ΞRUM

Enhancing Research
Understanding through Media

Communicating Science

EVIDENCE-BASED COMMUNICATION
GUIDELINES FOR EARLY STAGE
RESEARCHERS AND JOURNALISTS

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Introduction

We are living in times of deep uncertainties and are facing an unprecedented convergence of threats and multiple crises (public health, economic, political, environmental) due to the coronavirus outbreak. The pandemic has triggered a massive infodemic and accelerated the dissemination of misinformation, fake news, half-truths, conspiracy theories, rumours, hoaxes and lies. Different kinds of information disorders have been around for decades, while the COVID-19 public health emergency has certainly acted as a catalyst for the proliferation of disinformation in a digital communication infrastructure. This is a serious threat to democracy, social cohesion, and stability, as it destroys the very essence of trust and informed decision-making (Parvin, 2018). To deal with these new realities and contexts, reliable and accurate information and access to trustworthy sources are critical in the controversial news environment.

To counteract mis/disinformation, science journalism based on an evidence-based paradigm could be a model for the future journalism and news media industries. Providing evidence rather than opinions and reporting facts and research transparently may improve the quality and credibility of journalism, reconnect it with the public, and build trust in news media. While there is a significant amount of scientific literature focusing on different aspects of science communication, the new and unprecedented challenges coming from the changing landscapes of science, media, and technology are making it necessary to reconsider major principles and practices of science news reporting. In this guide, we question and discuss traditional science communication challenges, including verification of scientific research, balanced reporting, and the scientist-journalist-audience relationship; as well as newly and rapidly arising issues, like disinformation, information overload, scientific uncertainties, or technological innovations.

This document is part of the Erasmus+ funded project ERUM (Enhancing Research Understanding through Media), which intends to improve students' media literacy, evidence-based communication skills, and resilience towards mis/disinformation. The guidelines are based on research on controversial issues in the news media by the ERUM project team, a survey conducted amongst journalists and media professionals, as well as a literature review. The survey data include information about journalists' current and former work practices, ethical standards in reporting, fact-checking procedures, disinformation, and COVID-19 challenges to journalism and media. Detailed results of the survey have been compiled in a separate report, which is available for download on the ERUM project website (https://projects.uni-foundation.eu/erum/).

We hope that the guidelines will be of use to students, young journalists, and researchers in the development of their science communication competencies and skills, and contribute to a better understanding of the role of media in communicating science and research to non-scientific audiences.

1. Spotting a science story worth covering

Discovering a good science story is the first important step towards successful science news reporting. However, it can be rather tricky and require more patience and investigation compared to other journalistic forms. While there are quite a large number of good sources to turn to for ideas and inspiration, including press releases from reliable institutions, blogs by world-leading scientists, podcasts, webinars, or social media platforms, amongst others, the essential point for a science journalist in the era of information overload is how to identify a truly good and important story to cover.

Two major questions have to be tackled at this stage:

⇨   How do I find the story (or, to be more precise, how does the story find me)?

⇨   How do I know it is worth covering?

"Social media and science blogs increasingly are being used to spread both accurate information and misinformation from science" (National Academies of Sciences, Engineering, and Medicine, 2017, p. 96). More and more journalists (including those covering science issues) are using social media as a primary source of information (Harper, 2010; Mansour, 2018 von Nordheim et al., 2018; see also *ERUM Report on Survey Results*, Figure 12 and Q17 in Appendix 2). Indeed, social media can help to follow the news stream and save time, especially if you customise your social media channels to meet your expectations. The question is, where do you find your sources? Whom do you follow online? Surveys and other research studies confirm that many scientists and scientific institutions can be found online. For instance, *ResearchGate*, *LinkedIn*, *Facebook*, *Twitter* and *Academia.edu* are the top five websites visited by scientists and engineers (van Noorden, 2014). For more recommendations, see Table 1.

REPUTABLE INSTITUTIONS AND THEIR INITIATIVES, PROJECTS

Customise your social media accounts so that you follow international organizations, universities, publishers (global and local) – those are reliable and often primary sources of important scientific information. Make sure you are on their list as well, so you receive their press releases and other information.

Here are some suggestions:
World Health Organization | https://www.who.int/
The Intergovernmental Panel for Climate Change | https://www.ipcc.ch/
The World Economic Forum | https://www.weforum.org
EurekaAlert! | www.eurekaalert.org (website managed by American Association for the Advisement of Science)
Harvard News | https://news.harvard.edu/gazette/
Knight Science Journalism @MIT| https://ksj.mit.edu/resource/data-journalism-tools/databases/

PRESTIGIOUS JOURNALS

Customise your social media accounts so you can see all of the news published by the prestigious journals in the fields of your interest. To learn about the quality of the journal, you can look for a journal's impact factor or check Google Scholar journal rankings. The impact factor of the journal indicates the average number of times papers published in a certain journal are cited during a period of one year. Most journals are freely accessible through a university's subscriptions.

Some of the most prestigious journals:
Nature | http://press.nature.com
Science | https://www.sciencemag.org/
New England Journal of Medicine | https://www.nejm.org/
The Lancet | https://www.thelancet.com/

Science Communication | https://journals.sagepub.com/home/scx
OPEN-ACCESS AND/OR SUBSCRIPTION BASED DATABASES
Look for topics to cover in the databases. **For example:** World Bank Open Data | https://data.worldbank.org/ WHO The Global Health Observatory | https://www.who.int/data/gho/ Google Public Data Explorer | https://www.google.com/publicdata/directory Registry of Open Data on AWS (RODA) | https://registry.opendata.aws/ European Union Open Data Portal | https://data.europa.eu/euodp/en/home FiveThirtyEight | https://data.fivethirtyeight.com/ Data.gov | https://www.data.gov/
WORLD LEADING SCIENTISTS, EXPERTS AND OTHER INFLUENCERS IN THE FIELD
You can find and check Google Scholar, PubMed, ResearchGate, LinkedIn, or leading scientific journals for top authors and scientists. You can also check an author's h-index, which indicates both author's productivity and citation impact of his/her scientific publications. The index is based on the set of the scientist's most cited papers and the number of citations they have received in other publications. While it can be difficult to say what a good h-index is, some scholars interestingly state that *"on average, assistant professors have an h-index of 2-5, associate professors 6-10, and full professors 12-24. These are mean or median values only—the distribution of values at each rank is very wide. If you hope to win a Nobel Prize, your h-index should be at least 35 and preferably closer to 70"*. (Schreiber, 2019) Google Scholar | https://scholar.google.com/ PubMed | https://pubmed.ncbi.nlm.nih.gov/ ResearchGate | https://www.researchgate.net/ LinkedIn | https://www.linkedin.com/
WELL KNOWN AND TRUSTWORTHY RESEARCH CENTRES
Pew Research Center | https://www.pewresearch.org/ Eurobarometer | https://www.europarl.europa.eu/at-your-service/en/be-heard/eurobarometer
OTHER MEDIA OUTLETS
BBC Science Focus Magazine | https://www.sciencefocus.com/ Research Features | https://researchfeatures.com/articles/ Science Media Center | https://www.sciencemediacentre.org/ Science Writing News Roundup | https://sciencewriting.substack.com/ Scientific American | https://www.scientificamerican.com/ Forbes | https://www.forbes.com Smithsonian magazine | https://www.smithsonianmag.com/ The Economist | https://www.economist.com/ BLOG: SciComm Book Reviews Public Understanding of Science | https://medium.com/scicomm-book-reviews Science News | https://www.sciencenews.org/

Table 1. Recommended resources for journalists on science data.

Traditional sources for journalistic research are still important, but some of the new channels, including social media, web-based materials, and information gathered via search engines, are becoming more and more prominent. In the survey conducted amongst journalists, press releases and information from news agencies were mentioned as often as web-based material or information retrieved via search engines. While social media and internet-based information is easy to access, it requires extra effort in the verification process. However, it is essential to carefully and critically assess and double-check any kind of information. There is no exception for press releases: while in many

cases they might be more trustworthy (because they have been released by a primary source), they are also prone to exaggeration and often use some kind of spin to "sell the story" (Yavchitz et al., 2012).

There can be multiple ways to check and verify your information, including technology-based solutions or traditional channels (see table below), however, whenever possible, journalists should look for a primary source of the fact.

