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The use of artificial intelligence in education in the light of security Culture according to the opinions of Hungarian and Turkish youth

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Abstract: Today, the importance of information security in education is increasingly emphasised. For members of generations X, Y and Alpha, ICT tools have become everyday objects of use, making it essential that teaching methods adapt and innovate accordingly. In particular, it is important that students learn to use data and devices safely, and the necessary guidelines should be integrated into the educational process. The six principles of security set out by the OECD apply to both students and teachers and provide guidance for users. Safety awareness is central to the development of a safety culture. In addition to knowledge and competences, safety culture also includes awareness and intentionality, which are essential for future success. There are many dimensions and aspects of awareness, but perhaps the most important in the context of education is the development of the digital dimension. However, it is also important to teach young people about the safe use of artificial intelligence and the limits of its applicability. The aim of our study is to examine how young people use the opportunities offered by digitalisation in educational institutions, with a particular focus on the use of AI and the perceptions and visions of its use. We will interpret this through an intercultural lens, comparing the intercultural characteristics and attitudinal differences of Hungarian and Turkish youth based on a questionnaire survey conducted in both countries.

Keywords: *Artificial intelligence, Critical information infrastructure, Digitalisation, Education, Security awareness, Security culture, Security.*

1. Introduction

Modern society in the 21st century must constantly face and meet challenges. These challenges depend to a large extent on technical and virtual infrastructure. In particular, thanks to the rapid development of computing and information systems, artificial intelligence is increasingly present in more and more aspects of social and economic life. In terms of the way it communicates, AI can be defined as a kind of innovative communication agent. Alongside digitalisation, innovation has become the leading concept of the 21st century, thanks to which we can meet artificial intelligence [1] The rise of AI has become an unstoppable process. Reading the 6 principles set out by the OECD gives us a clearer picture of the foundations and factors that underpin the construction of an information security culture. These principles apply to students and teachers alike, according to their responsibilities. In practice, they provide a kind of assistance to users [2]. Security awareness plays a major role in the development and evolution of a security culture. This suggests that a safety culture requires not only knowledge and competences but also awareness and intentionality, which is based on a number of elements [3].

Security as a concept definitely means some kind of protection, protection from various dangers. Everyone has a different perspective on the concept. Definitions and approaches evolve according to different priorities. Security is a significant factor in all aspects of our lives. All living beings strive to achieve security throughout their lives. Education and security are in close and inseparable cooperation.

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Safety is of paramount importance in all aspects of education. We can safely call the society of the 21st century the information society. Sooner or later, the lives of all humanity will be shaped and shaped in an integral way by the achievements of information technology and engineering. The interconnections between them are in a state of constant interaction and circulation thanks to a process of interdependence. There is a virtually inextricable link.

2. Literature Review

2.1. The Security, Educational Dimensions of Artificial Intelligence (AI)

There are many definitive approaches to defining artificial intelligence. Artificial intelligence (AI) is the general term for the development technology of machines that are created using entirely artificial means and are able to exhibit similar behaviour and movements to humans. It is basically a set of techniques that allow computers to mimic human behaviour [4]. The concept was first used in the 1950s and is now used in a wide range of fields. Many sectors are affected and reformed every day. Including education, the military and, in addition, security sectors. In many parts of the world, it is being given a high profile, introduced and integrated into the most diverse areas of life through new innovative practices. An interesting example is the United Arab Emirates, where they have even created a so-called Ministry of AI, promoting an open approach to the world. The fact that there is no longer a mobile priority has been announced by world-leading IT organisations such as Microsoft, Google, Apple and Facebook. Instead, they have introduced the so-called AI priority. They identified the various digital assistants as the primary source of information.

