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Climate disinformation on the internet and social media. Analysis of the phenomenon

Abstract
Climate disinformation is a very serious challenge that modern societies must face. Authors of disinformation content use many tools and methods to interfere with discourse, including social media. They are often created and sponsored by industry representatives who spend millions of dollars on publications and advertising. The aim of the article is to attempt to analyse the phenomenon of climate disinformation on the Internet and social media. An important element here are the narratives exchanged by researchers on the subject, which include denying and disregarding climate change. They take the form of a delaying discourse, the aim of which is to postpone aid activities in the area of climate, or to convince that humans are unable to influence the climate in such a way as to change it. An important role is played by disinformation actors, i.e. a group of people and entities that create and distribute disinformation content. The selected research method is the desk research method based on the analysis of secondary sources regarding the analysed issue. The results of the analysis allow us to build a characterization of the polarized phenomenon of climate disinformation on the Internet and social media, present its components and who is responsible for it.

Keywords: disinformation, internet, climate changes, social media, discourse.

Dezinformacja klimatyczna w internecie i mediach społecznościowych. Analiza zjawiska

Streszczenie
Dezinformacja klimatyczna jest bardzo poważnym wyzwaniem, z jakim zmierzyć się muszą współczesne społeczeństwa. Autorzy treści dezinformacyjnych korzystają z wielu narzędzi i sposobów, aby ingerować w dyskurs. Są to między innymi media społecznościowe. Często tworzą i sponsorują je przedstawiciele przemysłu, który wydają miliony dolarów na publikacje oraz reklamy. Celem artykułu jest próba analizy zjawiska dezinformacji klimatycznej w internecie i mediach społecznościowych. Ważnym elementem są tutaj narracje wymieniane przez badaczy tematu, do których należą zaprzeczanie oraz lekceważenie zmian klimatycznych. Przyjmują one formę dyskursu opóźniania, którego celem jest odsunięcie w czasie działań pomocowych w obszarze klimatu, bądź przekonują, że człowiek nie jest w stanie wpłynąć na klimat tak, aby go zmienić. Ważną rolę pełnią aktorzy dezinformacji, czyli grupa ludzi oraz podmiotów tworzących i dystrybuujących treści dezinformacyjne. Wybraną metodą badawczą jest metoda

desk research oparta na analizie źródeł zastanych dotyczących analizowanego zagadnienia. Wyniki przeprowadzonej analizy pozwalają zbudować charakterystykę spolaryzowanego zjawiska dezinformacji klimatycznej w internecie i mediach społecznościowych, przedstawić, jakie są jej elementy składowe oraz kto jest za nią odpowiedzialny.

Słowa kluczowe: dezinformacja, internet, zmiany klimatu, media społecznościowe, dyskurs.

Introduction

For many years, scientists have been warning us about the ongoing climate change. Meanwhile, there is still a large group of people who deny the existence of these changes and question the knowledge provided in this area. As studies show, almost half of Poles declare that they have encountered disinformation regarding climate issues in the last few months, and its main sources are the media and politicians[1]. Disinformation creators are using a variety of tools and methods to disrupt discourse. An analysis by researchers at the University of London shows that in 2022, there were more tweets and retweets using climate sceptical terminology on X (ex-Twitter) than in any other year since the platform was founded. The amount of climate sceptical content on the platform increased by 200,000 in just one year, and has quadrupled since 2020, the largest increase in x.com's 17 years of existence. More than 40 percent of disinformation posts are associated with a single hashtag, #climatescam, which encompasses many types of false information about climate change[2].