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EUROPEAN DIGITAL MEDIA OBSERVATORY | https://edmo.eu/
The European Digital Media Observatory (EDMO) brings together fact-checkers, media literacy experts, and academic researchers to understand and analyse disinformation in collaboration with media organisations, online platforms. and media literacy practitioners.
VERIFICATION HANDBOOK FOR DISINFORMATION AND MEDIA MANIPULATION | https://bit.ly/VerificationHandbook3_EN
A handbook published by the European Journalism Centre. The latest version of this book, released in 2020, is dedicated to providing journalists with the essential knowledge and skills on how to understand and investigate social media accounts, bots, private messaging apps, deep fakes, and other forms of disinformation and media manipulation.
VERIFICATION HANDBOOK: A DEFINITIVE GUIDE TO VERIFYING DIGITAL CONTENT FOR EMERGENCY COVERAGE | http://verificationhandbook.com/
This is a resource for journalists and aid providers on the tools, techniques, and step-by-step guidelines for how to deal with user-generated content (UGC) during emergencies.
VERIFICATION JUNKIE | https://verificationjunkie.com/
A directory of tools for verifying, fact-checking, and assessing the validity of eyewitness reports.
FACTCHECK.ORG | https://www.factcheck.org/
A project of the Annenberg Public Policy Center of the University of Pennsylvania, aiming to reduce the level of deception and confusion in U.S. politics.
FIRST DRAFT NEWS | https://firstdraftnews.org/
The mission of this project is to protect communities from harmful misinformation.
POYNTNER INSTITUTE | https://www.poynter.org/ifcn-covid-19-misinformation/ |
International Fact-Checking Network's "CoronaVirusFacts / DatosCoronaVirus Alliance Database."
POYNTNER INSTITUTE | https://www.poynter.org/ifcn/factchat/
Led by the International Fact-Checking Network (IFCN) at the Poynter Institute, FactChat was the first collaborative project to unite U.S. fact-checking organisations with two major Spanish-language news broadcasters to fight mis/disinformation during the 2020 presidential campaign.
POLITIFACT.COM | https://www.politifact.com/ | https://www.politifact.com/article/2020/mar/11/7-ways-avoid-misinformation-during-coronavirus-pan/
Politifact.com and their guide to avoid misinformation during COVID-19. PolitiFact is owned by Poynter Institute for Media Studies - a non-profit journalism school and research organization located in St. Petersburg, Florida. It is run by editors and journalists. From the very beginning, the initiative was focused on looking at specific statements made by politicians and rating them for accuracy.
WORLD HEALTH ORGANIZATION'S MYTH BUSTERS | https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/myth-busters
The WHO provides information regarding some of the most sensitive COVID-19 related issues and myths, including 5G mobile networks, use of hydroxychloroquine or chloroquine, masks, and alleged CO_2 intoxication, among others.

TEEN FACT-CHECKING NETWORK (TFCN) | https://www.poynter.org/teen-fact-checking-network/
The MediaWise Teen Fact-Checking Network (TFCN) publishes daily fact-checks for teenagers, by teenagers. The program is a verified signatory of the International Fact-Checking Network's code of principles.
RETRACTIONWATCH | https://retractionwatch.com/
A whole website built to combat irresponsible research and publications. Look up journal and researcher names to see whether any research has been retracted and find out why.
WAYBACK MACHINE APIs | https://web.archive.org/
The Internet Archive Wayback Machine is a tool to retrieve information about different domains, websites, and information in over 40 languages.
WEVERIFY| https://weverify.eu/
This is a cross-modal disinformation detection and content verification tool to expose fabricated content, through cross-modal content verification, social network analysis, micro-targeted debunking, and a blockchain-based public database of known fakes.
USE E-MAILS AND THE TELEPHONE TO FACT-CHECK
Sometimes the best and only way to check the fact – get in contact directly with the source.
OTHER TRADITIONAL FACT-CHECK RESOURCES
Libraries, subject databases, dictionaries, review articles, scholarly publications, press releases, etc.

Table 2. *Tools and resources for information verification and fact checks.*

Data of our survey indicated that scientific research was the least often used source of information among our respondents (selected by 43% of respondents) compared to other listed sources: 79% of respondents said their primary source is social media; the same number said it is personal contacts. 69% indicated press releases or press officers, followed by web-based material (67%), news agencies (65%), search engines (52%), or other media outlets (44%) (see *ERUM Report on Survey Results*, Q17 in Appendix 2), 45% of respondents reported they refer to scientific research in their stories almost daily or weekly (see *ERUM Report on Survey Results*, Figure 13 and Q18 in Appendix 2), which, indeed, does not seem too bad, however, in times of increased uncertainty and crisis we should expect journalists to stay more in touch with scientists and their findings.

When reporting news based on a research paper, the best way to check the information is to find and analyse the primary source, read it, and/or interview the scientist(s). **While you do not necessarily need to read the paper from beginning to end, it can be worth paying attention to the following aspects:**

1. *Is the study peer-reviewed?*
   Research papers published in peer-reviewed journals had to undergo a long revision – two or more independent reviewers usually read and comment before publication.

2. *What is the date of publication?*
   Are the data discussed in the publication up-to-date? Are there any other articles providing more recent data or analysis?

3. *What is the sample size?*
   Is it representative? Which groups are included/excluded? Do the data match the conclusions drawn by the author(s)?

4. *Research design and methods applied?*

Was the study well designed? Have the findings been replicated? Is there a necessity for further research to check the results and to gain widespread acceptance? Is there something about the technique that raises questions for you?

5. *Contribution to the research field.*
   How does this study compare with others that have been published before? How does it add to or contradict existing scientific views?

6. *Who conducted the study?*
   What do you know about the author(s)? Are they leading authors in the field? What are their backgrounds? If there is more than one author in the list, the order matters. The first name usually means this person was highly involved while the last one was in charge of the group.

7. *Who funded the research and are there any ideological connections?*
   Are there any possible conflicts of interest to consider?

8. *What are the limitations of the study?*
   Each study has its own strengths and also limitations, - what are they? Usually they are mentioned and clearly discussed in the article, but you might want to double check the sample size, methods, theoretical approach or other aspects of the study.

9. *Put the research in context.*
   Is it preliminary or definitive? Does the research confirm or conflict with past research? Get an opinion from other leading experts working in the field. Are the findings relevant and/or new?

Table 3. *Recommendations on scientific articles for journalists (based on Krueger, 2016; Elliott, 2019; Casasbuenas & Appiah, 2019; Russel, 2010; ScienceNews.org).*

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TIPS FOR SCHOLARS AND SCIENTISTS

When thinking about writing a popular science piece by yourself (e.g., for your social media platform or blog or professional media, etc.) or when working together with journalists, scientists are always encouraged to approach their research from a broader and wider perspective by identifying the newsworthiness of the story as well as recognizing personal biases.

First, when telling your research to lay audiences, make sure your story is **understandable and corresponds to the criteria of newsworthiness.** While for the scientist some issues and aspects can seem to be very important and understandable, the general public might be of a different opinion. Therefore, following the list of newsworthiness criteria can suggest helpful tips for your story. Newsworthiness is a set of values used by journalists and media to distinguish between stories worth covering. The list includes such categories as impact, timeliness, prominence, proximity, the bizarre, conflict, currency, and human interest, among others. Besides, it could be a good idea to consult someone outside the field (a family member or a friend) to make sure the story you are about to cover is important and understandable by others.

Second, always be **honest and tell the whole story**: while it can be tempting to show your research in a promising and optimistic light (which might also be true!), be careful about personal biases and clearly distinguish between your opinions and facts. Also, present a wider context while explaining your results.

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TIPS FOR REPORTING

(1) Always make sure you are on top of the news in the field of your interest by following world-leading sources: scientists, experts, global institutions, popular science blogs, etc. When looking for a science story to be covered, make sure you have all the necessary and most preeminent information sources close to you.

(2) *Always check and verify your information!* Although some sources are more reliable than others – all the information has to be questioned and verified. While technology-based instruments can be helpful, it is always important to find your primary source, e.g., scientific article or scientist, and to check the study in terms of sample size, methods, funding sources, or other circumstances leading to conflicts of interest and study limitations, amongst others.

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2. Telling the story: balanced and fair reporting

"Too often science-policy stories create drama by citing experts arguing from two extremes without trying to find out whether there is a scientific middle ground" (Russell, 2010). While journalists, in general, have the goal of providing balanced perspectives and include all sides in their stories (Deuze, 2005; Clarke et al., 2015; Elliott, 2019), in science journalism, balanced reporting may cause misinformation. The biggest challenge comes when there is a real disagreement in the field. At this point, journalists must dig deeper and find out the true story behind this "disagreement": Is it a result of irresponsible claims or is it an outcome of "reasonable differences in approaches to making important value judgements (which would often be helpful to report)" (Elliott, 2019)?

