**Define, explain and identify: Introduction to “fake news” and 5g technology**

**MODULE DESCRIPTION AND GUIDELINES FOR THE INSTRUCTOR**

The module starts with an interactive introduction to the topic of fake news followed by 4 chapters on the following content:

1.Definitions: Fake News, Misinformation, Disinformation, Infodemic

2.Fake News and Technology

3.How it all started: 5g technology and Covid-19

4.ERUM sub-report: Does 5g technology pose any health risks?

Lastly there will be the possibility to reflect and summarise the outcome and time for concluding remarks.

Below each chapter will be explained briefly:

***Introduction***

**Activity: Brainstorming**

The topic can be introduced through a general brainstorming session about “fake news” (M01/S01 slide 4). This open collection of instinctive thoughts enables an open start into the complex topic. If necessary, the brainstorming can be accompanied by asking the following questions to give some ideas:

* What comes to your mind when you hear “fake news”?
* What topics of “fake news” do you know?
* Where do you hear or read “fake news”?
* Who is the target?

The activity will be followed by a presentation of example topics on fake news. The previously discussed questions should be identified and explained clearly through the example topics. For future use of this module the topics can be adapted easily in order to be relevant to the location and date of the presenter and the students. (M01/S01 slides 5-7)

**Activity: Discussion/Examples**

To support the discussion of the brainstorming exercise, three latest examples of “fake news” will be briefly presented, encouraging discussion on the topics (M01/S01 slide 8). The topics should be explained in their context answering questions such as:

* Where was the topic published?
* What was the story behind the “fake news”?
* Who was the target?
* What was the expected outcome of the spread of the “fake news”? What were they trying to achieve?

The previously discussed questions should be identified and explained clearly through the example topics. For future use of this module the topics can be adapted easily in order to be relevant to the location and date of the presenter and the students.

Students will be introduced to the theme of the module mainly through guided discussion by the lecturer. The suggested questions above could be implemented into the discussion by the lecturer to guide the conversation when it is needed. The introduction to the general term of “fake news” leads to the next chapter where it will be analysed in depth.

***1.Definitions: Fake News, Misinformation, Disinformation, Infodemic***

The first chapter starts with discussing the different terminologies of the topic: fake news, misinformation, disinformation, infodemic, etc.

Fake News: Fake news is false or misleading information presented as news. It often has the aim of damaging the reputation of a person or entity, or making money through advertising revenue. However, the term does not have a fixed definition, and has been applied more broadly to include any type of false information, including unintentional and unconscious mechanisms, and also by high-profile individuals to apply to any news unfavourable to his/her personal perspectives (M01/S01 slide 9).

When looking at what constitutes “fake news” and how it gets shared on [social media](https://mailchimp.com/marketing-glossary/social-media-marketing/), there are two kinds of false information to be aware of: misinformation and disinformation. Researchers at Indiana University found these [two types of information often go viral](https://pdfs.semanticscholar.org/20b8/62a225ea53a1ec410de861bc3bb97b62e2a8.pdf) because “information overload and users' finite attention span limit the capacity of social media to discriminate information on the basis of quality.”

Because social media is a public platform, anyone - including news outlets - can post anything without being accountable for fact-checking. It’s left to users to distinguish misinformation vs. disinformation in their feeds.

Misinformation: What differentiates misinformation from disinformation is the intent of the person or outlet sharing it. In the previously cited study from Indiana University, misinformation is classified as “false or misleading content including hoaxes, conspiracy theories, fabricated reports, click-bait headlines, and even satire.” Misinformation is not deliberately intended to deceive. Instead, it aims to shape or change public opinion on a given topic (M01/S01 slide 10).

Disinformation: Disinformation can be spread using many of the same tactics as misinformation—hoaxes, click-bait, fabricated reports. Disinformation is created to deceive. Chadwick and Vaccari’s study found that 24.8% of their respondents shared a news story they either thought was made up when they saw it or knew was exaggerated (M01/S01 slide 11).

