AI Governance: The Role of Global Regulations in Light of the Ethical Views of Data Science Students*

László Trautmann[1,†], Konrád Ákos Nagy[1,†] and Csaba Csáki[1,a,†]

[1] *Corvinus University of Budapest, Fővám tér 8. H-1093 Budapest, Hungary*

Abstract

The technological shift we witness today is indicated by the emergence of a global infrastructure combining information systems with the existing physical infrastructure where this integration is increasingly enabled by artificial intelligence (AI). The safety and control of this fast-paced progress cannot be ensured without global governance, and the need for global regulation is becoming more and more visible. However, global rule-making raises additional ethical dilemmas that require the cooperation of not only politicians and legal experts, but also IT professionals and data science specialists to be solved. Understanding the ethical views and commitment of information system and AI development experts, especially those from the data science field is crucial for governmental actors in their efforts to bring AI under control. Furthermore, universities with data science programs need to be aware of this unfolding challenge. The research reported here investigated two groups of data science students – both full-time students and postgraduate students with substantial work experience – to shad light on their views and commitment to AI and data related ethical standards. The key finding indicates that while students expect governments and regulatory agencies to take charge in forming (global) AI policies, they consider themselves and their employers to be responsible for implementing and adhering to them.

Keywords

Artificial Intelligence, AI Governance, AI Ethics, Data Science, ethics of students

1. Introduction

Today, we are witnessing a technological shift, which is indicated by the emergence of a global infrastructure that combines information systems with existing physical infrastructure elements [1]. Increasingly this integration is fuelled and enabled by including artificial intelligence (AI). The safety and control of this fast progress is unthinkable without global governance, and this need for global regulation is becoming more and more visible [2]–[4]. The emerging regulations, however, are increasingly technology- and code-driven [5], [6]. But such rule-making also raises ethical dilemmas that require not only politicians and lawyers, but information technology (IT) professionals and data science (DS) specialists

Proceedings EGOV-CeDEM-ePart conference, September 1-5, 2024, Ghent University and KU Leuven, Belgium

† These authors contributed equally.

[a] Corresponding author.

laszlo.trautmann@uni-corvinus.hu (L. Trautmann); nagykonradakos@gmail.com (Á. K. Nagy); csaki.csaba@uni-corvinus.hu (C. Csáki)

00090007-64397982 (L. Trautmann); 00090001-3708-7889 (Á. K. Nagy); 00000002-82451002 (C. Csáki)

to be solved. This leads to further complexity since AI is not only part of this fast-evolving infrastructure but should be part of the solution as well [1], [7].

The role of the sciences and related professions is threefold here: explore the ethical implications of technological results; propose solutions to decision-makers; and create a commitment in computer scientists – especially data scientists – to follow ethical standards. Furthermore, it can be argued, that IT specialist should not only consider ethical implications but their commitment to high ethical standards should, in particular, provide ethical support and assistance to their users in their decisions. It follows, that a lot hinges on the views and education of IT and Data Science professionals.

The success of any global (and local) AI infrastructure governance thus depends on the commitment of information system and AI development experts. Therefore, a more clear picture of how global regulation should involve data scientists and how universities may contribute to the shaping of future AI governance is essential. The need to understand the required level of ethical commitment forms the empirical basis of this study. The research presented here thus used a questionnaire analysis to investigate how ready the Data Science community of one country is to embrace professional ethics and how much it perceives the need for ethical guidance. Furthermore, ethical leadership is part of the cultivation of science and technology, and university education represents the highest level of knowledge. Therefore, this paper argues that education should play a greater role in raising ethical and value issues and in encouraging the ethical commitment of future technology leaders.

The results of the survey showed that both postgraduate and full-time students see a need for regulation and guidance, but that there is not yet a consensus among students on the institutional system needed to achieve this. It is perhaps an East-Central European characteristic that they expect mainly legislative solutions and have little confidence in the ethical code, while they would indeed entrust themselves and their employers to implement regulations in daily practice. The findings imply that university Data Science programs need to be reevaluated in order to include wider ethical focus.