While **balanced reporting** and a multiple-source approach are seen by journalists as a major precondition for good reporting, in some instances, reporting scientific news aiming for journalistic balance might result in a *false balance*. For example, when a reporter puts "established scientific consensus around issues like genetically modified foods or climate change on equal footing with nonfactual claims by think tanks or interest groups for the sake of 'showing both sides'" (Scheufele and Krause, 2019, p. 7667). Importantly, balance in science news reporting requires a broader context and deep understanding for when certain points simply need to be ignored (Russell, 2010). We call it *fair reporting*, representing opposite sides while also fairly acknowledging their scale and significance in the field. To report scientific topics with fair balance, one must have a good understanding of the topic. For early stage researchers and journalists, it can be quite a challenge, especially if there are time constraints for the investigation. However, science and scientific research itself is aiming for consensus and to reduce scientific uncertainties: A peer-reviewed process means that some experts from the field already approved the paper for wider publication, in turn giving reporters more confidence to quote it, rather than quoting any other, unreviewed sources (Friedman et al., 1999; Figdor, 2017). Hence, it is most important for the science journalist to understand the process of science, the structure of scientific writing (see section 1 "*Spotting a science story worth covering*"), and to learn about the ways to recognise leading scientists and their works.

Other journalistic norms can also have different interpretations in science reporting. For instance, **personalisation** is one of the most frequently used approaches by journalists to get their audience's attention, make an impact, or even change public behaviour (Bodó, 2019). Research indicates that "personalization narratives, like showing a patient in a cancer treatment story, and narratives involving 'scientists as heroes' of disease, were associated with perceived security values as well as readers' concern for other people they feel close to" (Jarreau and Scholl, 2014). On the other hand, the journalistic "tendency to present stories in ways that involve personalization, dramatization, and novelty can also make it difficult to characterize science accurately" (Boykoff and Boykoff, 2007, p. 12). Hence, personal but verified stories can be a good option, meaning, there is bigger pressure on the journalist to verify the story using the tools and sources mentioned in the first section of these guidelines. Furthermore, when reporting personal stories, always ask yourself if you are being fair to your other primary sources. And be careful to favour accuracy and precision over personification and dramatization.

When covering a story, ***accuracy and precision*** should be the primary focus, especially when communicating statistics and risks. It is often recommended to use metaphors and comparisons in communicating science for better understanding (Kendall-Taylor et al., 2013), however, this has to be done in a precise and accurate manner. For instance, know the difference between absolute and relative risks, correlation and causation, single event probability or rare exposure (Johnson, 2016; Russell, 2010; Science Media Center, 2019). Another slippery topic is single event probability: "The chances of a single, undesirable event taking place can be easily confused with the day-to-day likelihood of things going awry" (Science Media Center, 2019). While it can be tempting for a journalist to exaggerate and overemphasise some points of the story to increase its outreach, you need to make sure that the points made reflect the truth and are accurate (Wilcox, 2003; Condit, 2004). If you are not sure how to interpret the results (and what the numbers/percentages mean), contact the author(s) or other experts and make sure to get all the answers and eliminate your doubts.

Absolute and relative risk
Absolute risk refers to a number of people experiencing the risk-related effects or conditions in relation to the whole population. *Relative risk,* meanwhile, is often used to compare risks in two groups (e.g. smokers and non-smokers). It helps to explain how one or another factor contributes to the increasing/decreasing risk: for instance, research confirms that smokers have a higher risk of developing heart disease compared to non-smokers.

Causation and correlation
Causation refers to the cases when action A causes outcome B. *Correlation*, meanwhile, indicate the relationship between A and B or more separate variables, however, it does not necessarily mean that one causes the other.

Single event probability and rare exposure
Single-event probability is a probability for a single event to happen, for instance, consider tossing a coin, we will get a single event (either head or tail) as the expected result.
Rare exposure, meanwhile, points to conditions, circumstances, or events which are rare, unusual, or uncommon and in some way might have an effect on a person or population.

Also, always avoid ***oversimplification.*** Instead, explain the research findings you address in a clear manner and educate your audience. Do not limit your story to the results, also talk about the research sample, design, limitations, etc. This way you can educate people and consequently strengthen their scientific literacy.

Scientific literacy refers to the public knowledge and understanding of science (including scientific data, concepts and processes) required to make justified and well-informed personal decisions in everyday life.

Choose the *frames* carefully and only when you have all the data and evidence collected. Many controversial scientific issues are often politically framed, and this can cause confusion and uncertainty in public. For instance, Hansen (2016) found that "media reports of climate change are politically framed, and that therefore, not everyone will agree with scientists' assessment of the cause of or appropriate response to coral bleaching". ERUM research on the media representation of controversial topics, including COVID-19, G5 technology, migration, climate change, and other environmental issues, also illustrates how the language and visualisations are used in news reporting to fuel the narratives with opinionated, emotional, and often ideologically driven, statements (see ERUM project website).

Public division by political parties, especially evident in the USA, talking about such issues as climate change or COVID-19 (see COVID-19 related public surveys performed by Pew Research Center in 2020): "Conservatives in the United States are substantially less likely than liberals to accept that climate change is happening and is human-caused and are less supportive of policies to limit climate change" (Goldberg et al., 2020, p. 495). Political or ideological biases make it difficult to communicate verified messages, especially in polarised and divided societies. Goldberg et al. (2020) report that "social consensus plays an important role in climate change beliefs, attitudes, and policy preferences for people across the ideological spectrum, but especially among conservatives" (p. 495).

Positive vs. negative framing: It is important to pay attention to the way statistics are framed. "While a 97% chance of survival and a 3% chance of dying may both be correct, they don't always mean the same to the person listening" (Science Media Center, 2019). Positive framing is more effective than negative framing in persuading people to take risky treatment options. On the other hand, research has also found that frames of fear can sometimes be effective in reporting health risks (Kang and Lin, 2015; Halle and Dillard, 1995; Carey and Sarma, 2016; Keller and Lehmann, 2008) and some research indicates that *optimistic bias* can be related to greater public resistance to restrictions to fight the global COVID-19 pandemic (see f.e. Bottemanne et al, 2020). Meanwhile, the World Health Organization and other organisations urge the public to be aware of the negative impact that negative framing could have on their mental health (Su et al., 2021). Some scholars stress that framing climate change as an explicit risk rather than focusing on uncertainties and fears may positively impact the public's attitudes and behaviours towards more sustainable and more conscious living (Painter and Ashe, 2012; Hansen, 2016). Hence, it is important for journalists to responsibly select the frames and evaluate possible effects this may have on the public. But also, public education on media effects must be a significant part of socially responsible journalism, for instance, a "caution note" could be added at the end of articles, highlighting the impact media can have on a person's mental health, similar to those when reporting about suicides.

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TIPS FOR SCHOLARS AND SCIENTISTS

It is indeed evident that for scientists, the research of his/her own is usually easy to understand and then present the data for the scientific community in the form of a scientific article, conference presentation, lecture, etc. However, it can be rather challenging to explain the same things to lay people, who do not share the same knowledge and understanding of science and scientific processes. Therefore, while speaking with the general public, scientists must always **clarify and explain things with patience and respect. Real-life examples, comparisons or illustrations are always helpful**. Besides, personal stories and narratives can also assist in attracting and maintaining the attention of the audience.

Just like journalists, scholars and scientists communicating research are expected to **focus on educating and empowering the public**, which can be achieved by "unlocking the mysteries of science making": explaining methods, study design, and processes in simple words, contextualizing results, talking about limitations and openly discussing possible biases or disclosing conflicts of interests.

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TIPS FOR REPORTING

(1) *Educating and empowering audiences through socially responsible news reporting* is the major requirement for a good journalist nowadays. Being responsible includes *balanced and fair reporting; accuracy and precision* **rather than** dramatization or sensationalism. But most importantly, a good science journalist aspires to educate, engage, and enable the public by *clearly explaining research findings instead of oversimplifying them.* Furthermore, *public education on media effects must also be a significant part of socially responsible journalism*.

(2) Indeed, *visibility* is important: while personal stories may be more acceptable for audiences and have a bigger influence, this approach should be applied with an extra precaution. *Personal but verified stories* can be a good choice and *accuracy and precision should always be favoured over* visibility or attractivity.

(3) Science communication nowadays not only aims at informing people (increasing public science literacy) but also *engaging them in common dialogue and enabling more sustainable and resilient actions and behaviours*.

