan countries, including Montenegro are not addressing specifically AI implementation, but rather going from a broader perspective and are in the phase of dealing with regulatory frameworks related to digital transformation. Therefore, AI-related strategies and regulations, in Montenegro are non-existent. (<https://balkaninsight.com/wp-content/uploads/2023/03/FINAL-AI-Report.pdf>, <https://eurocc.udg.edu.me/wp-content/uploads/2024/01/AI-act-eng.pdf>).

This is not only stagnation because of regulation for the usage of new technologies, but rather overall issues with undefined laws, related to AI, such as Montenegro's Personal Data Protection Act not being aligned with European GDPR, The Copyright and Related Rights Act being too limited which leads to works generated by AI not being protected and included, the Montenegrin Labour Act and the Competition Protection Act will also face challenges. (<https://practiceguides.chambers.com/practice-guides/artificial-intelligence-2024/montenegro/trends-and-developments>)

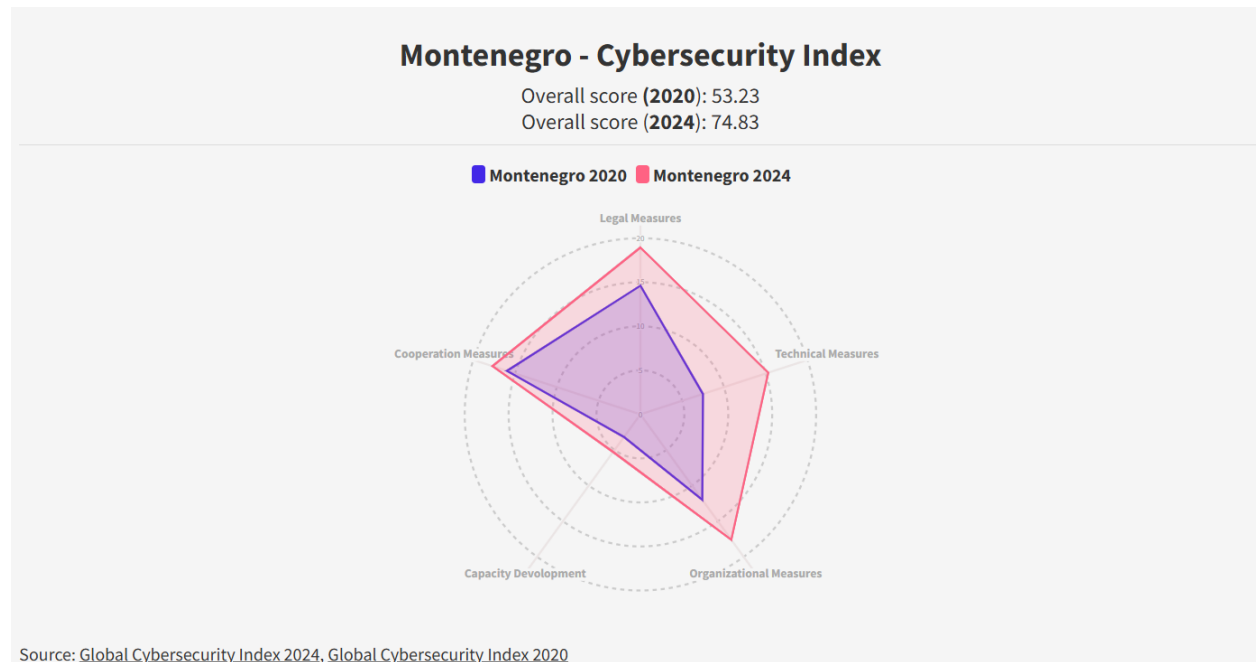
Montenegro's government and the Ministry of Public Administration, Digital Society and Media, adopted the [Digital Transformation Strategy 2022-2026](#). This strategy focused mostly on the



digital transformation of public administrations and public services, but it has resulted in significant improvements in the cybersecurity area. The Draft Law on Information Security was drafted and submitted to the European Commission for its opinion. This adoption will create a national framework for cybersecurity as well as the need for harmonization with the Directive (EU) 2022/2555 of the European Parliament and Council of December 14, 2022 on measures for a high common level of cyber security throughout the Union, amending Regulation (EU) no. 910/2014 and Directive (EU) 2018/1972 and on the repeal of Directive (EU) 2016/1148 (NIS 2 Directive). This is just the beginning of establishing a pathway for the implementation of similar AI regulations, because, without clear regulations and national legislation on information and data protection, there cannot be AI regulations.