There are a variety of reasons that individuals’ social media accounts or even business accounts might spread disinformation. It could be to increase their social media marketing effectiveness, boost their online traffic, [build more followers](https://mailchimp.com/social-media/) for their page or business, incite an emotional response, or create a distraction.

Disinformation can be dangerous on social media because, as previously mentioned, the sheer amount of information there and the length of readers’ attention spans can allow it to go unchecked.

Types of Misinformation and Disinformation: A second layer of definitions regarding misinformation and disinformation will allow a deeper understanding of the terms (M01/S01 slide 12). It’s important to distinguish between the different levels of harm these fake news could cause based on the typology and the intention. Students will be enable to understand the spectrum of the types of the general term of “fake news” and understand that term is very generalised. Therefore they will be more cautious when they are using/hearing or reading the term, and in order to avoid any miscommunication, they will be able to use a specific term for each instance.

False connection: When headlines, visuals or captions don’t support the content.

False context: When genuine content is shared with false contextual information.

Manipulated content: When genuine information or imagery is manipulated to deceive.

Satire or Parody: No intention to cause harm but has potential to fool.

Misleading content: Misleading use of information to frame an issue or individual

Imposter content: When genuine sources are impersonated

Fabricated content: Content that is 100% false, designed to deceive and do harm.

Propaganda: When content is used to manage attitudes, values and knowledge.

Sponsored content: Advertising or PR disguised as editorial content.

Error: When established news organisations make mistakes while reporting.

Infodemic: An infodemic is too much information including false or misleading information in digital and physical environments during a disease outbreak. It causes confusion and risk-taking behaviours that can harm health. It also leads to mistrust in health authorities and undermines the public health response. An infodemic can intensify or lengthen outbreaks when people are unsure about what they need to do to protect their health and the health of people around them. With growing digitization – an expansion of social media and internet use – information can spread more rapidly. This can help to more quickly fill information voids but can also amplify harmful messages.

Infodemic management is the systematic use of risk- and evidence-based analysis and approaches to manage the infodemic and reduce its impact on health behaviours during health emergencies (M01/S01 slide 13).

The different definitions should give students an idea of the general concepts the module is addressing. Students should have the possibility to explore and develop a deeper understanding of the typical features and functions of these definitions. The next part aims to explore and decode the definition of fake news in order to enable a deeper understanding of the topic.

**Activity: What, Where, Who, Why, How, When?**

This activity aims to explore the definitions further by answering certain questions. The questions can either be answered in plenum, and the answers collected on a white board or as a group activity: Therefore students should form a group for each question and then rotate between the groups/questions (“World cafe” method)(M01/S01 slide 14-25). The activity will begin with the first set of questions outlined below:

* What are the topics of fake news that you’ve heard/read? What are fake news? What distinguishes them from accurate real news?
* Where did you hear/read about them? Where did you came across fake news? Where are you more likely to hear/read fake news?
* Who is responsible for the fake news? Who is spreading fake news? Who believes in them?

Adding up the information and answers provided by the students with scientific data and explanations. The aim is to implement critical thinking to the discussion, by persisting to ask questions and challenging the answers. For example, Just because most fake news are believed by people in a difficult life situation doesn’t mean that everyone going through major challenges will believe fake news; or that people who are not in a difficult life situation are not likely to believe fake news.

The next step is to go deeper thematically with the following questions - they will be addressed by the lecturer with the knowledge, explanations and sources provided in the slides.

* Why do people believe fake news? Why there are fake news? What is the purpose of fake news?
* How are fake news spread? How does fake news work? What are the main characteristics?
* When does fake news gain more publicity? When was their origin? (Leading us to the next chapter..from past to the present)

By the end of this chapter, students will be able to understand the themes around fake news which will be the basis for the next chapters. The next chapter will be an introduction based on the theme of technology and fake news which is the general topic of the modules.