(4) Journalists covering scientific issues must understand the power of framing and the main positive/negative/neutral, political/scientific, fearful/calming effects that frames have on their audiences, their perceptions or behaviours. While it can be difficult to evaluate the effect a selected frame could have on the audience, it is important *to closely follow scientific discussions regarding these issues and follow recommendations of responsible global and national experts and institutions*.

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3. News for the public good:
Bridging the gap between journalists, scientists and the public

"Effective science communications inform people about the benefits, risks, and other costs of their decisions, thereby allowing them to make sound choices" (Fishhoff, 2013). Nowadays, we expect science communication to go much further, aiming at engaging the public in common action, and in turn to work together against global risks and support a more sustainable future (Hansen, 2016). However, long-lasting tensions between scientists, journalists, and the public make this goal rather difficult to achieve. Different metaphors and terms have been used by scholars, experts, and those working in the field to describe the relationship between science and the public (or, more specifically, between science and the media) – "distance", "gap", "barrier", "fence", "oil and water", and "creative tension" (Peters, 2013). Traditionally, scientists apprehend the media with suspicion and feel "uncomfortable with press coverage, worrying about being misquoted or having their research taken out of context" (Russell, 2010). From the first glance, it seems that scientists and journalists follow the same values – objectivity, accuracy, truth. But, in reality, they interpret these values differently – and this is the main source of mutual hostility.

> "For journalists, objectivity means presenting both (or all) sides of a conflict, while for scientists disinterestedness means avoiding personal commitments while evaluating the evidence – but then committing to the 'right' answer once the evidence has been evaluated. For journalists, accuracy means getting 'the facts' right, on deadline. For scientists, accuracy is equated with truth, with taking the time to test information against misinterpretation before expressing an opinion."
> (Lewenstein, 1997, 171-172)

However, some studies report an evident but slow shift towards better understanding: Scientists start considering "visibility in the media important and responding to journalists a professional duty—an attitude that is reinforced by universities and other science organizations" (Peters, 2013). To help bridge the gap, a set of recommendations can be valuable for both journalists and scientists. There are several differences in the work of scientists and journalists, but it is essential to show respect and mutual understanding while ideally serving the common good.

RECOMMENDATIONS FOR JOURNALISTS	MAJOR REASONS CAUSING THE GAP BETWEEN SCIENTISTS AND JOURNALISTS
DIFFERENCES	
Acknowledge and respect differences: Be open to new knowledge and experience – you never know when it can help you again.	***Different kinds of knowledge and skills:*** While scientists have a deep understanding of the area/topic they are researching, journalists have the skills to speak with the public and be heard.
It is ok to not know everything about the topic you are examining, but it is important to ***be prepared*** for the interview – read the original paper, prepare the questions, get some information about the scholar you are interviewing.	***Different kinds of research:*** Scientists spend months, sometimes years working on their projects, journalists usually just have a few hours.
While following news values and journalistic norms, ***make sure you understand the topic correctly and always be accurate and precise while reporting it.*** Do not pretend you understand if you don't; double-check; ask for clarifications or examples.	***Different values:*** While scientists value accuracy and precision; journalists follow news values and journalistic norms.
Take the time to ***read and understand scientific papers*** before contacting scientists. While journalists report the most important points in the lead or the headline, in the scientific paper the major findings will be discussed at the end of the article.	***Different production:*** While scientific articles have a strict structure and requirements, not to mention the scientific jargon, journalists write for people in the language understood by the general public and in a much more relaxed way.
COMMON GOALS	
Although it may seem there are more differences than commonalities, ***prioritize common goals instead of differences*** – try to approach scientists as colleagues and attempt to work as a team for a common good.	***Serving for common good:*** Besides other important goals, both scientists and journalists also dedicate themselves to improve people's understanding of their environment (natural, social, political, economic, etc.) and support informed, decision-making processes.

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Table 4. *Recommendations for building strong, respectful and trustful relationships between journalists and scientists.*

There is also a well-known gap between science and the public. While different initiatives are founded to promote the ideas of "open science", "science democratisation", "pluralism", "public engagement", etc. (Kleinman, 1998; McCormick, 2007; Cornelissen, 2018) and journalists are placed amid this "gap bridging", it is also evident that the connection between journalists and the public is also complicated. Our survey data indicated that the relationship between journalists and their audiences was perceived as the least problematic issue by survey participants when compared to other issues: a bit more than a third of the respondents agreed that "Journalists have become out-of-touch with their audiences" (33% somewhat agreed and 6% strongly agreed); while half of the respondents indicated that "Journalists are exposing their points of view in their reporting too frequently" (42% somewhat agreed and 10% strongly agreed); 45% agreed that "News reports are increasingly full of factual errors and sloppy reporting" (31% somewhat agreed and 14% strongly agreed); 48% said that "There is less diversity in choosing stories for reporting" (35% somewhat agreed and 13% strongly agreed) (for more see *ERUM Report on Survey Results*, Figure 11 and Question 23). One out of ten respondents also reported that he/she does not get any feedback from the audience and one added "that's not a journalist's job". However, knowing your audience is one of the preconditions for successful reporting.

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TIPS FOR SCHOLARS AND SCIENTISTS

Standing in a position of power, which comes from the ability to access and understand the data, scientists also have responsibilities for society – to make sure the data is used properly and **serves a common good.** This can be reached by sharing the power of knowledge, by educating and empowering others. However, too often scientists and lay audiences are speaking different languages - one is saying "oranges" another hearing "apples". Indeed, there is growing literature investigating public understanding of science (why people speak about "apples" instead of "oranges"?), but not much is being said about **scientist's understanding of the public**. Too often, publics are seen as outsiders, with insufficient knowledge and understanding, etc. And while reaching for better public understanding, engagement, and empowerment might be challenging, this is the main goal of contemporary societies where public understanding of science refers to more sustainable living, better crisis management, etc.

There is also the question of the relationship between scientists and journalists, which was discussed in the section, and there is not much to say in addition to it, because the same rules should be acknowledged by scientists as those listed for journalists: **focus on common goals instead of differences and aim to serve the common good.**

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Social responsibility – lies at the core of journalism. The true essence of journalism lies in the common good, therefore, caring for your audience should be an indispensable requirement for any journalist. This means knowing your audience, being in close touch with them, listening to and considering their views, concerns, and fears. "A central irony of the newsroom is that while many journalists' decisions are made with having readers in mind, the audiences for their work often remain unfocused, imagined abstractions, built on long-held assumptions, newsroom folklore, and imperfect inference" (Robinson, 2019). It could be expected that with the rise of digital media and new tools, journalists should know

more about their audiences, but it seems that learning from data (use of analytics, metrics, etc.) is not replacing the traditional ways – learning from people. "Journalists' reactions to these new technologies seem to echo the sentiments of the print era. The opinions of strangers are still frequently dismissed; social media may often be an echo chamber of like-minded peers; and metrics — suspiciously similar to ratings — can be mistrusted, perceived as just as corrosive to one's news judgement" (Robinson, 2019). When asked "How do you get information about your audience?" our survey respondents indicated that feedback from readers (59%), audience research (50%), click-stream data (39%) and circulation numbers (37%) are the most important sources, followed by family and friends (35%) and online forums (22%).

Based on their knowledge, our respondents believed that most of their readers do not have the necessary skills to verify news items when reading and sharing them online. The promising side of our data was that respondents acknowledged that public *media literacy* is an important aspect while fighting disinformation (Table 5 and Question 32, Appendix 2).

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TIPS FOR REPORTING

(1) Building and maintaining *close relationships based on trust and respect with scientists* and representatives of scientific institutions (e.g., press officers) is essential and while new technologies are helpful to follow their work and stay in touch, personal communication (including technology-mediated) is not losing its importance. Be in constant touch with *scientists or press persons from scientific institutions*, i.e., via social media channels, newsletters, or e-mails.

(2) While working with a scientist*, focus on common goals instead of differences*. Being aware of all the differences between the two cultures and the problems that can cause may help you to better overcome them.

(3) Communicating science today is often about *engaging the public for common action*. To reach that goal, knowledge about the audience is critical – how does your audience feel about the topic? What do/don't they know? What are the myths or misconceptions? Always keep your audience close to yourself in traditional and new (technology-assisted) ways – this is an important part of your work.

(4) *Social responsibility lies at the core of journalism.* The true essence of journalism lies in the common good, therefore caring for your audience is an indispensable requirement for any journalist, this includes keeping in mind the public's science as well as media literacy.