There are also several approaches to the definition of human security. In the words of Gergely Horváth, in addition to protecting human life and occupational safety, it also means "preparing users, the staff of our organisation, to do their work responsibly, aware of the safety hazards. They should also be trained to use the tools and information systems they need to do their jobs, thus reducing safety incidents due to human error." [5]. Mógor groups the components of human safety. He distinguishes between professional education-training, personal competence, control-assessment-sanctioning, national security control, adequate security awareness and personal adequacy [6]. Péczeli, based on the 1994 United Nations Development Programme, formulated the following principles: 'the universality of human security is that it can affect anyone. According to its interdependent nature, if anyone's security is threatened, it can affect other people. It is preventive in nature, easier to create through preventive measures than to remedy through restrictions. People-centred, it puts the focus on the individual [7].

The incorporation and application of innovations and improvements directly affect the level of education and development of countries. Artificial intelligence can help to create personalised learning experiences, adaptive education systems and even better support by analysing student performance [8]. In fact, education and the new technology itself interact in two ways. When creating artificial intelligence algorithms, it is essential to collect the right amount of data. The process of education itself supports this and allows the systematisation of the data coming from different individuals, students, teachers, parents and school staff. This comprehensive information can be used both to create a policy based on generalisations in education policy and to develop AI-based software.

In the field of education, the use of artificial intelligence brings countless innovations and developments. It automates basic teaching activities, such as grading. It makes it more objective and transparent. All this creates and supports human security. It shows where improvement and practice is needed and provides continuous feedback. Educational software can be tailored to the needs of learners. They teach a kind of information interaction about how and where to find useful information, thereby supporting and improving learners' learning methods. The concept of safety awareness requires special attention at this point. Users need to be aware of the dangers behind the application and the solutions to avoid them.

Artificial intelligence can better visualise and model social processes. On the one hand, this is due to the multimedia interface through which it communicates with students. This channel is closer to the

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needs and attitudes of the current generation of learners. Technology is part of the everyday life of digital natives [9].

2.2. Definitions of security in the light of academic sources

Reading scientific articles, the range of definitions seems endless. The concept of physical security can be defined in several ways. It means the protection of physical integrity and property, think of rescue robots [10]. During the covid-19 pandemic and other deadly epidemics, the role of so-called medical robots is of paramount importance, as they are responsible for reducing the spread of disease and providing quality care to the sick [11]. On the other hand, it covers the protection of buildings and infrastructure against physical hazards [12]. Personal security as protection of privacy. Security as personal safety is of paramount importance today due to the dynamic technological development. Mobile security and data protection play a prominent role, focusing on the integrity and well-being of individuals against various threats. The networking of different devices over the Internet creates a number of security challenges. Examples include forensic challenges, unexpected data exploitation, single points of failure, blockchain vulnerabilities, machine learning (ML), deep learning (DL). Healthcare security refers to the protection of patient data, the quality of healthcare and the health of patients. Security and privacy also play an important role in the healthcare sector. The CIA model, which stands for confidentiality, integrity and availability, is a model of information security. 1 Challenges in ensuring eHealth security include ethical challenges, user authentication, confidentiality and integrity, privacy, data privacy, data security, cybersecurity [13]. The range of categories seems almost endless.

Several of the definitions and approaches listed above form a system that can be linked to education. Indeed, education and security are closely and inextricably linked. Safety is of paramount importance in all aspects of education. Physical security is the protection of buildings, the environment, against accidents and crime, which also includes the physical security of people. Mental-emotional safety means a supportive environment that is also mentally safe. Emotional support, trust and protection are key elements of this. Cyber security is given a prominent role through the integration of digital education, tools and the internet. It also includes online security of students and school systems against cyber threats. Education today with students born and growing up in a digital environment requires different teaching methods [14]. Health security refers to protecting the health of students and teachers within different educational institutions.

Artificial intelligence plays an important role in risk management and risk analysis [15]. One of its innovative features is its ability to predict/predict risks, i.e. it can make estimates of the future probability and impact of risks. In addition to these, it also represents outstanding and novel achievements in the areas of text recognition and analysis, image and video recognition and analysis, and speech recognition and analysis. In various forensic areas, such as detection, it plays a major role in faster and more efficient analysis of data. By detecting networks of contacts, it represents a step forward in unmasking various criminal organisations. Its value is enhanced by its ability to identify, predict and prevent potential security threats. It will certainly bring forward-looking results in the field of cyber security. Examples include attack detection, alert management, secure user identification, spam filtering and deep analysis of log files. When developing artificial intelligence, an important question is the level of autonomy that developers give to the machine (Kollár, 2023).