***2.Fake News and Technology: From the past to the present***

As a follow-up to the questions “When does fake news gain more publicity?” and “When was their origin?”, the following chapter will explore the roots of fake news in the context of technology through historical examples leading to the modern era of fake news. The central aim is to obtain a deeper knowledge and critical understanding of the impact of historical events of fake news and how they shaped the path for modern fake news.

Technology has given us everything from smart TVs that can hear you talking to self-driving cars, but before we became the digitally-driven society we are today, fear of new technology commonly served as one of the greatest threats to innovation. What we see as dated and relatively harmless inventions of the past were once the new technology that people freaked out about. Without an efficient way to educate the masses about the latest, hottest new inventions of their era, paranoia and confusion quickly took the place of logic and curiosity for many consumers. While many of these inventions are now seen as revolutionary and their modern counterparts are a part of our daily lives, there was once a time when these gadgets were some of the most frightening topics of discussion.

*“Innovation and Its Enemies”* shows that resistance to new technologies is heightened when the public perceives that the benefits of new technologies will only accrue to a small section of society, while the risks are likely to be widespread. This is why technologies promoted by large corporations often face stiff opposition from the public.

Similarly, new technologies face great opposition when the public perceives that the risks are likely to be felt in the short run and the benefits will only accrue in the long run. So telling a sceptical public that new technologies will benefit future generations does not protect us from the wrath of current ones.

The aim is to educate students about the link between technology and fake news by presenting and discussing historical examples where people challenged new technologies. This analysis will prove a pattern and unveil the timeless issue of people resisting evolution in the context of technology. The historical examples will outline the common points where contemporary fake news about technology are based on (M01/S02 slide 4).

Example 1: Trains (1825)

“Some people believed the body would simply melt, while others insisted limbs would be torn from riders' bodies. Others warned women’s [uteruses would fly out](http://mentalfloss.com/article/67806/early-trains-were-thought-make-womens-uteruses-fly-out) if they reached speeds of 50 miles per hour” (M01/S02 slide 5).

Example 2: Telephone (1800s)

The telephone introduced society to a slippery slope where we would soon be

“nothing but transparent heaps of jelly to each other.” Other attacks on the telephone insisted that it would make society lazy and anti-social and some even claimed the new technology would be used to communicate with the dead (M01/S02 slide 6).

Example 3: Telegraph (1800s)

When the telegraph was first introduced, critics insisted the new technology would ruin the poetry of the English language. The widespread belief was that by encouraging people to communicate in short, incomplete sentences, the telegraph would eventually train people to always speak in sporadic, choppy thoughts (M01/S02 slide 7).

Example 4: Radio (1940)

“Marconi asked himself if he had “done the world good” or just “added a menace?” Marconi explained that he only intended for his invention to improve communication between ships at sea. Even he never saw the true potential the radio introduced in terms of broadcasting content across an entire region” (M01/S02 slide 8)

Example 5: Television (1927)

Everything people feared about the radio was amplified with the introduction of the television in 1927. There was a fear that radio would turn people away from reading or having intimate conversations with one another; the television received that very same critique (M01/S02 slide 9).

Example 6: Computer (1990s)

A [1996 book titled *Women and Computers*](https://books.google.com/books?id=XKD8oj4x26QC&pg=PA20&lpg=PA20&dq=computerphobia+women+and+computers&source=bl&ots=KTbgiOjvSu&sig=mADKJ20UHsMQldZH8_Y9CtsyFM4&hl=en&sa=X&ved=0ahUKEwjdh9zqzbrPAhXJbiYKHRxlALkQ6AEIJjAB#v=onepage&q=computerphobia%20women%20and%20computers&f=false) explains the variety of phobias that

surrounded the computer. According to the text, “computerphobia” included everything from the “fear of physically touching the computer or of damaging what’s inside it” to “a reluctance to read or talk about computers.” The book also discusses the crippling fear of believing computers could replace people or enslave society as a whole (M01/S02 slide 10).