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4. Professional journalistic standards and personal qualities in news reporting

Professional ethics is one of the most essential qualities a good journalist should follow to build their professional identities and to better understand the world around them. Journalists and news media may also play an effective corrective role in contending the spread of false information and significantly contributing to public awareness and critical media use. Through quality journalism, based on high ethical standards, including truth and accuracy, transparency, integrity, independence, fairness and impartiality, humanity, and accountability, people get the facts and information they can trust. And while a number of codes for journalistic ethics (with smaller or bigger differences) exists worldwide, they do share some core elements: truthfulness and accuracy in reporting; the harm limitation principle; and the principle of independence (Medvecky and Leach, 2017; Nielsen, 2020; National Association of Science Writers, 2014). From our survey, it was evident that all these principles are recognised as critical in journalistic work. Furthermore, while answering a general question about professional ethics, the majority of our survey respondents supported a deontological approach to ethics and agreed with the statement that "journalists should always adhere to codes of professional ethics, regardless of the situation and the context" (see *ERUM Report on Survey Results*, Table 1 and Question 21, Appendix 2). But more specific questions – about situational or personal aspects – disclose some type of "ethical flexibility" among the respondents, raising the question about ethics while working under conditions of increased pressure. While pressure can be put on you by your employer, authority, your own family or personal beliefs, as well as someone threatening or bribing you, nowadays, the big source of pressure is constant change, unknown risks or never-ending crisis. Being aware of such moments of weakness and vulnerability and preparing for them would be the first step to take. Do whatever in your power to always follow the ethical principles and highest standards of journalism and science communication. Of course, you might make mistakes, and if so: Acknowledge your mistakes, be transparent about them towards your audience, learn from them, and move on.

The principles of successful reporting come not only from ethical requirements but can also be linked to ***different journalistic cultures***. Meaning, that what is being perceived as good reporting in one country, can lead to dissatisfaction or total misunderstanding in another. Different national contexts can lead to different expectations for journalists.

> "In 1991, a leading American environmental journalist defended "objectivity" and "balanced reporting" as central to the concept of the press as an independent watchdog on other social institutions. At the same meeting, a Philippine journalist called for science writers to become "missionaries" for the environment, abandoning Western ideals of objectivity – because only then, he said, could the press be independent of other social institutions whose activities were degrading the environment (Cornell, 1991). Thus, <…> a value commitment expressed in superficially similar terms ("independent" journalism as a watchdog on social institutions) can represent almost diametrically opposed positions in different national contexts:" (Lewenstein, 1997, p. 172)

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Question of education. Literature debating the education of journalists does not offer a success formula, however, most of the literature concludes that attitudes, commitment, and passion might be more important than formal education (Dunwoody, 2004; Schultz, 2002). "It's about gaining the right combination of skills and knowledge, which can be done in a number of ways. <…> No matter which path one chooses, the most important thing is to simply be open to learning all the time" (Pattani, 2018). Our survey results echoed these insights: A degree in journalism was considered as the least important quality of a professional journalist, while passion and work experience topped the list.

Experience in science journalism, meanwhile, is seen as a valuable quality, necessary for dealing with controversial topics. "I would argue that coverage of recent controversies in science and public policy suggests that reporters with a specialty in science journalism are better equipped than general-assignment reporters to provide context and background on the research itself; science reporters can pick up skills needed to write about the legal, political, and ethical debates surrounding the research. This is true of both breaking news, where there is little time to get up to speed on the science, as well as more in-depth features, which require greater understanding of a given science field." (Russell, 2010).

While science journalists are expected to have a list of qualities and abilities to do their work well, including knowledge on conducting scientific research and reading scientific papers, etc. There is no big difference in how they get these qualities – i.e., through formal education or through experience. The most important thing is the **mindset** – never stop learning. And nowadays, there are plenty of different platforms, associations, or university programs, which provide free or paid courses from different fields (see the recommended list of organisations providing educational content in Table 5) useful for (young) science communicators.

**European Journalism Training Association (EJTA)	https://www.ejta.eu**
Organizes different kinds of events, dedicated to encouraging discussion about the important questions of the journalistic profession and its training problems, among other important activities.
**European Federation of Journalists (EFJ)	https://europeanjournalists.org/**
The EFJ aims to foster social and professional rights of journalists working in all sectors of the media across Europe. Among other activities, the Federation also organises different kinds of events (summits, conferences, workshops, etc.) for journalists.
**National Association of Science Writers (NASW)	https://www.nasw.org/**
Holds its annual journalism workshops in conjunction with the Council for the Advancement of Science Writing (CASW), a fifty-year-old educational organisation started by science journalists to improve the quality of science information reaching the public.
**Knight Science Journalism MIT (KSJ@MIT)	https://ksj.mit.edu/**
The Knight Science Journalism Program at MIT seeks to advance science journalism in the public interest by nurturing and enhancing the ability of journalists to accurately and thoughtfully illuminate science and its intersection with human culture.

The Open Notebook: The story behind the best science stories | https://www.theopennotebook.com/
A non-profit organisation that provides tools and resources to help science, environment, and health journalists, at all levels of experience, sharpen their skills. Co-founded by Siri Carpenter (an award-winning freelance science journalist, contributing editor for *Science News for Students*, and former features editor at *Discover* magazine) and Jeanne Erdmann (an award-winning health and science journalist whose work has appeared in *Discover*, *Real Simple*, *Family Circle*, *Women's Health*, *Spectrum*, *Slate*, *The Washington Post*, *Nature Medicine*, and *Nature*, among other publications).
European Journalism Centre | https://ejc.net/training
European Journalism Centre is aiming to build a more sustainable, ethical, and innovative future for journalism through grants, events, training, and media development.
SciDev.Net | https://www.scidev.net/global/content/script.html
SciDev.net is the world's leading source of reliable and authoritative news, views, and analysis about science and technology for global development; offering free and high-quality training for scientists and journalists.
The Ethical Journalism Network | https://ethicaljournalismnetwork.org/
The Ethical Journalism Network brings together news on media ethics, self-regulation, media literacy, corruption, hate speech, and accountable journalism from around the world.
Center for an Informed Public at the University of Washington | https://www.cip.uw.edu
The Center brings diverse voices from across industry, government, non-profits and other institutions together to confront mis/disinformation through research, education, policy, and engagement efforts. The Center translates research into policy, technology design, and public engagement, using a network of urban and rural libraries, a national network of educators and institutional partners.

Table 5. *Recommendations for organisations and institutions, providing educational content for science communicators.*

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TIPS FOR REPORTING

(1) While professional ethics remain one of the most important qualities journalists should follow, and they indeed recognize this themselves; working under increased pressure and uncertainty can result in questioning ethical principles. ***Being aware of such "moments of weakness" and preparing for them*** is the first step to take. You might make mistakes along the way, and if so: Acknowledge your mistakes, be transparent about them towards your audience, learn from them, and move on.

(2) ***Attitudes, growth mindset, commitment, and passion*** might be even more important in the daily work of science journalism than formal education in science or communication. Especially in this rapidly changing environment, it is essential to ***never stop learning and growing.*** This is not a difficult task, as there are plenty of different platforms to update your knowledge or learn something new.

Carol S. Dweck, in her book, *Mindset: The New Psychology of Success* (2007), clearly explains the difference between **fixed and growth mindset:**

People with a **fixed mindset** are convinced that intelligence is static and, therefore, often avoid challenges. They give up easily, seeing their efforts as fruitless. They ignore useful but negative feedback and feel threatened by the success of others. Those with a **growth mindset**, meanwhile, are sure that intelligence can be developed. The latter mindset inspires people to learn by embracing challenges, persisting in the face of setbacks, seeing effort as a way to mastery, learning from criticism, and finding lessons and inspiration in the success of others.

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TIPS FOR SCHOLARS AND SCIENTISTS

While there are no significant contradictions in professional ethics of journalism or science, in fact, both are aiming for similar values of honesty, integrity, respect, etc., it can be more essential to have an understanding of the differences (discussed in previous sections, for instance, balanced and fair reporting) and find the solutions for them while openly communicating the science.

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5. Covering science in times of change and crisis

The pandemic has had a strong impact on journalists' agendas by shifting the focus towards COVID-19 issues and often ignoring other topics, which could be potentially important for the public. In our survey, 76% of the respondents somewhat or strongly agreed with the following statement: "Other issues have been ignored because of COVID-19". While the effect of COVID-19 on agenda setting has its negative outcomes, it is not the only issue to consider.