In turn, the 2023 report by the European Digital Media Observatory indicates that climate-related disinformation already accounts for 12 percent of all disinformation content. This growth is particularly noticeable in European Union countries, and fake news generated by artificial intelligence is worth noting. Although their number is still relatively small, a strong upward trend is observed. Disinformation about an alleged radioactive cloud from Ukraine has entered the news cycle in 16 countries, false reports about the death of George Soros were distributed in 9 countries, and fake news about a harmful coating on fruit and vegetables circulated in 5 of them[3]. Significant increases in the amount of disinformation content are usually observed around events concerning climate change, when the distribution of fake news or conspiracy theories increases. Fake messages mainly appeal to emotions, which is why they have a much stronger impact on recipients, attract attention and are convincing. They are often combined with other narratives, for example those related to plans by governments to take over

[1] P. Sobiesiak-Penszko, F. Pazderski, *Dezinformacja wokół klimatu i polityki klimatycznej. Opinie Polek i Polaków*, https://www.isp.org.pl/pl/publikacje/dezinformacja-wokol-klimatu-i--polityki-klimatycznej-opinie-polek-i-polakow (accessed on: 28.08.2024).

[2] J. Calma, *Climate misinformation explodes on Twitter*, https://www.theverge.com/2022/12/5/23494220/elon-musk-twitter-climate-misinformation-rise-analysis (accessed on: 28.08.2024).

[3] Demagog, *EDMO: Dezinformacja klimatyczna zanieczyszcza debatę publiczną*, https://demagog.org.pl/analizy_i_raporty/edmo-dezinformacja-klimatyczna-zanieczyszcza-debate-publiczna/, (accessed on: 28.08.2024).

specific areas of social life. The effect of disinformation content is a reduced level of knowledge about climate and ecology, greater social polarization and a decrease in the level of trust in scientists dealing with this topic[4].

Taking a closer look at the topic of climate disinformation in social media seems necessary due to the dynamic growth of this phenomenon and its increasingly broad social impact. The topic is also increasingly being taken up in public discussion, mainly due to its negative consequences. Analysis of the role of social media, sample disinformation narratives and actors of climate disinformation are the main points, the examination of which will help to build a slightly broader picture of climate disinformation. It can also be the basis for creating ways to prevent its harmful impact. Therefore, the aim of the publication is to analyse climate disinformation using the desk research method. The main research questions concern what characterizes climate disinformation in social media, what are its components and who is responsible for it. This is to serve as an attempt to determine the possibilities of limiting this type of disinformation in the future.

Disinformation narratives

The number of people questioning climate change is significant and they are often united by the search for global conspiracies created by elites. This is how policies and international agreements that recognize climate change as a global challenge that must be counteracted are perceived, and the goals defined by the European Union, such as achieving climate neutrality or reducing greenhouse gas emissions, become the leitmotifs of populist disinformation narratives. These, viewed through the prism of disinformation theory, most often take the form of phenomena of the nature of disinformation (intentional actions) and misinformation (unintentional actions)[5]. In the thematic area, disinformation content mainly focuses on questioning climate change or expresses far-reaching scepticism, but rarely does so directly. It focuses on trivializing the problem and its consequences in the short and long term. Such anti-climate narratives (denialist or escapist) distract from the issue of climate change, mainly through scepticism about the scientific consensus on the issue. Delaying narratives, on the other hand, are those that acknowledge that climate change is occurring, but undermine actions to slow or stop it. Both types influence the formation of social understanding of climate change, determine the views and attitudes of individuals in this area, and influence the activities of politicians, ultimately translating into the decisions of governments and institutions. In Poland, the main denialist or escapist narratives are those that talk about the exaggeration of fears related to climate change, suggesting

[4] *What impact do climate change misinformation and disinformation have?*, https://www.gov.uk/government/publications/climate-change-misinformation-impacts/what-impact-do-climate--change-misinformation-and-disinformation-have-html (accessed on: 28.08.2024).

[5] C. Wardle, *Understanding information disorder*, https://firstdraftnews.org/long-form-article/understanding-information-disorder/, (accessed on: 30.08.2024).

that they are too extensive to be bothered at all, and that remove responsibility from the individual as inert and deprived of decision-making. Among the delaying narratives, those related to the energy transformation and attachment to fossil fuels, especially coal, which Polish society cannot afford to give up, dominate, as do those in which responsibility is shifted to politicians, while at the same time indicating their helplessness in this area. In this respect, it can be said that Poles are not divided into those who believe or do not believe in climate change, but those who know that it can be prevented at the international level and those who believe that it can be avoided[6].