2.3.Critical infrastructure- Critical information infrastructure

The elements of critical infrastructure form an island that cannot be separated from each other and are interconnected. It cannot be physically separated into distinct entities such as people or nations. Critical infrastructure is an interacting network of interdependent infrastructure elements, facilities, services, systems and processes. The existence and functioning of critical infrastructure is often fundamental and factual to society. We often do not even realise their practical existence until something goes wrong.

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Take the example of the spread of a computer virus. Its impact is felt practically down to the smallest part of our lives, causing disruption [16].

There is a mutual relationship between critical infrastructure and critical information infrastructure, in which both are of similar importance. The critical information infrastructure is the set of available networks. Critical information infrastructure refers to those infocommunications systems that are themselves critical infrastructure elements or are essential for the operation of the infrastructure elements, such as telecommunications, computers and software, Internet, satellites. Examples of critical information infrastructures include energy supply systems and networks, infocommunications networks, government and public administration infocommunications networks, and infocommunications networks for national defence [17].

In our modern society, the recognition of education as a critical infrastructure is becoming increasingly important. If we think of critical infrastructure as including systems and services that are essential to the functioning and security of a country, there is no longer any question as to whether education falls within this category. It performs key functions that are essential for the long-term development and sustainability of society and the economy. Its importance is evident on several fronts. It contributes to strengthening the cohesion of society by providing access to knowledge and skills for all. At the economic level, it prepares the labour market, thus contributing to economic development. It also promotes critical thinking, which is key to security and defence today. It also brings challenges and opportunities. The digitalisation of education is also a significant factor today. In particular, distance learning and online learning platforms [18][19][20]. In fact, this is not only due to epidemics, but also to new labour market needs. Education must ensure accessibility and inclusiveness for all. The same quality must be available to all, from anywhere, in any circumstances. By improving the education system, a safer and more prosperous society can be achieved [21][22]. This has a constructive effect on the development of national economies [23][24] and the competitiveness of businesses [25][26] [27] as well as a positive impact on social welfare.

2. Material and method

In our research, we investigated the learning process of secondary school and young university students through a questionnaire survey, in terms of the integration of new technological tools, with a special focus on the use of artificial intelligence and the opinions related to it. The target group consisted of Hungarian and Turkish secondary school students and university students. The questionnaire was prepared in Hungarian and English, thus allowing for a comparison between the two countries thanks to the international results. As the two nations have different educational systems, other conclusions can be drawn from the samples. Thanks to the closed questions, the samples obtained can be easily evaluated. The questions were structured around the theme of incorporating artificial intelligence into student learning, in relation to my research topic. We were looking for their opinions on the use of digitalisation and AI. How do they think AI will affect their future employment and the world of work, do they see the use of AI as an evolutionary step forward or an evolutionary dead end, and to what extent do they consider AI to be a threat to humanity. The questionnaire was distributed online and completed by members of the target group. The Hungarian sample consisted of 470 responses and the Turkish sample of 328. In order to draw conclusions, cross tabulation analysis was conducted in addition to traditional basic statistical methods. The results were evaluated according to the age of the respondents, as shown in the figure.