Working on highly uncertain scientific topics is never an easy task. Besides, there is always some level of **_uncertainty_** when we talk about scientific research – each and everyone's study has its limitations. The same results can be interpreted in different ways; different methods can lead to different results, and so on (Longino, 2002; Elliott, 2019; Royal Society, 2012). However, in times of crisis, the pressure is increasing: While scientists are tackling unknown situations and working on cures, the public, politicians, and the media are eagerly waiting for the news and answers. Of course, this puts pressure on the scientific community. While the scientific process can take up a lot of time, many research findings are increasingly becoming accessible to lay audiences without being published by peer-reviewed scientific journals. The increased speed of science making and communicating indeed raises questions about quality and trust: "News releases and news reports with simple, often provocative, messages, based on single studies, have had substantial influence on medication use, the stock market, political discourse, and policy" (Saitz and Schwitzer, 2020). Therefore, extra precautions have to be taken by reporters, especially when the news is focusing on a single study or when the only source is a press release (without an original research paper). Following these recommendations might be helpful:

1. Pay attention to the *methods* and include them in your story.

2. *What is the context of the study?*
   Have similar studies already been conducted? What did they find? While you can look for such studies on databases or other reliable sources, interviewing independent experts in the field may help you to find some answers, too.

3. *Dig deeper into the results!*
   What is the size of the study and what do the results actually mean? Can you make any generalisations according to them? If not, what groups do they represent?

4. *What are the limitations?*
   Explain them to your readers. Some authors suggest that any journalistic publication based only on a single study should include a "note of caution" to the public, stressing that single or case studies are rarely definitive and need further explorations.

5. *Talk about the complexity!*
   Science is complicated. While it can be tempting to simplify the results and present them in a personalised way, it is important to always stay accurate and precise by disclosing all the situations. For instance, *"with COVID-19, this might include the idea that hospitalized patients who receive mechanical ventilation are different from outpatients, that prophylaxis is*

> *different from treatment, and that treatments may work (or not) differently depending on the stage or severity of disease"* (Saitz and Schwitzer, 2020).

> 6. If there is no accessible original research paper and the news is only available via a press release, there should be a recommendation included that *"any practice or policy change should await scrutiny of publication of complete data from the study. These recommendations should also lead news organizations to question why the findings announced prior to publication of the peer-reviewed article are newsworthy in that moment"* (Saitz and Schwitzer, 2020).

Table 6. *Recommendations for journalists, covering highly uncertain scientific topics in critical situations.*

An ***intensified situation in the media ecosystem*** – increased volumes of mis/disinformation, and information overload, amongst others, poses additional challenges to the journalists covering science. 69% of respondents in our survey indicated they face information overload as a result of the pandemic. Journalists' ability to check facts and verify information in unclear situations is critical. While respondents in our study acknowledged that fake news is becoming a big issue in journalism, they also seemed to be optimistic about dealing with it. Indeed, an array of tools (technological solutions) are easily accessible to newsrooms and journalists to help verify the information and track mis/disinformation (see Table 2).

Other effects of the pandemic on journalistic work, according to the results of our survey, included: difficulties to understand and explain scientific information about COVID-19; difficulties accessing information from the government and officials; harder to get hold of verified information because of the restrictions in place; difficulties finding independent sources; and financial problems (due to job loss, salary cuts, cancellation of commissions).

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TIPS FOR REPORTING

(1) The pandemic has had a strong impact on ***journalists' agendas by shifting the focus towards COVID-19*** issues and often ignoring other topics. While crisis-related information is important, other issues of public interest should be included in the coverage to ensure a balanced agenda. Furthermore, it is also essential to ***choose quality over quantity*** while reporting long-lasting crisis news.

(2) Working on ***highly uncertain scientific topics*** is never an easy task. The increased speed of science making and communicating raises questions about quality and trust. Moreover, the intensified ***situation in the media ecosystem*** – increased volumes of mis/disinformation, information overload, etc. – also poses additional challenges to the journalists covering science. Therefore, extra precautions have to be taken by reporters, especially when the news is focusing on a single study or when the only source is a press release (without an original research paper). Journalists are expected to demonstrate their excellence in fast and reliable ways by providing verified and fact-checked information using technology-based or traditional solutions.

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TIPS FOR SCHOLARS AND SCIENTISTS

In a crisis, such as a global pandemic, when research is vital to fight back the enemy, scientists are our frontline heroes, experiencing increased pressure to find the solutions and save humanity. However, we know that scientific research is a time-consuming process, especially if we consider peer-review procedures. Despite that, in the case of COVID-19 we have witnessed unprecedented speed in vaccine research, verification (by the scientific community and international and/or federal bodies) and distribution. While increased speed might result in questioning the quality of the research, **open and clear communication from the scientific community is vital from the beginning**. Scientists are usually highly trusted and respected by the general public in many countries, therefore they might be the ones who should be speaking and addressing the problems to ensure more effective communication and achieve the desired impact on society. It is especially essential to help **combat misinformation, fake news, and conspiracies.**

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Conclusions

The massive disinfodemic has proven that the communication of reliable knowledge is an essential asset for societies in crises. At this transformative moment, reinforced by the coronavirus outbreak, when social cohesion, democratic values, and pluralist societies are at stake, we need, more than ever, to reflect and better understand the fundamental changes in journalism and news production and their implications on media, science, and democracy.

Such a moment also requires a renewed quality of learning and training that aims at empowering journalists, scientists, and the public to understand the complexity of today's communications and media-enhanced affordances and applications. Media and information literacy is needed to support the understanding of the complex ways in which media and ICTs can act either as connecting or disconnecting, empowering or degrading, positive or negative forces in society. More than ever, consolidation of efforts and engagement of the academic community with society and media are necessary to provide informed measures and solutions and to share these with policymakers, journalists, and civil society.

While challenging, this transformative situation might also be seen as an opportunity (long-awaited) for media and journalists to reflect upon their situation, reconsider their values, and grow stronger with new visions and missions. The evident change in media ecosystems suggests that the future of professional journalism is not so much about information dissemination (being first), it is about being reliable and trustworthy. It is not about a set of skills or competencies journalists must have (including a university degree), it is about the ability to grow and learn constantly, and it is still about the same professional ethics – the only constant value we have in journalism.

We call for more ***social responsibility*** in journalistic work. The power journalists have in their hands – not so much of information coverage or dissemination, but of professional ability to verify, check, and distinguish between true and false news – also requires taking responsibility for those who are more vulnerable to the "sick" information environment in which we find ourselves today. Educating and empowering people to be better informed in everyday decisions through professionally selected and covered news is essential. It should be seen as an opportunity for the media and journalists to step up and start a new and more socially responsible era of journalism.

The ***growth mindset*** is a "must" for a journalist. This requirement involves: constant learning, improving, acknowledging and learning from mistakes, being on top of the news in the field, following world-leading sources, easily adapting to technology-assisted ways of information gathering or verification, being flexible, being open, being adaptive, etc. However, there is one thing, which requires no flexibility – ***professional ethical principles and values.*** While so many things are changing around us, one important thing to keep stable is the professional ethics of journalism. Balanced and fair reporting, accuracy and precision, trust and respect – those are true and timeless values that help to make a distinction between true professional journalism and amateurism or treacherous attitudes.

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ANNEX – Survey Research Report:
Media and Journalism amidst a Global Pandemic and Disinformation

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I

Introduction

This survey research is part of a wider project called ERUM (Enhancing Research Understanding through Media), which intends to improve students' media literacy, evidence-based communication skills, and resilience towards disinformation. The Erasmus+ funded project is being conducted by university partners from Cyprus, France, Greece, Lithuania, Luxembourg, and Spain, under the coordination of the University of Vienna (Austria).

Carried out in the framework of IO2 of the ERUM project, the survey aimed at collecting good practice from journalists and media professionals on their work practices, ethical standards, fact-checking practices, disinformation and COVID-19 challenges to journalism and media in order to provide guidance to students and journalists on scientific communication and identify best practices.

The main instrument of the survey was an online questionnaire composed of 34 (closed- and open-ended) questions and published on Google Forms. Quota sampling was applied to reach the target of 300 respondents from the ERUM project partner and other countries. The sample frame included practicing journalists, including freelancers, editors, producers, media managers. The data collection for the survey was carried out by the ERUM project partners between October and December 2020. In total, 197 respondents completed the online questionnaire, which is 66% of the sample size.

Acknowledgement

We are very much appreciative to all the respondents across the world who contributed to the survey research, as well as the ERUM project partners who did their best to collect the survey data.