Among the most common disinformation narratives from 2007 to 2022 on x.com (formerly Twitter) and Reddit platforms, we can distinguish those that climate change is a hoax or conspiracy, those that indicate the uncertainty of scientists who talk and write about climate change, those that the changes we are observing are natural and have no connection with human activity, therefore our actions will not bring results. Also important are messages that indicate the benefits of climate change. In addition, there are noticeable messages that CO2 levels are not rising, glaciers are not melting, the water in the oceans is still cold, and in some countries the weather is still not sunny. The popularity of individual narratives has changed over the past 15 years, depending on world events, while gaining in popularity. Much of the disinformation narrative, according to researchers from Boston University, may have come from a single sponsor, Exxon Mobil, which financed more than 50 organizations that published tweets saying that climate change is not dangerous, but that the United States' policies in this area are harmful to economic growth[7].

In Europe, four dominant climate disinformation narratives have been identified. The first denies the existence of climate change or the role of humans in it, the second accuses traditional media of spreading panic about it, the third attacks renewable energy sources, and the fourth attacks climate movements, accusing them of hypocrisy and stupidity. The largest concentration of all types is found in social media, although they are also located in traditional media such as press, radio and television, but often have their original source on the internet. The first narrative takes the form of fake news, most often about the lack of a link between CO2 and global warming. This news has particularly infected the infosphere in France. In the Netherlands, on the other hand, there have been messages that CO2 cannot be related to climate change because there is too little of it in the atmosphere. In Portugal, fake news included information that only 5 percent of climate change can be caused by human activity, or in Great Britain, where disinformation carried the message that global warming had stopped. Other examples of this narrative include: attributing climate change to the sun (Germany, Belgium), the eruption of Mount Etna emitting more CO2 than all of humanity (Italy), and there

[6] Fundacja Pole Dialogu, *Nowy negacjonizm klimatyczny. Jak populizm kształtuje nasze myślenie o walce ze zmianami klimatu*, https://poledialogu.org.pl/wp-content/uploads/2023/09/Nowy-Negacjonizm-Klimatyczny_raport_PL.pdf (accessed on: 28.08.2024).

[7] Institute for Global Sustainability, *How Climate Disinformation Spreads: Twitter*, https://www.bu.edu/igs/research/projects/climate-disinformation-initiative/twitter/ (accessed on: 28.08.2024).

is no drought in Spain because it cannot be seen from space (Spain). The narrative targeting traditional media as panic-mongers spread most widely through the published temperature map in Sweden from 1986 and 2022, where supposedly similar temperatures were marked in different colours, sometimes reporting them as normal, and sometimes as extremely high. The disinformation here consisted of confusing dates and media and the legend describing them. This content was dominant in Spain, France, Germany, Poland, the Netherlands, Romania, Austria, Belgium, and Hungary. In Austria and Germany, on the other hand, an erroneous quote from an expert was circulating, saying that temperatures above 35 degrees Celsius had not occurred in the past. In reality, this was a manipulated sentence taken out of context. Manipulations were also perpetrated by disinformants from the third type of narrative, that electric vehicles and recycling are dangerous. In Belgium, the dominant message was that each wind turbine emits 62 kilograms of plastic into the environment per year, and in Portugal, that waste segregation does not exist because one vehicle collects all of it. A significant part of the messages concerned the fact that electric cars are flammable (Italy), quickly become useless (Germany, Portugal), and that they require significant amounts of CO2 to produce (Finland, Austria). The last, fourth narrative is about the stupidity of climate movements. This type of message focused mainly on the figure of Greta Thunberg, an activist, who was supposedly at a festival surrounded by mountains of rubbish. This narrative was present in Spain, the Netherlands, Belgium, Bulgaria and Italy. Another example is the association of Greta with child labour, which dominated the messages in Germany and Belgium. The common denominator of all the messages identified in Europe is that if you believe in climate change and try to change your life because of it, you are a puppet in the hands of the powerful of this world[8].