Example 7: Virtual Reality (1992)

Virtual reality has only become available on a widespread consumer level of late, but the fear of this technology extends back more than two decades. “If you are in a virtual world and you have a model of your office and you pick up a virtual shotgun and blow your boss away because it might be amusing, then does that blur the line between activities you do in fantasy and the activities you do in real life,” questioned author [Howard Rheingold in 1992](http://www.cbsnews.com/news/the-threat-virtual-reality-posed-in-1992/) (M01/S02 slide 11).

Example 8: Tech Wearables (2015)

Wearable technology is constantly being promoted as the future, but before the first smart watch even hit the shelves there was fear that wearable tech would have a negative impact on our health. The *New York Times* led the charge in criticizing new technology, publishing an article that seemed to suggest [smart watches could cause health issues](http://www.nytimes.com/2015/03/19/style/could-wearable-computers-be-as-harmful-as-cigarettes.html?_r=0) like cancer (M01/S02 slide 12).

Example 9: 5G Technology (2020)

Some groups have even developed [conspiracy theories linking 5G to the COVID-19 pandemic](https://www.businessinsider.com/coronavirus-conspiracy-5g-masts-fire-2020-4). These conspiracy theories argue, for example, that the spread of the virus from the epicentre of the pandemic in Wuhan, China, is linked to the large number of 5G towers in the city. In reality, a 5G network is not even fully deployed there. Other theories falsely claim that the waves emitted by the 5G infrastructure would weaken our immune system (M01/S02 slide 13).

The genre of conspiracy theories linked to wireless technology has been around for decades, and the debate over whether things like cellphones lead to [brain cancer](https://www.mayoclinic.org/healthy-lifestyle/adult-health/expert-answers/cell-phones-and-cancer/faq-20057798) or [mind control](https://www.scientificamerican.com/article/mind-control-by-cell/) has gained newfound relevance with the rollout of 5G technology. Some theories postulate that 5G, like earlier generations of cellular technology, also [causes cancer](https://www.theguardian.com/environment/2017/may/22/california-conspiracy-theorist-farmers-chemtrails) or, somehow, [kills birds](https://www.snopes.com/fact-check/5g-cellular-test-birds/). Others are more extreme, suggesting that the technology can cause “[electromagnetic sensitivity,](https://www.theguardian.com/technology/2019/jul/26/how-baseless-fears-over-5g-rollout-created-a-health-scare)” bringing about headaches and harming the immune system.

Last year, the New York Times [traced the present 5G anxiety to a Florida physicist named Bill Curry](https://www.nytimes.com/2019/07/16/science/5g-cellphones-wireless-cancer.html), who published incorrect research showing a correlation between rising frequency of radio waves and tissue damage in the brain. Curry failed to account for the fact that human brains are shielded from such radiation by their skin and skulls, but a chart he made about the theory has become canon in the world of cellular technology conspiracy theories. The [Russian television network RT](https://www.wsj.com/articles/russia-and-the-5g-cancer-scare-11557875333) has pointed to such ideas to push theories about the dangers of 5G technology, as has Infowars founder Alex Jones. Infowars even sells a “5G Kills” T-shirt. (M01/S02 slide 14)

**Activity: Example topic: “5g technology”**

A contemporary example (e.g., fake news about the 5g technology and Covid-19 pandemic) should be the starting point for a research task in small groups (M01/S02 slide 15). In this case students could research beliefs in the past that link to previous wireless technologies (e.g. 1g, 2g, 3g, 4g and their link to illnesses).

The idea is to follow the question of: How does the “contemporary fake news around 5g technology” relate to the old historical roots of the topic?

Students should learn to connect the knowledge about historical manifestations with the information about what fake news are, so that they can apply this connection to other situations and can also identify newer forms of expression of myths that have been emerging and spreading.

This activity will lead to the next chapter which will analyse how the fake news about 5G technology and the Covid-19 pandemic started, the role of social media in spreading fake news and the aftermath of this spread.

***3.How it all started: 5G technology and Covid-19***

This chapter presents the way fake news about the link between 5g technology and Covid-19 initiated, how a single post on social media can cause an avalanche of misinformation, and the significant real-life impact on people and infrastructure. A research study by the Queensland University about Facebook and theories about 5g will be presented. The aim is to showcase to the student a real-life recent example in detail in order to highlight the importance of our actions on social media (M01/S03 slide 4).