The study is structured as follows. After the theoretical arguments, the methodology of the questionnaire survey and basic data of respondents are presented. This is followed by a description of the answers to the relevant questions and a presentation of the results. The paper closes with a conclusion and ideas for future research directions.

2. Theoretical foundations of AI ethics and governance

2.1. The socio-technological challenge

"The great Globe itself is in a rapidly maturing crisis, due to the fact that the environment in which technical development takes place has become small and poorly organized... the crisis is not due to accidental results or human error, but is rooted in the relationship of technology to geography and political organization" ([8], p. 361). As early as 1955, John von Neumann pointed out that the natural limit to technical progress was the actual size of the Earth, which mankind had already achieved with its various technical means. The content of this technology and in particular of info-communication technology (ICT) is the spanning of space and time, and is thus called infrastructure. This is why current social forms created by the infrastructure built on latest technologies are understood as platform societies [9].

However, this is precisely the same reason why they require a new, specific socio-economic institutional system. This task is what the OECD calls the socio-technological challenge [10]. By this they mean that the institutions needed to use technology and to 'run' platform societies are global, affect all citizens, and will only work well if all states and all citizens participate in shaping them and actively contribute to their functioning.

Neumann's prediction about new political and technological institutions is even more relevant today, as the conquest of the Earth by technical means is the essence of globalization, which process is now perceived by all of us through the infocommunications infrastructure. This new physical and information infrastructure transcend the level of the traditional machine, because the essence of the machine is isolation, an operation independent of nature [11]. This isolation is eliminated by the infrastructure, because it connects geographical territories and units, whether we are talking about pre-Internet technologies in a traditional sense or the platforms of the 21st century [12].

In contrast to the machine and the factory, infrastructure, by its global nature, necessarily eliminates these anomalies, since everyone's decisions and behaviour have a global impact, which can both be perceived and exercised through the info-communication infrastructure. However, as long as the political and technological environment and the institutional system do not facilitate the participation of citizens and states in globalisation, this infrastructure will remain unused. The full utilization of the capabilities offered by the infrastructure requires business, technical and political culture. This is a subjective factor that can be enabled by state governance.

2.2. Ethics and morality of technological societies

Moral guidance cannot be left to goodwill alone. Therefore, the current performance level of the ICT sector and the infrastructure it embodies also represents a necessary change in the form of ownership: it forms the technological side of public property. The role of entrepreneur and owner is subordinated to the task of running the IT utility. This IT utility is a public service, it thus should be owned by the state, although there are many ways of enforcing this. The ICT sector, as part of the infrastructure and the IT utility, asserts democratic public ownership over private ownership. The growing controversy between public and private ownership is the result of the last 30 years. Neoliberal economics has argued that private property is the source of efficiency [13] and that public ownership distorts markets. This perception is particularly prevalent in the countries of the former Eastern bloc and has resulted in a lack of resources to achieve community goals. Public ownership is necessary for democracy to function, and efficiency is an independent issue. The debate between private and public property has been useful in that it has eliminated provincial, arbitrarily managed state property, but has ultimately been replaced not by private property but by globally managed public property [14]. State property remains subordinate to it, and then there are further levels of property.

It is inevitable to create a political economic policy based institutional system that guarantees the moral soundness of entrepreneurs and links values with security of existence [15]. This is also a question of technology policy, since the development and regulation of technological infrastructure is a fundamental governance task. One element of this is the increasingly important industrial policy orientation in economic policies, which

is essentially technology policy, not protectionism. As Hufbauer and Jung [16] have shown, successful industrial policy is in fact science policy, which is the promotion of the technological knowledge necessary for the survival and improvement of the state.