The role of social media

Creating and distributing disinformation content would not be as easy without the tools offered by technology, especially social media. They are not the only source of disinformation, but they significantly accelerate its circulation in the information ecosystem. Due to the lack of external regulations, anyone who does not violate community standards can publish any content, especially if it is in opposition to mainstream messages. This makes social media an important element both in the entire information ecosystem and in the area occupied by disinformation[9].

The platform with the highest detection of disinformation is x.com (ex-Twitter), followed by Facebook. The next places are occupied by Instagram, TikTok, LinkedIn and YouTube, which have been swapping positions in the ranking of disinformation

[8] EDMO, *Disinformation about climate change – Main narratives in June at the European level*, https://edmo.eu/publications/disinformation-about-climate-change-main-narratives-in-june-at-the-european-level/ (accessed on: 28.08.2024).

[9] D. Boćkowski, E. Dąbrowska-Prokopowska, P. Goryń, K. Goryń, *Dezinformacja – inspiracja – społeczeństwo*, Wydawnictwo Uniwersytetu w Białymstoku, Białystok 2022.

content in recent years. Fake news published on x.com also arouses greater interest than real content, the opposite is true for TikTok, but x.com shows the highest rate of audience engagement in posts, commenting on them and sharing them with other recipients. This is a statistically significant indicator, because engagement on x.com is twice as high, which may also affect the acceleration of the distribution of disinformation content. The highest engagement in real content is observed on the YouTube platform, which is associated with the currently lowest level of false content on this platform. High engagement correlated with a high level of disinformation content may be an indicator of higher exposure of recipients to damage caused by disinformation. The x.com and Facebook platforms also have the highest percentage of disinformation actors, i.e. people responsible for creating it, where they are also the most active and gather the largest audience, while the smallest number of them occurs on the YouTube platform. Consequently, on the x.com and Facebook platforms, disinformation content gains the highest visibility, which strengthens the spiral of engagement, contributing to the generation of further content[10]. Stop Funding Heat estimates that false climate change messages could generate between 800,000 and 1.3 million views per day[11]. The most sophisticated forms of climate disinformation are identified in democratic countries, i.e. wherever the topic of climate change is most present in the discourse. This is when the most uncritical opinions are created, promoted by sceptical politicians or dishonest business groups, which reach the majority of social media users. Disinformation denying climate change then takes the form of content with a wide range of topics, from personal issues to purely political ones. In addition, this type of disinformation is amplified by specific individuals or companies, as well as seemingly anonymous commentators who in fact receive remuneration for their propaganda activities on the Internet. As the importance of the topic of climate change increases, the amount of disinformation content and the level of its aggressiveness[12].

The power of social media is being used by those who benefit from climate disinformation. They use platforms without content control to distribute false content. It is impossible to ignore fossil fuel companies, of which 16 entities were responsible for placing (and paying for) over 1,700 ads on Facebook in 2021. In total, these ads received around 150 million views and brought the platform that published them $5 million in profit. In turn, x.com in 2020, right after it was purchased by Elon Musk, allowed half a million posts to appear denying climate change. As a result of the intervention, it later

[10] Code of Practice on Disinformation, *A comparative Analysis of the Prevalence and Sources of Disinformation across Major Social Media Platforms in Poland, Slovakia, and Spain*, https://disinfocode.eu/wp-content/uploads/2023/09/code-of-practice-on-disinformation-september-22-2023.pdf (accessed on: 30.08.2024).

[11] Stop Funding Heat, *In Denial – Facebook's Growing Friendship with Climate Misinformation*, https://stopfundingheat.info/wp-content/uploads/2021/11/in-denial-v2.pdf (accessed on: 30.08.2024).