The Queensland University of Technology team tracked Facebook posts from 1 January to 12 April 2020, and were able to illustrate the “gradual spread of rumours from the fringes to more popular spaces in the Facebook platform” over five distinct phases (M01/S03 slides 5-12).

The data showed not only the spread of 5G misinformation during the pandemic, but also the way it dovetailed with other pre-existing conspiracy theories such as vaccine misinformation. It also highlighted the role of celebrities and some celebrity and sports media in helping those theories reach the mainstream.

The graphs show how Facebook posts containing 5G-coronavirus conspiracy content went from reaching only a few thousand people to pages, profiles and groups with hundreds of millions of followers – potentially contributing to a spate of attacks on phone towers in Australia and across the globe.

After months of conspiracy content linking Covid-19 to the rollout of 5G, the online shifted to the real world (M01/S03 slide 13-14). A wave of vandalism and destruction of 5G infrastructure began across the globe. By 30 April, ZDNetcounted 61 [“suspected arson attacks”](https://www.zdnet.com/article/amid-5g-mast-arson-and-coronavirus-conspiracy-theories-social-media-walks-a-fine-line/) in the UK alone, with further attacks in the Netherlands, Belgium, Italy, Cyprus and Sweden. The vandalism extended to Australia. On 9 May, there was [a fire at a phone tower](https://www.theguardian.com/technology/2020/may/27/5g-fires-australian-mobile-companies-work-with-police-to-prevent-arson-attacks) in Morphett Vale, South Australia. Investigators believe it was [deliberately lit](https://indaily.com.au/news/2020/07/20/phone-towers-targeted-amid-virus-5g-conspiracy-theory/). Then, in the early hours of 22 May, a fire broke out at a power and mobile phone tower in Cranbourne West in Melbourne’s outer suburbs. It is still under investigation by Victorian counter-terrorism police.

The attacks did not happen in a vacuum. After months of increasingly widespread misinformation about 5G and Covid-19, by May an anti-lockdown movement had begun to emerge in Melbourne. On 10 May, 10 people were arrested and one police officer taken to hospital after demonstrators gathered in the city’s CBD for a protest advertised as being against “self-isolating, social distancing, tracking apps [and] 5G being installed”.

By the end of this chapter students will understand the important role of social media on the spread of fake news and the importance of personal responsibility everyone holds on sharing news online.

**Activity: Discussion: Share your experience**

This activity intends to reflect on the past two chapters and create an opportunity for an open discussion (M01/S03 slide 15). Example questions for discussion are:

* Did you ever share information on social media that proved to be fake news?
* How often do you see information on social media that is fake news?
* Who shares this information?
* What are the topics of these posts?

***4.ERUM sub-report: Does 5g technology pose any health risks?***

For the following chapter a sub-report based on the 5g technology will be presented. The sub-report will provide the students with the current state on the topic and will outline the aspects that led to misrepresentation of research results in the mainstream media.

With the social opinion divided into supporters and opponents of 5G technology, the topic has also been intensively represented in the mainstream media, especially during the last year (Decker, 2019; Loughran, 2019; Soler & Busilo, 2019). However, discussion around the topic often lacks scientific argumentation, while evidence-based statements are also replaced with “fake news” contributing to the misinformation of the public audience.