KEY FINDINGS

- **Changing media landscape:** Media and journalism are facing quite a few challenges, including "too little attention is paid to complex issues" with approximately 68% of the respondents somewhat or strongly agreeing with the statement. 61% of the respondents expressed their belief that "there is more plagiarism today than in the past 20 years" (33% somewhat agreed and 28% strongly agreed) and 54% agreed that "the distinction between reporting and commentary has seriously eroded" (37% somewhat agreed and 17% strongly agreed).

- **Building trust:** When speaking about the importance of increasing audience trust in news media, the respondents mentioned fact-checking (76%), separation of news and opinions (67%) and more transparency (67%) as the main measures, as well as including less "clickbait" (65%), usage of primary documents/sources (65%), usage of more sources (62%) and focusing on public interest stories (52%).

- **Reporting in times of crisis and permanent change:** The global COVID-19 pandemic has boosted disinformation and increased the need for reliable reporting. According to the answers of journalists and media professionals, the main changes on daily journalistic routines occurred in the case that other issues have been ignored because of COVID-19 (76%). It also affected their own focus and agendas – 72% agree that their "focus shifted to COVID-19 coverage during the pandemic". Besides, journalists face information overload as a result of the pandemic (69 %).

- **Selecting sources for information:** The main sources for information selected by the participating journalists include personal contacts (79%) and press releases (69%), while scientific research, on the other hand, is the least often used with 43% of respondents mentioning it as their primary source. 45% of respondents reported they refer to scientific research in their stories almost daily (19%) or weekly (26%), while others acknowledged doing it monthly (31%), once or twice a year (20%) or almost never (4%).

- **Dealing with fake news:** In the survey, journalists and media professionals were also asked to rate statements about disinformation and fake news. A vast majority of respondents believed that "disinformation has become a major problem for the news industry" (80% somewhat agreed or strongly agreed) and more than half of them said "disinformation affects their day-to-day work" (55%). However, respondents were very optimistic about their ability to distinguish between quality and unreliable information: 87% in total somewhat agreed or strongly agreed with the statement "I can distinguish between quality and unreliable research/information" and only less than 6% disagreed. On the other hand, only 13% believed that "Readers have the necessary skills to verify news items when reading and sharing them online".

- **Future of journalism:** Reflecting on the future of journalism, respondents were asked whether they would advise a journalism career to a young student. The answers were distributed among three relatively equal groups, i.e., optimists (36%), pessimists (30%) and neutrals (34%). However, a majority of the respondents (57%) felt they would rather recommend a young person to choose a journalist career path.

II

DEMOGRAPHIC PROFILE OF SURVEY RESPONDENTS

This section provides the main demographic characteristics of the sample, including country of residence, gender, age, education, employment status, media type, etc. The distribution of the number of survey respondents by country is provided in Figure 1.
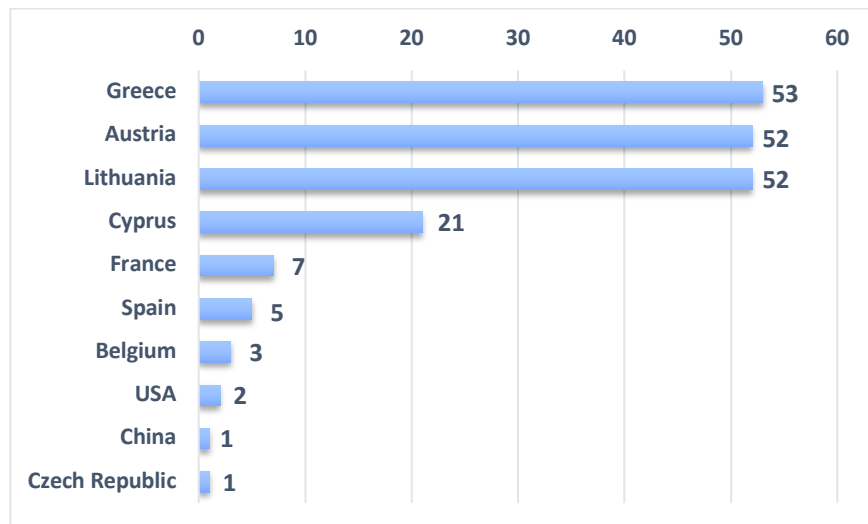
Figure 1. Distribution by country (N=197)

There is quite an equal distribution of the respondents by gender in the survey, i.e., 48% of females and 52% of males. The number of respondents by age is demonstrated in Figure 2.
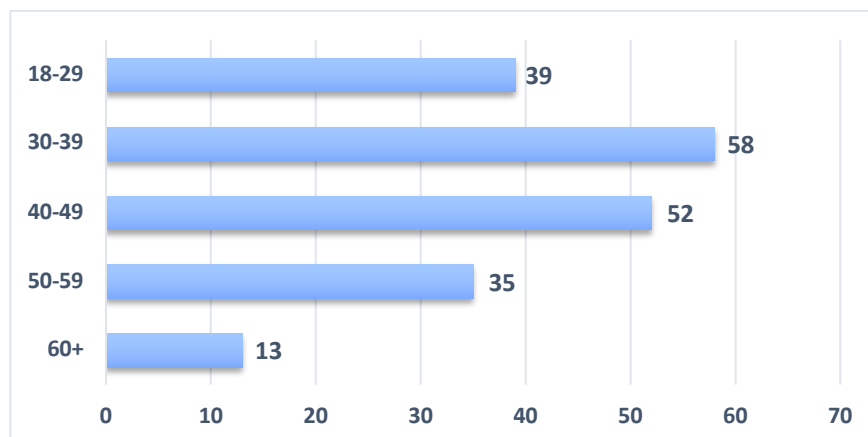
Figure 2. Distribution by age (N=197)
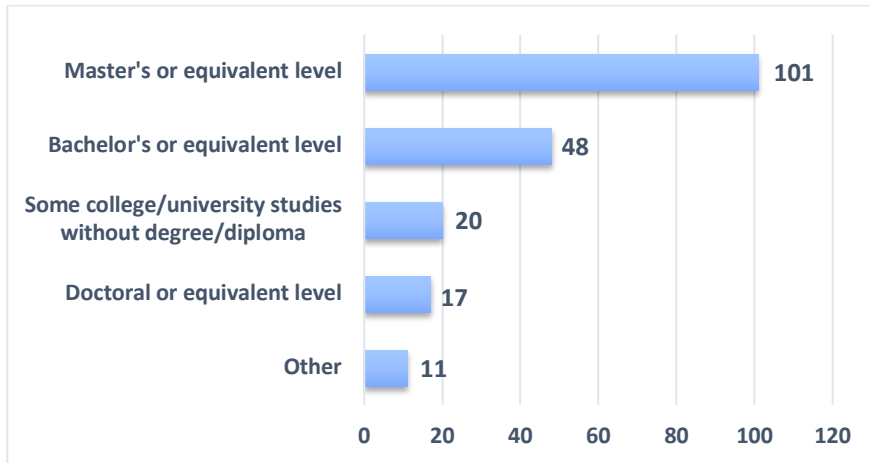
Figure 3. Distribution by education (N=197)

Half of the survey respondents (51%) hold a master's or equivalent level degree. 24% of the respondents are graduates of Bachelor or equivalent studies. Every tenth respondent holds a PhD or equivalent degree, while another 9% have some college/university studies without a degree or diploma (see Figure 3).
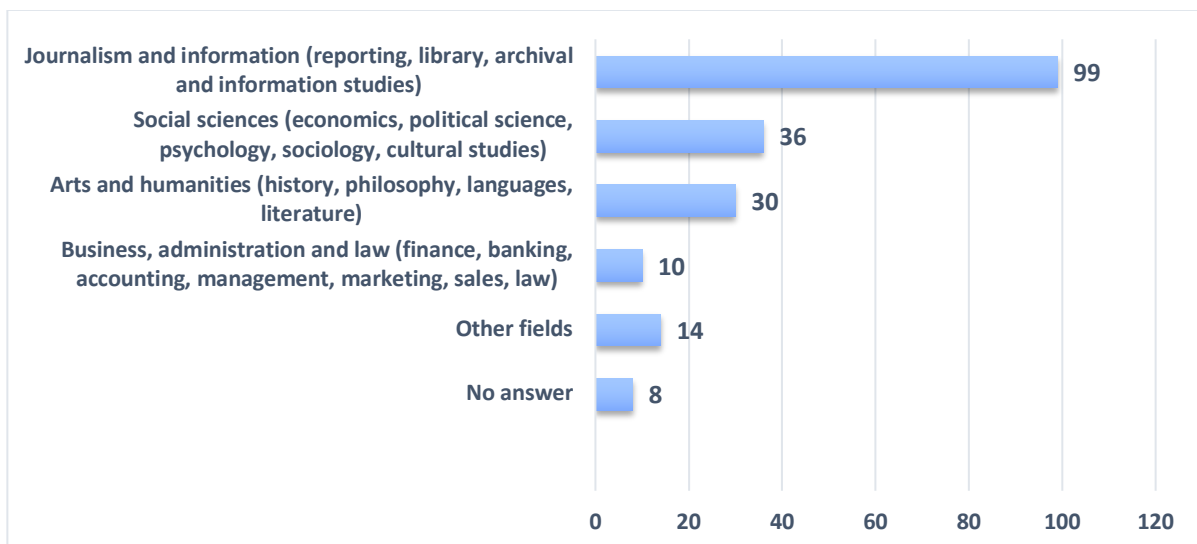