[12] M.M. Mashamaite, *The Impact of Misinformation and Fake News on Climate Change Perception and Response: A Comprehensive Review*, "International Journal of Social Science Research and Review", Vol. 6, Issue 9, p. 183–193.

modified its algorithms to redirect users to scientific sites, but the effectiveness of this change was relatively low. Facebook, whose publications also contributed to the spread of climate disinformation, was supposed to place appropriate labels on such content, but it did not mark over half of the posts that denied climate change. A former Facebook employee has admitted that the platform intentionally misleads the public and its investors about its efforts to combat disinformation. This is part of the strategy of both x.com and Facebook, which work closely with companies that benefit from climate change. The aforementioned Exxon Mobil paid for more than 350 social media ads to influence New York state legislation to phase out natural gas installations in buildings. Climate disinformation has been incorporated into the marketing plans of many fossil fuel companies, and social media is a channel for distributing their content. Natural gas groups regularly pay Instagram influencers, often young women with large culinary followings, to talk about the benefits of cooking on a gas stove versus an electric one. This is even a condition for the success of a culinary recipe. Such messages, not marked as ads or partnerships, are then amplified by other disinformation distributors who also support the fossil fuel industry. Social media is an ideal place to create and distribute climate disinformation, also because it reaches users who prefer to use mental shortcuts. These, combined with cognitive biases and the tendency to trust people we know, make us very susceptible to the effects of algorithms. Platforms such as x.com or Facebook model and adapt content to recipients every day, based mainly on the principle of emotional escalation. The topic of climate disinformation fits in perfectly here, because it is difficult to pass by indifferently. The decisions of governments and institutions in this area have such a significant impact on the lives of individuals that they are unable to remain passive towards the issue. Therefore, polarization and the adoption of one of the attitudes (accepting or negating) appear, which will be reinforced by the content in social media. This, combined with the amount of disinformation content, contributes to weakening the discourse and strengthening the false reality, which is used by all those who may want to eliminate, for example, renewable energy sources[13].

Regulating the participation of social media and thus limiting climate disinformation is no small challenge. Again, x.com is the worst performer in this area, with virtually no measures in place to prevent the creation or distribution of such content[14]. Google is also failing to deliver on its promises, with ads published on many platforms containing disinformation. Over 60 percent of articles denying climate change and containing other content that distorts reality are accompanied by Google ads. It was also this platform that allowed an entity such as the Daily Wire to display ads with the slogan climate change is a hoax. In turn, among videos containing disinformation content

[13] J. Turrentine, *Climate Misinformation on Social Media Is Undermining Climate Action*, https://www.nrdc.org/stories/climate-misinformation-social-media-undermining-climate-action (accessed on: 30.08.2024).

[14] EU Disinfo LAB, *Disinformation on X: Research and Content Moderation Policies*, https://www.disinfo.eu/wp-content/uploads/2024/01/20240116_Twitter-X_factsheet.pdf (accessed on: 30.08.2024).

regarding climate change on the YouTube platform, there were views of brands such as Nike, Hyundai and Emirates, and the number of their views exceeded 55 million. On Facebook, 92 percent of posts containing disinformation did not have an appropriate label from the platform[15]. So while there are promises from the tech giants, there is a big problem with enforcing them. Climate disinformation is profitable for social media, which is why both they and the companies that care about this disinformation are still looking for ways to create and distribute it.