(https://interoperable-europe.ec.europa.eu/sites/default/files/inline-files/NIFO_2024%20DPAF_Montenegro_vFinal.pdf, <https://www.gov.me/clanak/predlog-zakona-o-informacionoj-bezbjednosti>)

Additionally, there is also a practical benefit of Digital Transformation Strategy 2022-2026, that can be seen in terms of significant growth of the Cybersecurity index from the year 2020 to 2024.



In 2024, the Global Center on AI Governance launched the Global Index AI on Responsible AI 2024 to follow the development of responsible AI and give assessments in countries around the



world. This index overlooks the most important indicators related to human rights, frameworks, government actions, etc. All data is available online at global-index.ai. The rate is given from 0 to 100, where 100 is the highest score.

General scores for Montenegro are very low and are putting us among the lowest scores in Europe. A similar situation is with other Balkan countries, excluding Slovenia.

Scores of countries in Europe

Delve into the scores for each country in Europe.

COUNTRY	INDEX SCORE ▼	PILLAR SCORE				DIMENSION SCORE	
		Frameworks	Government Actions	Non-State Actors	Human Rights and AI	Responsible AI Capacities	Responsible AI Governance
ME Montenegro	14.84	0.00	15.01	44.19	20.61	17.02	9.63

These results are not surprising, considering that most Balkan countries are not part of the EU and that many of these countries do not have enough resources to develop and apply AI regulations before the EU does.

One of the most important current goals for this government is digital transformation, this a also a process that, to be followed correctly, demands the application of AI technologies, and hopefully will significantly fasten the development of AI legislation. This initiative is currently strongly supported by The United Nations Development Programme (UNDP) in Montenegro, alongside the Ministry of Public Administration. The main goal is to assess the readiness of Montenegrin state institutions for the application of artificial intelligence (AI). This assessment will lead to more specific and focused steps in further cooperation.

<https://www.undp.org/montenegro/news/artificial-intelligence-more-efficient-and-transparent-public-administration>)

Current, “umbrella’ that somewhat covers AI Activity acts is Montenegro's Innovation Activity Act, established in 2020, and is focused on the promotion of innovative activities and economic growth. Officials from the Ministry of Public Administration as well as newly established the Innovation Fund (which aims to foster innovative entrepreneurship and improve access to EU funding) have stated that this legislation extends to AI technology, allowing entities involved in AI to receive significant administrative and state support.



(<https://balkaninsight.com/wp-content/uploads/2023/03/FINAL-AI-Report.pdf>,
<https://www.gov.me/dokumenta/e8645781-6ef5-4bb3-b50c-9eda1f98eab4>,
<https://www.vijesti.me/vijesti/nauka/660584/ne-kasnimo-za-vjestacku-inteligenciju>)

Even though there are no official documents that address the regulation of AI technologies in education, the draft Strategy for Higher Education in Montenegro for the Period 2023–2026 emphasizes academic integrity as one of the primary challenges that need to be addressed. This segment includes AI and cybersecurity issues and the necessity of modernization of the educational system.

Towards achieving this goal, the Strategy underlines providing infrastructural support for teaching and learning across all HEIs. This support aims to include different approaches, such as the application of AI for independent learning. Besides, the strategy aims to adopt best practices from across Europe, and that includes incorporating the use and regulation of AI technology within higher education teaching, learning, and research.

1. <https://education-profiles.org/europe-and-northern-america/montenegro/~technology#2.1>
2. <https://www.unesco.org/en/articles/paving-way-towards-digital-inclusive-and-transformative-education-montenegro>

Higher education representatives are also heavily focused on ethical concerns, practical applications, and policy development related to AI in academia. This was stated at the workshop "Quality Education for All," held on May 29-30 in Podgorica as a part of the broader European Union/Council of Europe initiative "Horizontal Facility for the Western Balkans and Türkiye." This event was co-organized by the U.S. Embassy in Montenegro and the University of Montenegro and was an opportunity for expert speakers from the U.S. and Montenegro to provide insights into AI's application and to host open discussion on future steps.