2.3. The role of ICT, data, and AI

Technology policy is not only about the development of industry, but also about governance itself. Infrastructure development, including the ICT sector and AI automates the state machinery and makes it more efficient. This was recognised by Neumann too, who used the analogy between the brain and the computer as an example. The computer is not the traditional mechanical machine, because the latter could not incorporate freedom into its operation. People could only participate as a cog in the wheel, an unconscious mechanical unit in the realisation of state goals. In contrast, Neumann saw the computer as a device capable of handling error. This is now a technology of shared thinking, which is a significant leap. The technical possibilities of the time did not allow this idea to be realised, but the theoretical potential was recognised. Only today's artificial intelligence will be able to provide the necessary technical solution to restore freedom and manage errors [17].

Recognising and correcting the error is also a fundamental principle of a state that incorporates freedom: it is the principle of participation. Participation means creative implementation of ethical expectations, a conscious contribution to the proper functioning of the state. Each participant adds his contribution to the state by controlling values and basic moral principles in his own domain as well as during the consumption and production process, while he also provides feedback. The pursuit of correct consumption and production decisions increasingly requires the use of AI (just as, for example, spell-checkers also help to maintain language correctness and culture).

2.4. Ethical roles and responsibilities

Data specialists and IT engineers have an important role to play in creating the IT culture necessary for an ethical attitude. Part of the extension of this culture is the exposure and clarification of the ethical issues raised by AI. The code, the rule that gives form to data, can be a norm or a mirror [5], [18], [19]. On the one hand, AI merely represents the rule that members of society unconsciously follow. It holds a mirror up to society (and here we may recall Gogol's famous saying: do not blame the mirror if the image is crooked). On the other hand, it can also set a standard and may sanction deviation from the correct one when examining the application of ethical expectations. Norm-giving is preserved in the concept of measure, since creating a measure implies the establishing of the norm with respect to certain phenomena [20].

Artificial intelligence can be a means for society to protect itself from itself, to automatically follow the value system in the realm of infrastructure. This cannot be done without the consent of citizens, as it would lead to an Orwellian dystopia [21]. The result is the digital republic [18], in which the citizen voluntarily submits to morality and the technology that enforces it. It is the power of the code, the democratization of the state's nature of enforcing and incentivising the moral order. The responsibility of data and IT specialists will increase, because the code, the program will represent the unity of ethics

and expertise as expected by society. The professional ethics of data and computer scientists will become a central issue. During the last thirty years there has not been much emphasis on engineering ethics. There is now a renewed need for a global worldview and ethical guidance in engineering and IT education. Another reason for this is that trust in the code is essential for the stability of the digital republic. Citizens need to know that engineers and computer scientists do not abuse their power. This can only be achieved if value-based governance becomes generally accepted among IT and data professionals.

3. Methodology

To understand the attitude of future data science professionals towards the ethics of AI, a questionnaire was devised which explored areas of data security and AI among university students studying data science and business analytics.

The questionnaire was distributed among students of Data Science programs taught at the Business School of a leading Hungarian university. While the primary area of these programs is data analytics (including statistics, math, programming, machine learning and alike), there is a strong component of economics, finance, business and management to augment the main field. This combination of subjects makes this group a good target for the intended investigation as they cover more than just technical knowledge (i.e. they are different from pure engineering or computer science programs). Within the Business School, two key groups were accessible: students of postgraduate programs (who study IT after some time at work, often supported by their employer – PG for short) and full-time students. The reason for having two groups is that all postgraduate students work full time, most of them in related fields or are doing the retraining because they would switch to this field (i.e. Data Science). This difference would allow for a comparison of the views between mature students with several years of work experience and full-time students.

The questions posed to the above student population (including specific targeted questions to the two main groups) were orchestrated to shad light on how important ethical issues related to AI are to them, who they expect to define and enforce ethical norms, what norms they are familiar with, and how well do these norms guide them in the dilemmas they face. The survey had four parts: basic demographic information (4 questions), work related questions (3 questions, where relevant), questions about data security and AI ethics (10), and dedicated questions on data security, privacy, and ethics depending on group (5 for PG students about their workplace practices as they work full time; and 2 for full-time students). Not counting the 7 demographic and workplace questions, there were 13 questions with single choice while 4 questions with multiple choice answers. The slight difference in the questionnaire given to the two groups came from the fact that questions related to workplace practices were not displayed to full-time students (irrespective whether they worked besides studying). Instead, full-time students were given two questions addressed only to them (thus balancing a bit the length of the survey). All other questions were similar in wording and identical in answer options for comparability.