The present sub-report, conducted by the Cyprus University of Technology, provides the current state on the topic and highlights concrete examples of how research results might have been misrepresented in mainstream media, covering the time span of 2019 (January 2019 to December 2019). As part of this sub-report, a total of 300 articles on the topic has been initially retrieved from online newspapers from Greece and Cyprus (e.g. *Simerini*, *Kathimerini*, *Ta Nea*, *Ethnos*, *Phileleftheros*, *Proto thema*, *To pontiki*, *To vima*, *Reporter*, *SigmaLive*) covering the time span of 2019 (January to December 2019). **

A screening of these articles indicated that the vast majority of them focused on the political and financial aspects of the topic providing updates: (a) about the efforts of Cyprus, Greece and other countries in Europe and across the world (e.g. Germany, UK, China, USA) to enact and assess pilot 5G networks at various scales and/or (b) about the financial and political competition around these efforts due to the economic, military and geopolitical consequences. A significant portion of these articles presented also the efforts of several telecommunication providers and technology companies towards the development and testing of pilot 5G technologies and networks as well as the evaluation of its affordances at local and international level (e.g. *Huawei*, *Panasonic*, *MTN*, *Cyta*, *Cosmote*, *Vodafone*, *Telecom*, *Wind*).

Only a minority of the retrieved articles focused on informing the readers about the nature of 5G technology, seeking to communicate (a) what 5G technology is, (b) how 5G technology works, and/or (c) what the perceived consequences of this technological development are (especially for human health). A total of 25 articles were selected and another five articles with the same scope were also selected from international mainstream media (i.e. *The Guardian*, *New York Times*). These articles (n=30) composed the sample of this sub-report and were analysed applying content analysis (more information about the content analysis method can be found in the general methodological report) (M01/S04 slide 4).

Focusing on the general characteristics of the analysed articles, we have identified 8 problematic aspects:

Authorship of the articles

The first one is related to the authorship of the articles. In particular, as already mentioned, about half of the articles were not signed by an author, while most of those which were signed did not provide further details in relation to the author’s status and background. In turn, this has a negative impact on the credibility and trustworthiness of the articles. Go, Jung and Mu (2014) have supported that the author’s name, number of comments in, and group identity of online news articles have been shown to influence perceived credibility by the audience. Likewise, according to Sitaula et al. (2019, p. 5) “If a news article does not provide any information on its authors, its credibility can be questioned”. However, while this stands true in the case of newspapers it is common that articles are not signed. This can mean that the article represents the point of view of the editorial staff that just wants to launch a public debate around a topic. The same researchers have also observed that the number of authors of a news article has some correlation to its credibility. According to their findings, if an article has more than one author, it is more likely to be credible. Based on this finding, it is recommended to online news sites that they include sources, especially the author's name, status and occupation (M01/S04 slide 5).

Length of the articles

The second problematic aspect relates to the length of the analysed articles. Taking into account the desk-based research presented in this report, 5G networks not only represent a complex socio-scientific controversial issue, they are also based on a complicated technologicalinfrastructure whose functionality could hardly be conveyed and communicated in short articles of 300 to 500 words. Given that peer-reviewed articles published in scientific journals are usually between 5000 to 7500 words, one could easily understand that there is an outstanding difference between the two formats. Of course, we do not imply that articles published in mass media should be as extensive as scientific journal articles but at least they should be more comprehensive (e.g. 1000 to 1500 words) in order to adequately cover the controversial topic addressed, which in our case is 5G technology. Investigating whether the length of online news was an indicator of their credibility, Sitaula et al. (2019) confirmed that articles that misinformed were shorter in terms of number of words, compared to news items including correct information (M01/S04 slide 6).

Use of speech acts/speaking actors

When analysing the selected articles, we identified three problematic aspects related to (a) the use of speech acts / speaking actors, (b) the inclusion and citation of other resources, and (c) the content of the articles.

First, we have found that the involved stakeholders were given a voice randomly as in most of the articles analysed there was lack of speech acts, namely of speech that was quoted directly. We argue that articles presenting controversial topics should allow more space for the inclusion of speech acts for various reasons. Speech acts are important indicators for the establishment of (simulated and) direct interaction between the readers and the actors i.e. the stakeholders (Searle, 1976). They provide a sense of directness (see the immediacy-distance-continuum proposed by Koch and Oesterreicher, 2012) and at the same time, they help journalists to keep a more objective stance by separating their position from what is directly supported by the involved stakeholders (M01/S04 slide 7).