(<https://practiceguides.chambers.com/practice-guides/artificial-intelligence-2024/montenegro/trends-and-developments>, <https://education-profiles.org/europe-and-northern-america/montenegro/~technology#2.1>, <https://www.coe.int/en/web/education/-/navigating-the-ai-frontier-chatgpt-and-academic-integrity-in-higher-education-in-montenegro>, <https://www.unesco.org/en/articles/digital-inclusive-and-transformative-quality-education-montenegro>, <https://www.unesco.org/en/articles/paving-way-towards-digital-inclusive-and-transformative-education-montenegro>)

Initiatives regarding AI in MNE:



The Montenegrin AI Association, or MAIA, was established as a non-governmental organization in September 2022. This organization has the goal of bringing together all entities, University representatives, researchers, and scientists who are in the front run of AI transformation. The organization is connecting the Montenegrin AI community whether they are stationed in Montenegro or abroad.

This is an extremely important pillar to promote Montenegro as a regional leader in AI transformation and can lead to the swift initiation of passive legal processes. Also, having people who are directly included in the AI research can help navigate governmental and legal entities to better align regulations with technological advancements and foster collaboration between higher education, the general public, politics, and the economy.

<https://ictcortex.me/en/montenegrin-ai-association-maia-from-data-science-to-practical-applications/>, <https://aisociety.me/>

Montenegro is also gaining a significant reputation for being an attraction for digital nomads (<https://digitalnomads.gov.me/>), and there is a significant rise in increase in the number of foreign companies that open representative offices and bring new technologies, innovations, and research. Combining these statistics with an already significant number of young researchers who work in some AI fields is showing in the fact that there are more and more AI start-ups in Montenegro. Almost all of these have support and investment from local and national governmental bodies. Additionally, Montenegro has several foreign partners for future collaborative projects in AI, such as UAE <https://www.aktuelno.me/clanak/strateska-saradnja-uae-i-crne-gore-u-oblasti-ai> (https://tracxn.com/d/explore/artificial-intelligence-startups-in-montenegro/_gy24K9xqXTGRP_nngKyuzoUAPfQK1ETqmOVfLhgqc5s/companies).

Good examples:

Uhura Solutions, British-Montenegrin AI start-up, <https://uhurasolutions.com/>

Spectro Solutions, Montenegrin AI start-up, <https://spectro-solutions.com/#hero>

Media in Montenegro are also using and playing with AI technologies, whether they are publishing articles written by ChatGPT or having an AI broadcaster. In this experiment, there were a number of AI journalists, where Ana is the most popular one, and is reading the news (selected and written by editors), in the Montenegrin language.

(<https://www.dan.co.me/vijesti/drustvo/upoznajte-virtuelnu-voditeljku-portala-dan-5185144>)



Conclusion:

The presented situation is not surprising but can be worrying, the government representatives do not put enough emphasis on the importance of AI regulation which also translates to not having either regulation of the use of AI at any level of education and not enough education providers that use AI in classrooms. We can assume that at a higher level and perhaps, high school level, some professors and teachers use, or even encourage students to use AI technologies, but without data, we cannot confirm this statement.

Additionally, there are considerable differences in the knowledge and familiarity with AI among educators, while some may be tech-savvy, others may be resistant and not skill-equipped. Besides this, many educational institutions (especially those that work with younger children) may hold negative attitudes toward AI, leading to inconsistent implementation. This situation often relies heavily on the goodwill and skills of individual teachers, as well as institutions, which often do not even have enough resources to implement AI technologies or to provide training for teachers.

Furthermore, this threatens to develop significant differences in the level of knowledge of the use of AI tech between students, and can potentially create a divide in their understanding and application of AI in their future careers. Also, lack of regulation leaves the line of ethical use solely on students and teachers.