The two groups together had 192 students (with full-time students including both first year and final year students). The survey was conducted at the beginning of February 2024 for two weeks using the internal MS Forms application of the institution running on its

Intranet. Data were downloaded as Excel file and then analysed using the Tableau visualization tool (v2022.2) for basis statistics and with the R programming package (v2022.12.0+353) for complex queries.

Regarding basic statistics, 43 out of 60 responded from the PG programs, while 70 full-time students filled out the form out of 132 – making the whole response pool size 113. The gender distribution is 58% male and 42% female reflecting a more business student population than a 'stereotypical' engineering-computer science student group (with a typical approximation of an 80-20% split). The 43 PG students had an average of 14 years of experience (with the median being also 14, and the variation being 7.6). The majority (33 or 77%) work in a professionally relevant field. The area of banking, finance and insurance dominate (23%, 10 respondents). However, there are also jobs in infocommunications (6), other services (6) and 'trade and repair of motor vehicles' (5). Almost half of the respondents (47%) indicated a large enterprise with more than 1500 employees as their workplace. 28 of the 43 respondents (65%) identified a locally owned company. 13 of the full-time students have also claimed they work in a related field, with 7 working for large companies, mostly at larger banks located in the country.

4. Findings

4.1. The corporate reality of AI and data security

Looking at the PG group there is a clear pattern regarding the size of the companies who send employees to study for a DS degree: the majority of those who came back to acquire a DS/IT degree are from large firms (2/3) while SMEs do not send people. Those who do support the retraining of their employees are typically (local) banks and IT companies, while manufacturing and other industries are barely represented. The employers of PG students are dominantly local companies – this likely because global companies (e.g. German owned firms) do offer internal trainings.

The corporate reality of AI and data security, as reflected in the answers of PG (mature) students appears somewhat mixed. While most companies have dedicated internal regulations regarding general IT and data security, there appears to be no special attention paid to AI-related data issues. Indeed, students expressed their fear regarding potential data security breaches at their company. What is perhaps surprising is that working people, who came back to study answered "do not know" for how to manage security and ethical issues. This lack of understanding is reinforced by answers to three different questions.

35 out of 43 PG students (82%) expressed fear over the possibility of an attack against their corporate data (with 1 Do not know and 7 No). 95% of PG student claimed that there is a documented IT policy at their workplace (4% Did not know, and only 2%, 1 student replied No). At the same time, 84% of the firms have dedicated policy to deal with data security issues (beyond basic IT rules). Regarding data security solutions, the most used one is still "technology-based" (with almost 100%, as there was one 'Do not know'). This is combined with other solutions such as education (34/43) and internal person in charge (31/43), while half of the companies employed outside consultants to secure their data infrastructure. 3/4 of them answered that management is involved in creating IT and data related policies, while 70% of the workplaces involve IT people in this task. 35% of the firms

hired outside consultants to help creating IT policies. Only two students stated that it was fully the responsibility of IT people to determine IT rules with no other stakeholders (either management or outside experts) involved.

50% of PG students does not know whether their company has dedicated rules for developing AI models. Only 12% (5 students) replied that they do develop AI models, out of which 1 claimed they have no dedicated rules. However, when asked whether they think there should special corporate rules controlling the development of AI solutions, 87% replied Yes (and only 1 selected No). Regarding running and using AI models 47% does not know whether their company has dedicated rules, while 37% claimed they do not apply AI. Of the 7 PG students who claimed they do use AI in their work 4 were sure they do have dedicated rules for such situations. Similarly to the previous question pair, when asked whether they think there should be special corporate rules controlling the use of AI solutions, 88.5% replied Yes (and no one selected No, the rest Did not know).