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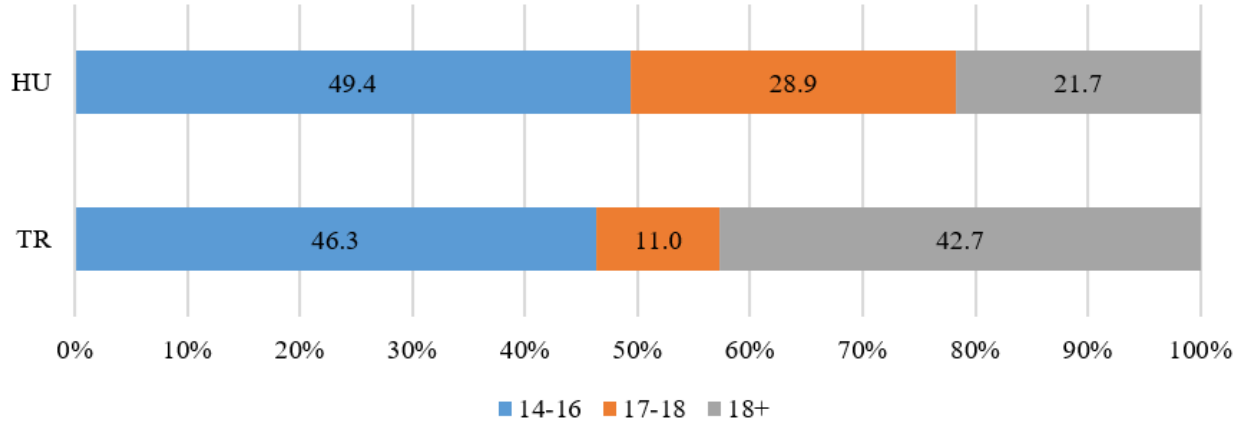

Figure 1.
Composition of the Hungarian and Turkish samples by age of respondents.
Note: N = 470 (HU), N = 328 (TR).

3. Results

First of all, we wanted to know how young people in Hungary and Turkey think about the future impact of artificial intelligence. It can be seen that almost half of Hungarian young people thought it would have a big impact on our lives in the future, and more than 40% thought it would have a medium impact and voted for medium. Thus, overall, 90% of young people in the Hungarian sample attributed a strong impact to AI. In contrast, Turkish young people, by nearly two-thirds, thought that AI would have a negligible impact in the future and, surprisingly, just under 4% thought it would have a strong impact on our lives.

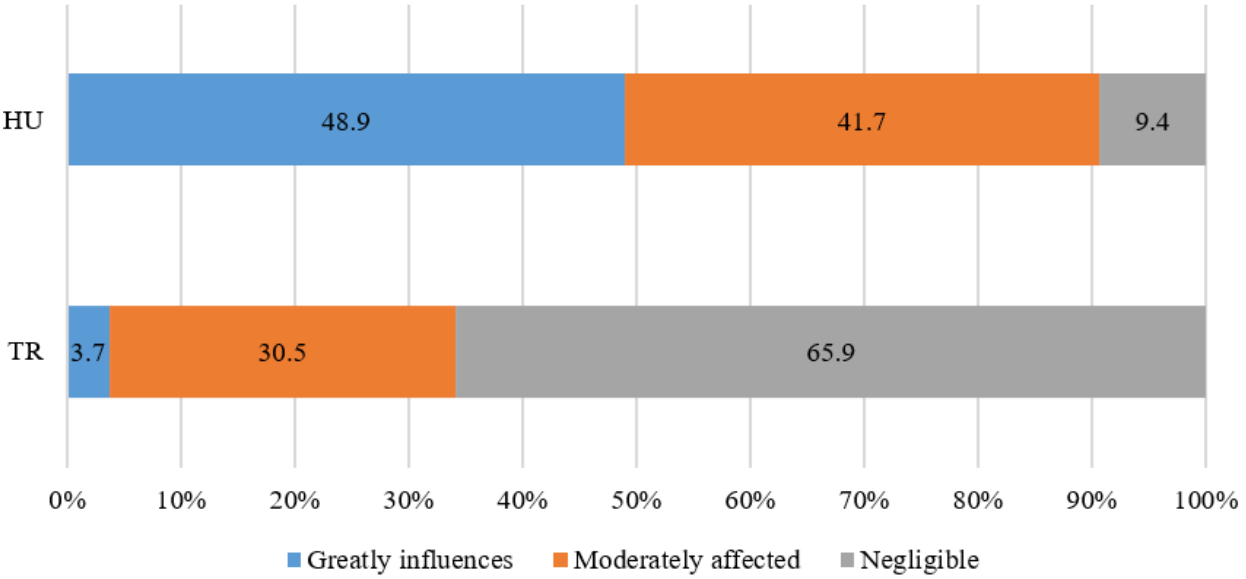

Figure 2.
Hungarian and Turkish young people's views on the future impact of MI.
Note: N = 470 (HU), N = 328 (TR)