Actors of disinformation

In the spread of climate disinformation, a significant role is played by disinformation actors who are not only involved in its creation, but also in building its reach among recipients and implementing it into discourse. In the literature on the subject, we can find a classification of 6 types of disinformation actors, who are not mutually exclusive. These are: scientists, governments, political and religious organizations (including analytical centres, foundations and institutes), industry (mining, steel, automotive), media (especially those with right-wing connections) and public opinion. All of them create a system of a loose coalition of interests that uses a number of front groups and astroturfing-type operations, supported by controversial scientists, conservative media and politicians. In recent years, this network of connections has also been joined by bloggers sceptical of climate change, whose publications focus on depreciating expert knowledge and presenting a reinterpretation of scientific publications in the field of climate change. This leads to a deepening polarization in the area of perception of this topic by society. Conservative think tanks play an important role in the process of creating and distributing disinformation content. Their discourse is dominated by scepticism, and they gain credibility by publishing reports, columns, and journalistic materials that present a dismissive attitude and a critical stance towards climate science. They play the role of an echo chamber that strengthens the mechanisms of climate change denial on a large scale[16].

The British organization Centre for Countering Digital Hate has created a list of 10 social media accounts that are responsible for 69 percent of climate change disinformation. They are called The Toxic Ten, and Russian and American entities dominate among them. The first actor is Breitbart, a media outlet run by former Donald Trump adviser Steve Bannon. It is a platform described as a home for the alt-right, publishing misleading claims about women and minority groups, as well as conspiracy theories about Barack Obama. It regularly features climate change deniers, and climate change activists are referred to in the media as climate alarmists. The Western Journal,

[15] Center for Countering Digital Hate*, Youtube's Climate Denial Dollars*, https://counterhate.com/research/google-climate-change-disinformation-youtube-videos/ (accessed on: 30.08.2024).
[16] K. Treen, H. Thomas, S.J. O'Neil, *Online misinformation about climate change*, https://www.researchgate.net/publication/342307224_Online_misinformation_about_climate_change (accessed on: 30.08.2024).

which has been repeatedly described by The New York Times as a potent online disinformation mill, is another actor on The Toxic Ten. Founded by activist Floyd Brown, the site is supported by ads, subscriptions, and donations, and its disinformation covers climate, medicine, and migration. Next on the list is Newsmax.com, which promotes disinformation about the US election and climate change. Founded by a friend of Donald Trump, the content is full of conspiracy theories that scare people with chemical waste and suggest that John F. Kennedy was killed by the mafia. During the pandemic, the site published content describing an antimalarial drug as a solution for COVID patients. Fourth on The Toxic Ten is the publishing group TownHall Media, which owns townhall.com, pjmedia.com, redstate.com and twitchy.com. They have an estimated readership of 6.2 million, and the authors who publish on these sites call climate change a hoax. Townhall.com previously had a different name, was a publication and was funded by ExxonMobil. Another disinformation outlet is The Media Research Centre (MRC), a think tank founded in the 1980s that describes itself as attacking leftist bias in media and popular culture. It devalues the achievements of scientists in the field of climate science, sponsors climate conferences, and is supported by donations and advertising, including from Republican donors. The Washington Times is another entity, which bills itself as a counterweight to the mainstream media. It regularly publishes climate change denial content and in 2021 issued a report under the slogan There is no climate emergency, containing content sponsored by the oil and gas industry. In seventh place is The Federalist Papers, which presents itself as an educator using social media to oppose the American government, including in the field of climate policy. The list also includes the largest publisher on Facebook, The Daily Wire, whose content enjoys greater interest than publications from The New York Times, The Washington Post, or CNN. The site contains misleading publications about the climate, including that wind turbine failures lead to power outages. The founder and owner of the website openly questions the scientific consensus, claiming that climate change poses no threat to humanity. The ninth position on the list is occupied by Russian State Media, which is part of the Russian news network. It owns RT.com and sputniknews.com, and are entities financed from the budget of the Russian Federation. Accusations of disinformation cover many areas, including NATO accusing Sputnik of distributing a false story about asylum seekers in Germany. In addition, this media group publishes climate disinformation as part of an American democracy conspiracy, a term that should be removed from the public narrative. The last actor on the list is The Patriot Post, which has been operating since the 1990s, claims to be supported by donations, and in its newsletters, which have hundreds of thousands of subscribers, publishes content that denies climate change or links LGBT+ people to Neanderthals. The identities of the writers are hidden and they usually appear under pseudonyms. Facebook, despite promising to label posts from the group, only marked 8 percent of posts as disinformation. Most of The Toxic Ten's entities are funded by Google