When asked about what ethical issues they encountered at their organizations in relation to data, 27 out of 43 indicated the lack of proper investigation of the data used to be the biggest issue, with the use of unknown data source being a close second (with 22) – and only 2 people claimed they have not met any issues at their company. However, close to half of working students (20) claimed, that internal policies only partially guide employees in case of such AI ethical dilemmas (with 8-8 students replying Not at all or Full; the rest Did not know). 72% of the PG students do not discuss AI related ethical issues at the workplace. Finally, 77% of them have not thought about whether their opinion of a company's AI ethics would influence them when choosing a job.

4.2. The view of students on the ethics of AI and data

Beyond workplace policy and data security (surveyed only for PG students who work full time), both groups were asked whether they saw any difference between the ethical rules on artificial intelligence (AI) and those on data security. Interestingly, while 44% of full-time students cannot decide whether there is a difference between ethical rules for data or ethical standards for AI, this proportion is over 60% for PG students (Figure 1). This is all the more surprising as 72% of PG students claim they have discussed AI related ethical issues with their peers, as opposed to 60% of full-time students (Figure 2).

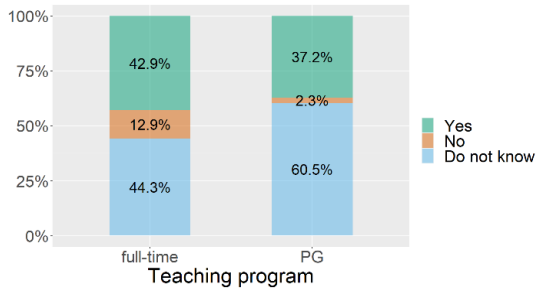

Figure 1: Do you see a difference between the ethical rules on AI and those on data security?

Similarly to working students, 87% of full-time students thought there should be special organizational standards controlling the development of AI solutions (and only 8 selected

No with 1 Do not know). Regarding running and using AI models, while 88.5% of PG students asserted that there should be special organizational standards controlling the use of AI solutions, a bit less, 83% of Full-time students thought the same, with 8,5-8,5% answered No or Do not know. The relatively high number of "No" is surprising (at least compared to 0 of PG students), especially in light of the answers to other question, where Full-time students appeared to be more opinionated about the necessity of AI related rules.

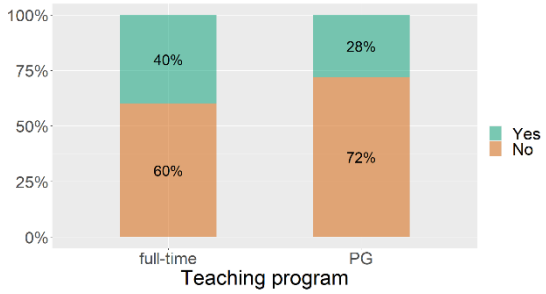

Figure 2: Have you discussed AI related ethical issues with your coworkers (classmates)?

Similarly to the question about data-related ethical issues at work for PG students (see above), Full-time students were posed the question what ethical issues they have learned regarding corporate and customer data. With multiple choices allowed, the answers were pretty even (beyond 5 students out of 70 claiming they did not recall studying about any AI and data ethical issues), with 'Data not properly investigated before use' leading the list by 60, followed by 'Unknown data source' with 56, 'Statistically inadequate data set' with 55, and 'Biased data' with 40 (still meaning 57%). The majority (close to 50%) of students expect the state or government to set AI related ethical expectations or standards, while the majority (53%) assumes that either themselves or their employer should ensure that such regulations are adhered to (Figure 3).