Next, we used the column percentages of the cross-tabulation analysis to examine the distribution of respondents in terms of the given answers in both the Hungarian and Turkish samples. It can be said

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that in the Turkish sample, 60% of respondents aged 14-16 years attributed negligible impact to AI, and surprisingly, more than 70% of respondents aged 17 years and above felt the same way. This proportion was only around 13% in the Hungarian sample of 14 year olds alone, with older respondents much less likely to say that AI has a negligible impact. In the Hungarian sample, nearly two thirds of 17 and 18 year olds thought it would have a major impact on our lives.

Table 1.
Distribution of Hungarian and Turkish young people's views on the future impact of AI by age group percentile of cross-tabulation analysis).

		14-16	17-18	18+	Total
TR	Greatly influences	7.9%	0.0%	0.0%	3.7%
	Moderately affected	31.6%	27.8%	30.0%	30.5%
	Negligible	60.5%	72.2%	70.0%	65.9%
EN	Greatly influences	45.7%	57.4%	45.1%	48.9%
	Moderately affected	41.4%	39.7%	45.1%	41.7%
	Negligible	12.9%	2.9%	9.8%	9.4%

Note: N = 470 (HU), N = 328 (TR).

In the following, we have also used cross-tabulation analysis to examine how the adjusted standardised residuals for this question evolve. We found that, compared to the expected value, the proportion of young people in the Turkish sample who attributed high influence was above the expected value for the 14-16 age group, and the same was observed for those aged 18 and over, but for them we see an effect below the expected value. For the Hungarian sample, there were much larger differences, with 14-16 year olds voting above the expected value for negligible influence and 17-18 year olds voting above the expected value for high influence and below the expected value for negligible influence. Pearson's Chi-square was used to see how much age influences the perception of the question. We found that there was a clear indication of significance for both samples, i.e. where it was below 5%, we expected to detect an effect between the two factors. The Cramer's V value was also used to examine the strength of the effect, which was found to be negligible.

Table 2.
Value of adjusted standardised residuals for the Hungarian and Turkish samples on the future impact of MI by age group (Cross tabulation analysis).

		14-16	17-18	18+	Pearson chi-square	Cramer's V
TR	Greatly influences	3.8	-1.2	-3.0	0.004	0.153
	Moderately affected	0.4	-0.4	-0.2		
	Negligible	-1.9	0.9	1.4		
EN	Greatly influences	-1.4	2.3	-0.9	0.015	0.115
	Moderately affected	-0.1	-0.6	0.8		
	Negligible	2.6	-3.0	0.2		

Note: N = 470 (HU), N = 328 (TR).

In the rest of the research, we looked at young people's views on the future of artificial intelligence, how they see it: as a step forward or as a dead end. Here, respondents were broadly consistent, with the vast majority of them all seeing it as a way forward.