Inclusion and citation of other resources

Second, we have found that less than half of the articles (11 articles – 36,7 %) have made reference to at least one resource, while only four articles (13,3 %) have made reference to multiple resources in order to support their claims. This finding is aligned with the conclusion of Evers, Jempson and Powell (2011) who stated that despite the growth of online news, a lack of references and links to sources in reports remains. However, as stated by Sitaula et al. (2019, p. 12), “a greater occurrence of numbers or digits may indicate that a news article is well-researched, containing verifiable data; similarly, the occurrence of hyperlinks and URLs may indicate citations suggesting that an article is supported by external sources.” On May 19th, 2011, *The Guardian* journalist Ben Goldacre asked “Why don’t journalists link to primary sources?“ He claimed that linking to sources, mainly original press releases or academic studies in science reporting, allows readers to check the information, to find out more and to show transparency (Goldacre, 2011). Based on our findings we fully agree to his recommendations (M01/S04 slide 8).

Content of the articles

Lastly, focusing on the content of the analysed articles, what we found really alarming was that while in the selected articles there was an evident overemphasis of the potential impact of 5G, most of the articles neglected the definitional and operational aspects (i.e. what 5G is and how it works). However, according to Theocharides (2019) both aspects are crucial for understanding this controversial topic and the way it is misrepresented. As Theocharides highlights, citizens need to be informed that the 5G network not only requires the installation of more antennas at closer distances. Instead, he argues that it is more important for citizens to be informed that this system with denser antennas will result in less powerfulelectromagnetic emissions, given that they will be connected to less power due to the shorter distance between them, and will operate at much higher frequencies, which decreases their penetration, f.e. through walls and windows. Overall, while the history of technology development suggests that trying to communicate physics-related details underpinning new technology may not always be the best approach to public education, it may be still adequate to explain the ways through which potential risks are addressed and how safety is ensured (Soler & Busilo, 2019). Grounded on this knowledge basis, citizens will be educated on the topic and thus they will be more able to identify misinformation surrounding it (M01/S04 slide 9).

Visualisation

The visual features of online news are often neglected. However, several researchers have put much emphasis on the power of visuals in online news, not only in complementing and augmenting the text but also in influencing the trustworthiness of the news or even contributing to misinformation on the topic presented (Kiousis, 2006; Jin et al., 2017; Lago, Phan, Boato, 2019).

As part of our analysis, we have identified several problematic issues in relation to the use of the visuals deployed in the selected articles around 5G technology. First of all, in terms of content the vast majority of articles included photos and images, with only two articles (6,7 %) containing charts and figures. According to Sitaula et al. (2019), this could be perceived as problematic as the use of visuals with numbers and digits provides the article with a more scientific perspective. Likewise, according to Young (2016), visuals such as graphs and charts help readers to better understand the information presented as well as to build trust around the reliability of the news presented. In addition, what we have also found problematic was the loose coupling effect between the text and the visuals. In most of the analysed articles there was a lack of consonance between the tonality of the visuals and the textual information presented, as well as lack of captions contributing to the relatedness of the visuals to the text. Besides, the visuals were also placed outside of the text (before the text, right under the headlines). However, this misalignment between the text and the visuals can contribute to a decrease in trustworthiness of the online news (Lago et al., 2019). In particular, according to Young (2016), when visuals lack context, this can make people more sceptical about the information presented.

Overall, considering our findings in relation to the visualisation of the selected articles it seems of paramount importance for journalists to take into account the instrumental role that visuals can play and therefore to pay close attention to the proper and productive use of visuals in online news (M01/S04 slide 10).

Controversy

One of the core functions of the news media is to critically investigate and present information about social, political, economic, and ideological issues. Some of these issues are controversial as they focus on issues which divide citizens’ minds by provoking arguments in which people express strong opposing views and opinions (Clarke, 1990; Martin, 2014). However, while prior research has investigated the presentation of and reporting on controversial topics in traditional media outlets focusing on the routines that print journalists undertake, little is yet known about the practices of online media sources when reporting controversial issues due to the lack of relevant studies (Anderson, Brossard, Scheufele, 2012; Garimella et al., 2017).