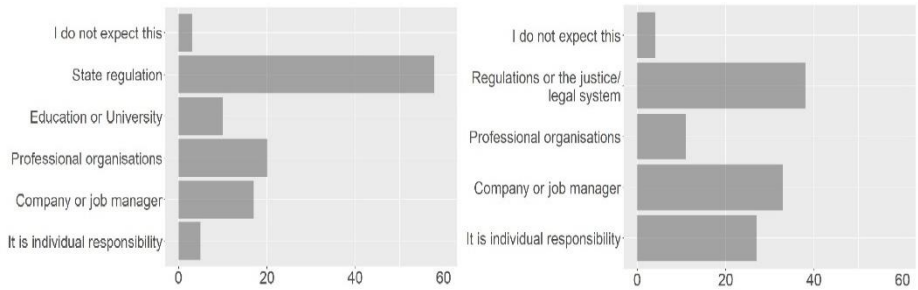

Figure 3: Who do you think should set (left) / enforce (right) AI related ethical rules?

Most students do know some AI related ethical recommendations, although 25 Full-time students (36%) and 25 PG students (61%) stated that they were not familiar with any such documents (Figure 4). The difference is noticeable and can be contributed to the fact that Full-time students do learn about AI ethics in class (underlined by the fact that most of them are familiar with one or more AI and data related issues). Indeed, while the highest number of PG students (12) mentioned AI ethics documents published by an international body, for

Full-time students the most mentioned option was document distributed at classes (mostly also ethical guides by international organizations).

Similarly to PG students (72%), 60% of Full-time students do not usually discuss ethical issues with their classmates (Figure 2). Furthermore, 46% Never reads the privacy policy or data protection document when visiting websites or webshops. The lack of concern about AI ethics and data problems is further underlined by the result that 46% of Full-time students have not heard about AI related public debates or court cases. The complete the picture, 53% of them have not thought about whether their opinion of a company's AI ethics would influence them when choosing a job.

Figure 4: What AI related ethical recommendations do you know? Multiple choice.

5. Discussion

The main question regarding the potential global governance of AI revolves around roles and responsibilities. The main stakeholder groups – other than users at large – are the technology companies, general market players, professional bodies, and governmental agencies. Technology companies (from big-tech to start-ups alike) drive innovation and development of new techniques, tools, and AI-based software products. Corporations as general employers look for AI-savvy staff, while professional organizations are inclined to offer standards and (ethical) guidelines to their professions. Finally, national governments – often in cooperation with inter-national organizations – are looking for ways of understanding and controlling the AI landscape and its impact on the economy and society. In the middle of this setting are the professionals, the trained AI or Data Science specialists.

Since professionals are the most important players – who work for any of the above organizations –, their views, stance and ethical behaviour is a major factor in determining what rules might work and how successful regulations might become. This seems to be recognized, as most companies (70%) do involve IT people in the creation of relevant policies. Furthermore, students who wok are aware of the dangers too. At the same time, it must be noted that most students do not see or are not aware of any difference between AI ethics and simple data security. This may point to a gaping hole in the IT culture when it comes to understanding the consequences of AI.

While the problem of data not being properly prepared before use and the issue of unknown data sources are the most likely event to occur at organizations with biased data appearing to be less prevalent in practice, university courses appear to teach them pretty evenly (Figure 5). Approximately 50% of Full-time students seem to be aware of each – and each seem to get even priority. This is probably because biased data related issues do get a

lot of media and scientific attention (e.g., journal publications). This seems to be supported by the fact that while the most studied problem is statistically inadequate data (which can be easily demonstrated in classes about machine learning), this problem is only the third most frequent in practice (with 37% or PG students having seen it).

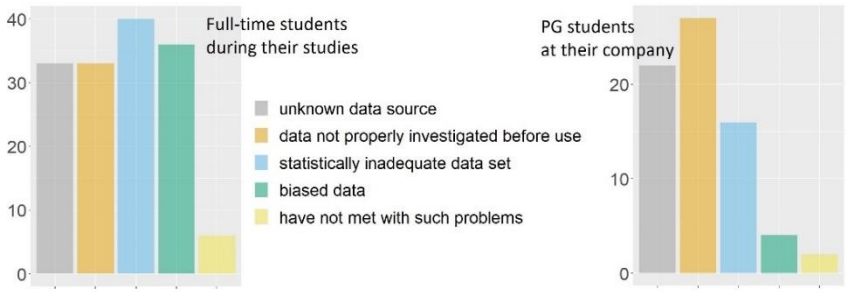

Figure 5: What data and AI related issues have you studied/have you met at your company?