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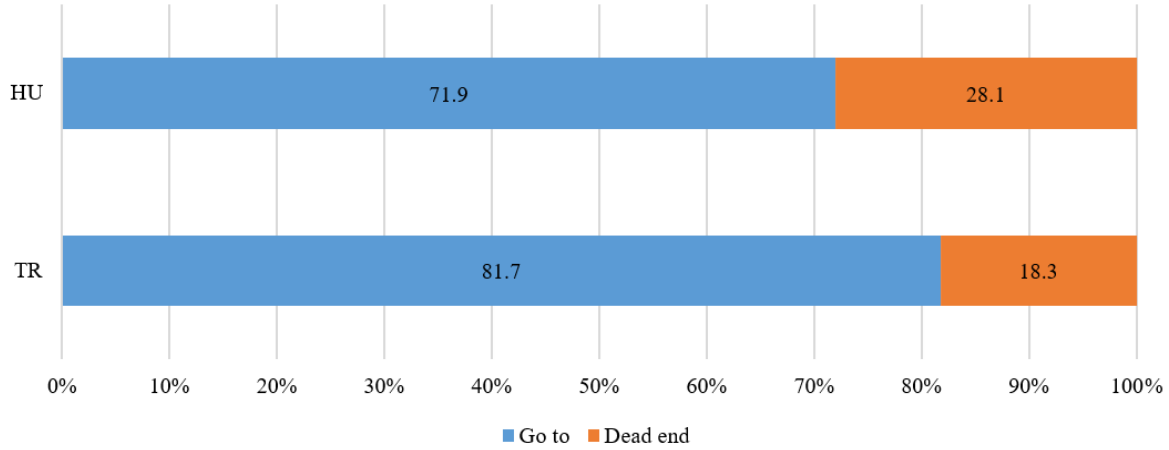

Figure 3.
Hungarian and Turkish young people's views on the future of MI.
Note: N = 470 (HU), N = 328 (TR).

Based on the column percentages of the cross-tabulation analysis, we have also examined the age-group distributions in this case. In the Turkish sample, between 80-90% of 17-year-olds said that there will be progress in the future of AI, while the Hungarian respondents gave a slightly lower value to progress, with under 75% of young people in the same age group seeing the future. This suggests that young Hungarians are sceptical about the helpfulness and future-oriented existence of AI. They are rather cautious and fearful of future impacts.

Table 3.
Hungarian and Turkish young people's views on the future of MI by age group (Cross-tabulation analysis, percentile of columns).

		14-16	17-18	18+	Total
TR	Go to	78.9%	88.9%	82.9%	81.7%
	Dead end	21.1%	11.1%	17.1%	18.3%
EN	Go to	71.6%	76.5%	66.7%	71.9%
	Dead end	28.4%	23.5%	33.3%	28.1%

Note: N = 470 (HU), N = 328 (TR).

The adjusted standardised residuals were also used in this case to examine which age group voted below or above the expected value. No correlation was found for any of the residuals, and in this case there was no detectable correlation for the Chi-square value.

Table 4.
Value of the adjusted standardised residuals on the future of MI by age group in the Hungarian and Turkish samples (Cross-tabulation analysis).

		14-16	17-18	18+	Pearson chi-square	Cramer's V
TR	Go to	-1.2	1.2	0.5	0.343	0.081
	Dead end	1.2	-1.2	-0.5		
EN	Go to	-0.2	1.4	-1.3	0.246	0.077
	Dead end	0.2	-1.4	1.3		

Note: N = 470 (HU), N = 328 (TR)

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In the last part of our research, we asked young people how they view artificial intelligence, whether it is a threat to them or not. In this case, in an unprecedented way, we found that the opinions of Turkish and Hungarian young people are broadly in line. Here, we found that Hungarian young people perceive AI as less of a threat in the future, a result that somewhat contradicts what we have seen before.