As part of our analysis we have found that the topic of 5G which was the focus of this report, was only presented as a controversial one in half of the analysed articles (15 articles – 50 %). Only 10 articles (66,7 %) presented multiple points of views on the topic (namely, positions from different stakeholders). At the same time, despite recommendations for journalists to take special precaution when they report on controversial issues (Mejova et al., 2014) we have found that in only six articles (40 %) presenting 5G technology as a controversial topic, the authors took an explicit position either against or in favour of this technology. According to the literature, it has been argued that journalists can become susceptible to the ideologies, attitudes and pressures of their organisation (Scheufele, 1999) as well as to unstated rules and norms prevalent in their organisation (Entman, 2007). Consequently, this can influence the language used to discuss controversial issues within a particular news source. Based on our findings, it seems that when presenting a controversial issue, journalists should be less biased, more objective and use language carefully in order to present all the aspects of the controversy precisely (M01/S04 slide 11).

Use of evidence-based research/science

As previously discussed, our desk-based research has indicated that there is no incontrovertible scientific evidence supporting that 5G poses risks for public health. While we second the need for further investigations, we also point out that the analysis of the selected articles has indicated numerous misstatements, incomplete information and omissions resulting in a factual fabrication of fake news on the hazards of 5G for human health. According to Chiaraviglio et al. (2019, p. 1), these fake news “may severely distort the perception of this technology by the population at large”.

Our finding that almost half of the articles (14 articles – 46,7 %) contained misinformation and misstatements on the topic is alarming. Indicatively, most of the misstatements pointed out that there is conclusive scientific proof that 5G networks are responsible for the increase of cancer, fertility issues and DNA destruction especially for young children or that there is lack of research on 5G radiation, indicating that there is no risk on human health.

However, which reasons can be identified to explain why 5G technology, as a topic, is misrepresented? One of the main causes is that in September 2018, 180 scientists published an open letter against 5G – “5G Appeal”. The letter contained general warnings, focusing on potential health and environmental risks of 5G technology and called for a memorandum for worldwide development of 5G networks. However, according to Soler and Busilo (2019, p. 212), “despite the number of signatures suggesting scientific character of the letter it contains information, which are not actual, not completely true nor accurate. The language is emotional and fear relating not scientific one and proof relating.” This 5G appeal movement has spread around misinformation that several journalists have often published in online news and mass media articles, without first proceeding with fact-checking processes. In this context, aligned with Soler and Busilo (2019, p. 210) we agree that “in order to counteract the disinformation better education of the society is necessary. It should focus on critical valuation of information and their sources and on identification of disinformation and its mechanisms” (M01/S04 slide 12).

In particular, what is needed is to (M01/S04 slide 13):

* Train journalists via strengthening their competences in identifying disinformation and verifying information.
* Support and promote scientific journalism as the practice of including primary sources along with journalistic stories and scrutinising questionable statistics or overinflated claims, while also investigating scientific misconduct, conflicts of interest, and ethical breaches.
* Create bridges between journalists, scientists and the scientific community at large as proper presentation of scientific and technological controversies requires expert knowledge.
* Make results of technology assessment accessible to the public, while also ensuring that these results will be brought across in a plain and understandable language.
* Empower citizens via strengthening their skills to evaluate information and its sources, especially on the internet.
* Provide all stakeholders (scientists/researchers/academics, industry representatives, policymakers, citizens) with equal space for stating their arguments, while always adhering to scientific evidence and documentation.
* Communicate if further studies on technology are necessary, on which aspects and what may be practical implications for the use of technology.

***Summary***

Open time to reflect and summarise what has been learned. Some inspiration for possible questions for reflection (M01/S04 slide 14):

* What are your thoughts about fake news and technology?
* Do you think this is an emerging problem? Do you believe that people should be more open to the idea of the evolution of technology by now?
* In your opinion, why do you think people resist change?