Although a little bit more (12% more) Full-time students discuss ethical problems with their peers, this still means that in both cases less than 40% of students engage in AI related ethical debates. This is surprising in both cases. Even though working students seem to encounter quite a few problems and ethical challenges at their workplace and 82% considered the possibility of an attack against their corporate data to be likely, this does not seem to concern them, as only 28% claimed they discuss AI related ethical issues with colleagues. For Full-time students the data contradicts the fact, that almost all students have heard about data and AI related issues. Indeed, most of them mentioned 2-3 different challenges they had learnt about already – yet this appears to be of no concern to talk about outside classes. This may relate to the individualism of the Hungarian society which has been demonstrated by several research studies (see Simai, 2006, for example). The weakness of civil society results in the lack of discussion about ethical questions in every profession, this is not a specialty of the IT or computer science fields. At the same time, as demonstrated in Figure 3, data science students do share the expectation that AI ethical rules should be set at high level such as state or government, while they do take responsibility for local enforcement of such standards. This can be contrasted with reviews of existing national and supra-national recommendations, where it was found that only a small portion of such documents are prescriptive or normative – or as Correa et al. ([22], p10) state, close to 98% of government documents about AI regulations may be considered 'soft-law'.

The ethical standards of companies do not seem to influence students' choice of workplace (Figure 6). This is even more prevalent for PG students as they do hold a job already, thus are not concerned about changing (and their employer often supports their studies), while thinking about jobs is on the mind of Full-time students, especial-ly those, who are nearing their degrees. The overall direction of students' stance points towards the need for global consensus on an acceptable level of AI ethical expectations. This resonates with the arguments Susskind makes in his book "Digital Republic" [18]: it is necessary to treat those experts who have power over digital technologies the same way society governs other professional groups of responsibility. Therefore, the same ethical expectations and training should be applied for data scientist and AI experts as is maintained in case of

lawyers, bankers, doctors, or teachers. One of the main implications is that ethical and philosophical knowledge should be more strongly reflected in university education and research, because philosophical and humanities knowledge is necessary for the scientific foundation of morality.

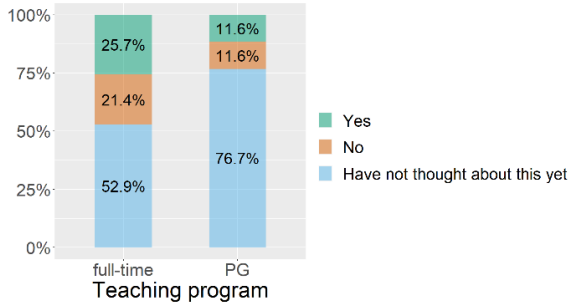

Figure 6: When choosing a job, would your opinion about company AI ethics influence you?

6. Conclusion, limitations and future work

This study argued that the use of artificial intelligence inevitably leads to higher ethical standards among computer scientists. This poses three challenges: linking expertise and the values that govern societies, and through this, defining professional ethics. The development of professional organizations and bodies capable of carrying out public and governmental tasks to develop and enforce professional ethics and, finally, the development and use of the technology needed to enforce ethics. The latter is linked to the concept of infrastructure.

The empirical part of the study investigated the openness of university students and postgraduate students to the inclusion and enforcement of ethical considerations. The questionnaire analysis showed that they are aware of these ethical issues and would like to see them regulated. At the same time, they consider legislation to be the guiding principle for regulation and do not trust self-regulatory mechanisms. This may be considered a Hungarian or Central and Eastern European specificity. This also includes the fact that they do not discuss ethical problems and do not seek to initiate such discussions. A serious limitation of the empirical part of the research is the small number of items in the questionnaire analysis, the extension of which, and the inclusion of other universities in the analysis, could provide important input. Further research will focus on the analysis of the ethical approach in computer science, which could cover three areas: the conceptual analysis of ethics in computer science, the application of philosophical issues of ethics to this discipline, the analysis of the ethical aspects of professional bodies and their ethical positions and, finally, the study of ethics in the university training of computer scientists. The latter covers both its existence and content.