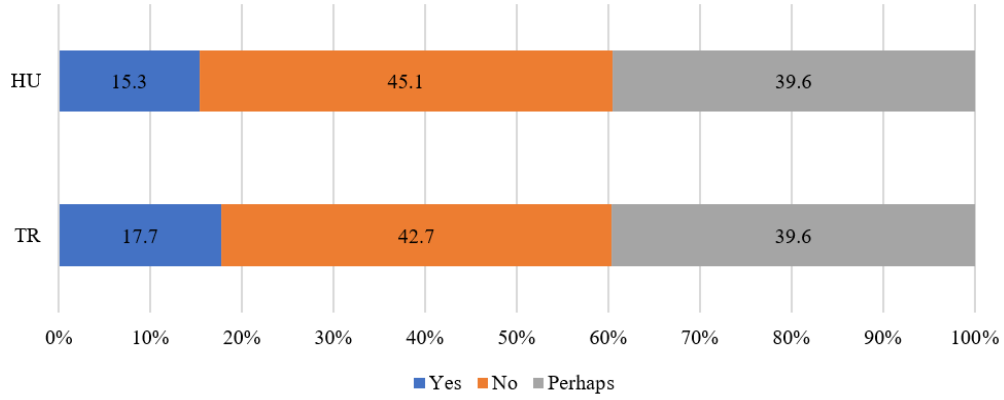

Figure 4.
Hungarian and Turkish young people's views on the threat of AI.
Note: N = 470 (HU), N = 328 (TR).

Finally, the results of the cross-tabulations were also used here to see which age groups have different views on the future threat posed by AI. For the Turkish sample, the highest proportion of young people who are afraid of AI as a threat is the 17-18 age group, which in the Hungarian sample is the age group older than 18. Those who do not see AI as a threat are the young people older than 18 in the Turkish sample, which in the Hungarian sample is the age group 17-18.

Table 5.
Hungarian and Turkish young people's perception of MI as a threat by age group (Cross-tabulation analysis, percentile of columns).

		14-16	**17-18**	**18+**	
TR	Yes	18.4%	22.2%	15.7%	17.7%
	No	39.5%	44.4%	45.7%	42.7%
	Perhaps	42.1%	33.3%	38.6%	39.6%
EN	**Yes**	15.5%	11.8%	19.6%	15.3%
	No	48.3%	50.0%	31.4%	45.1%
	Perhaps	36.2%	38.2%	49.0%	39.6%

Note: N = 470 (HU), N = 328 (TR)

Based on the value of the adjusted standardised residuals, there were only two cases of deviation from the expected value. Respondents in the Hungarian sample aged 18 and over gave a response rate below the expected value for the "no" response and above the expected value for the "maybe" response. Based on the Chi-squared value, we also see an effect on the responses for the Hungarian sample and the relationship between the age of respondents, which again, based on the Cramer V value, was a negligible effect.

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Table 6.
Value of adjusted standardised residuals for the Hungarian and Turkish samples on the hazardousness of MI by age group (Cross-tabulation analysis).

		14-16	17-18	18+	Pearson chi-square	Cramer's V
TR	Yes	0.3	0.8	-0.8	0.717	0.057
	No	-1.1	0.2	1.0		
	Perhaps	0.9	-0.8	-0.3		
EN	Yes	0.1	-1.4	1.4	0.028	0.108
	No	1.4	1.4	-3.2		
	Perhaps	-1.5	-0.4	2.2		

Note: N = 470 (HU), N = 328 (TR)

4. Conclusions

The emergence and increasing use of artificial intelligence is inspiring a wide range of visions for the future. Our world faces many benefits, but also many threats. From an ethical and societal point of view, it is of paramount importance to move towards more favourable standards for the use and integration of AI in different domains. It is important to provide concrete and constructive answers to the questions raised by societal challenges. Looking at the technological changes in the various disciplines, we can see that the relationship between the sciences is becoming increasingly complex in the light of AI. Whether we look at some of the utopian visions or the more worrying predictions, the scale of progress is undeniable and unstoppable.

The results of the research show that the young people in the sample are quite divided when it comes to AI. In several cases, we found that young people gave contradictory answers, due to less developed background knowledge. Overall, the results suggest that Hungarian young people seem to be more informed and more cautious on certain issues than their Turkish counterparts. Turkish young people did not seem to have a clear opinion on AI. All this suggests that education has a very important role to play in the future in terms of increasing knowledge. As has already been mentioned in the literature, it is very important to see the trends that are emerging in education systems. The changing needs and circumstances, the increasing shortage of teachers, the increasing digitalisation, make it clear that AI will very quickly become part of the education system. It is therefore very important to prepare young people in the right way for its use, as AI is both a tool and a weapon, the misuse of which could jeopardise the future of humanity.

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