ads, and the group generated $5.3 million in ad revenue in six months[17]. In total, their publications reached 186 million followers. The most interactions were on Facebook (70 percent), YouTube earned over $33 million, x.com 12 million, and Instagram over 8 million. The Stop Funding Heat Foundation emphasizes Facebook's inaction in limiting climate disinformation published. Of the 118 ads that contained content that denied or downplayed climate change, as many as 78 percent were financed by sites that had already been identified as disinforming. Such ads could have been viewed up to 10 million times. The initiative to publish links to the Climate Science Centre on Facebook also worked very poorly. Just over 10 percent of disinformation posts contained a link to a website with verified sources of information[18]. On the Polish internet, the topic of climate disinformation is also gaining popularity and false messages are increasing. The fact checking portal Konkret 24 reports that the carriers of this type of disinformation in 2023 were primarily Polish politicians active in social media, including Jacek Wilk, who wrote on x.com that there is no global warming because it is cold and rainy outside, while Marek Jakubiak suggested that climate change is natural and also occurred before the industrial era. This shows that conspiracy theories and disinformation messages do not end and there is still potential for new ones to emerge[19].

Although there are few actors of disinformation, their power of influence is significant. They have a great social influence, mainly because they use technological tools that were not available a few decades ago. In addition, they are entities with high funding, which allows them to be independent and create their own independent discourse.

Summary

The debate on climate change has been going on for many years and there is still a need to deepen it. It can be seen that creating and distributing content that denies or disregards climate change is profitable for many groups and entities. The still strong industries based on fossil fuels have the resources to support messages and even entire media that publish specific content. The emergence and popularization of social media additionally provides tools of influence that climate disinformants use. The pace and scope of disinformation content is reinforced by advertisements and actors who are gradually expanding their reach. There are only a few dominant narratives, but they are often combined with other topics and fuelled by conspiracy theories. This creates an explosive mixture for the discourse, the condition of which depends on the quality of the messages that create it. These, in turn, combined with belief systems or

[17] Center for Countering Digital Hate, *The Toxic Ten*, https://counterhate.com/wp-content/uploads/2021/11/211101-Toxic-Ten-Report-FINAL-V2.5.pdf (accessed on: 30.08.2024).
[18] Demagog, *Top 10 aktorów dezinformacji klimatycznej*, https://demagog.org.pl/analizy_i_raporty/toksyczna-dziesiatka-aktorow-klimatycznej-dezinformacji/ (accessed on: 30.08.2024).
[19] Konkret 24, *Dezinformacja w 2023 roku. Pięć nowych trendów*, https://konkret24.tvn24.pl/polityka/dezinformacja-w-2023-roku-piec-nowych-trendow-st7653041 (accessed on: 31.08.2024).

psychological heuristics, contribute to the even more efficient spread of disinformation. To curb climate disinformation, an interdisciplinary approach is needed, encompassing education, technology, regulation, and psychology. No single approach addresses all aspects of disinformation, so cooperation between communities and institutions is needed to solve this problem. We also need research and analysis of the phenomenon of climate disinformation, especially in the area of social media, because they are increasingly used for disinformation campaigns, have a significant social impact that is greater than in the case of longer written texts, and because they are quickly shared with new recipients[20]. Regardless of systemic actions, media literacy skills should also be supported. Particular attention should be paid to developing healthy scepticism and critical thinking skills, which can become guardians of information quality in times of increased information quantity. Awareness of conspiracy theories and their social impact should also encourage more frequent verification of sources, checking the authors of information and their competence to transmit it. These are basic things, but in the face of the increasing number of messages that distort reality, they seem to be essential for every user of the infosphere.

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