References

[1] J. Tirole, *Economics for the common good*. Princeton University Press, 2018.
[2] E. Erman and M. Furendal, 'Artificial intelligence and the political legitimacy of global governance', *Political Studies*, 2022, doi: 10.1177/00323217221126665.

[3] H. S. Sætra, 'A Hobbesian Argument for World Government', *Philosophies*, vol. 7, no. 3, p. 66, 2022.
[4] D. Acemoglu and S. Johnson, *Power and progress: Our thousand-year struggle over technology and prosperity*. Hachette UK, 2023.
[5] L. Lessig, *Code: And other laws of cyberspace*. ReadHowYouWant. com, 2009.
[6] J. Susskind, *Future politics: Living together in a world transformed by tech*. Oxford University Press, 2018.
[7] N. Elkin-Koren, 'Speech Contestation by Design: Democratizing Speech Governance by AI', *Florida State University Law Review, Forthcoming*, 2022.
[8] J. Neumann, *Selected Writings (In Hungarian)*. Budapest: Typotex, 2003.
[9] J. Van Dijck, T. Poell, and M. De Waal, *The platform society: Public values in a connective world*. New York: Oxford University Press, 2018.
[10] OECD, *Science, Technology and Innovation Outlook 2023: Enabling Transitions in Times of Disruption*. Paris: OECD Publishing, 2023. Accessed: Mar. 20, 2024. [Online]. Available: https://www.oecd.org/publications/oecd-science-technology-and-innovation-outlook-25186167.htm
[11] K. Marx, *Capital: A Critique of Political Economy*, vol. 1. Penguin Publishing Group, 1976.
[12] T. T. Csontos, 'Participation and Self-Enforcement: A Possible Reinterpretation of the Middle-Income Trap', *Köz-gazdaság - Review of Economic Theory and Policy*, 2023, Accessed: Mar. 19, 2024. [Online]. Available: https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&authuser=2&q=csontos+t+t+r%C3%A9szv%C3%A9tel+%C3%A9s+%C3%B6ner%C5%91&btnG=
[13] J. Kornai, *The socialist system: The political economy of communism*. Princeton University Press, 1992.
[14] R. Juhász, N. J. Lane, and D. Rodrik, 'The new economics of industrial policy', National Bureau of Economic Research, 2023.
[15] D. Szabó, 'Erkölcsfilozófia és közgazdaságtan', *Köz-gazdaság - Review of Economic Theory and Policy*, vol. 16, no. 4, pp. 305–314, 2021, doi: 10.14267/RETP2021.04.21.
[16] G. C. Hufbauer and E. Jung, *Scoring 50 years of US industrial policy, 1970–2020*. Peterson Institute for International Economics, 2021.
[17] B. Reese, *The fourth age: Smart robots, conscious computers, and the future of humanity*. Atria Books, 2020.
[18] J. Susskind, *The Digital Republic: Taking Back Control of Technology*. Bloomsbury Publishing, 2023.
[19] C. Katzenbach and L. Ulbricht, 'Algorithmic governance', *Internet Policy Review*, vol. 8, no. 4, pp. 1–18, 2019, doi: 10.14763/2019.4.1424.
[20] P. Dasgupta, 'Economic progress and the idea of social capital', *Social capital: A multifaceted perspective*, pp. 325–424, 2000.
[21] G. Orwell, *Nineteen eighty-four*. United Kingdom: Secker & Warburg, 1949.
[22] N. K. Corrêa *et al.*, 'Worldwide AI ethics: A review of 200 guidelines and recommendations for AI governance', *Patterns*, vol. 4, no. 10, 2023, doi: 10.1016/j.patter.2023.100857.