Figure 4. Distribution by the field of education (N=197)

Every second journalist who participated in the survey (50%) has graduated from a journalism programme or in the field of communication and information (see Figure 4). 18% of the respondents have been educated in one of the areas of social sciences (economics, political science, psychology, sociology, cultural studies), 15% of the survey participants have majored in arts and humanities (history, philosophy, languages, literature). Only 5% of the surveyed journalists are educated in business, administration and law.
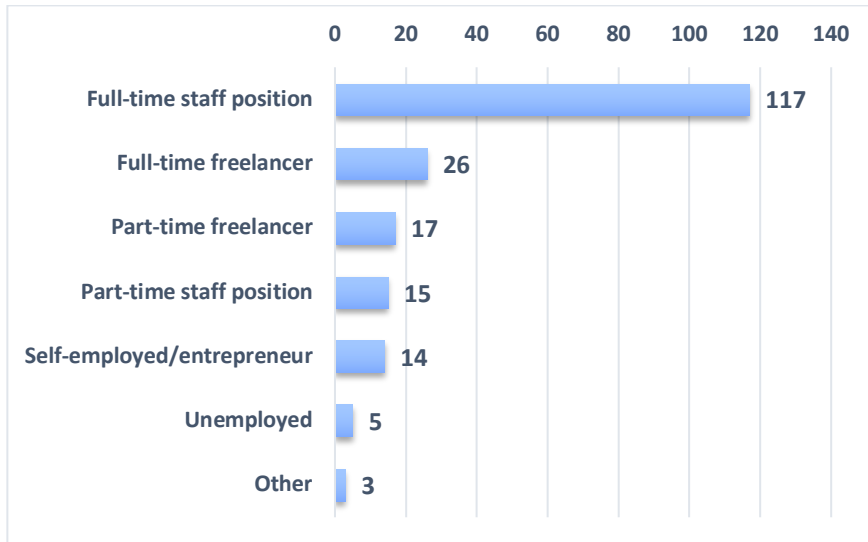
Figure 5. Employment status of survey respondents (N=197)

The majority of journalists who responded to the survey questions (59%) hold a full-time staff position in the media outlet they are working for (see Figure 5). 22% of the respondents are freelancers, working either full-time or part-time for different media outlets. 8% of the survey participants have a part-time staff position, while 7% are self-employed.
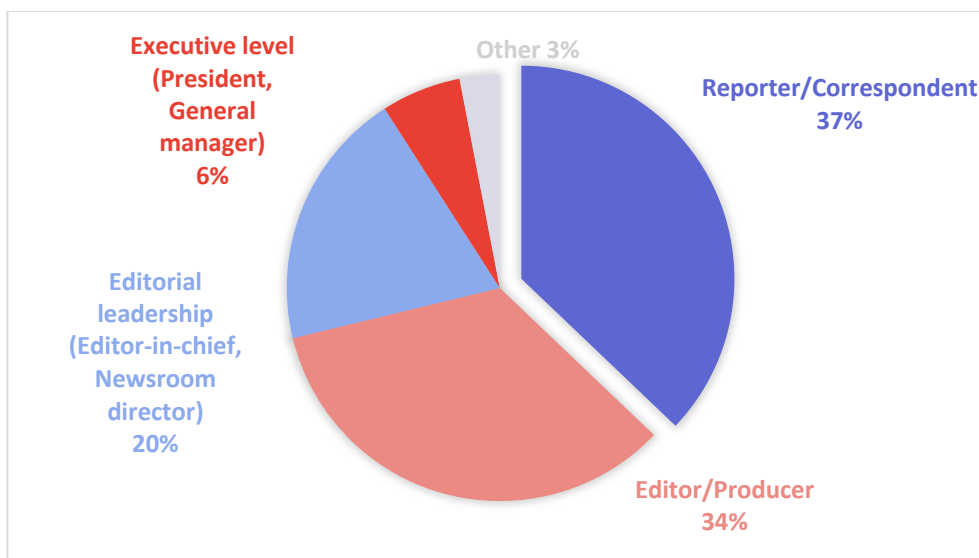

Figure 6. Employment position in the newsroom (N=131)

Out of 131 respondents who are employed full or part-time in the media outlet, 37% work as reporters or correspondents, 34% of the respondents are editors/producers, 20% work in an editorial leadership position and 6% represent executives of media companies (see Figure 6).
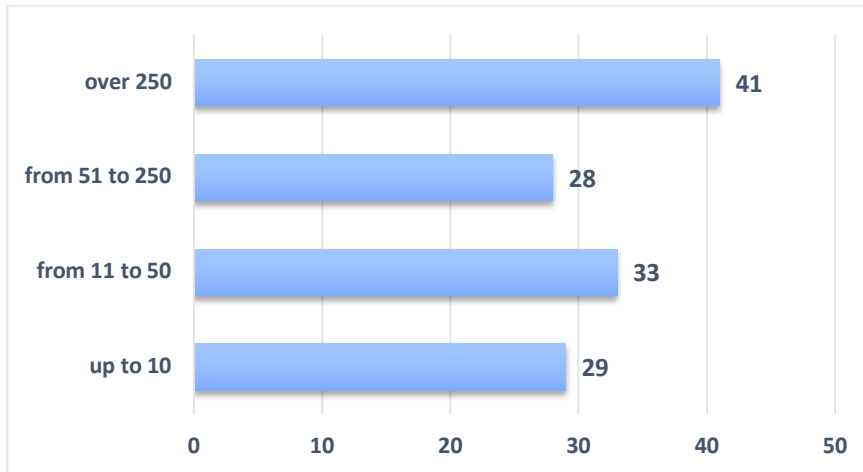
Figure 7. Number of employees in the media outlet (N=131)

The majority of the respondents (52%) works in large and moderately large media outlets with over 50 employees, every third (31%) is employed by a large media outlet with over 250 employees. The remaining respondents are employed by moderate and small media companies, respectively 25% and 22% (see Figure 7).

The survey covered all the media types and platforms. The largest group of journalists (24%) works for print media, both newspapers and magazines (see Figure 8). Online media and radio were also well represented in the survey (21% each) followed by multiple formats and TV (13% each). 5% of the respondents work for news agencies and 3% could not identify with the categories mentioned above.
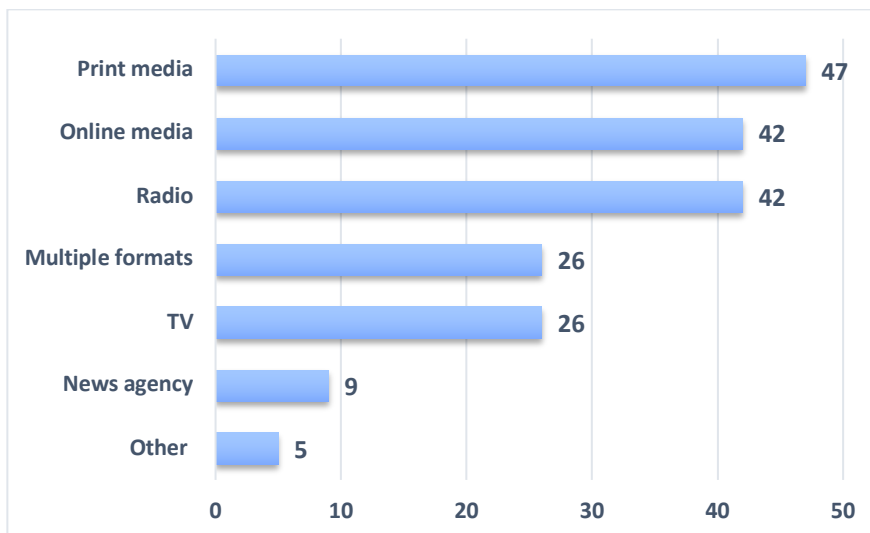

Figure 8. Type of medium/platform (N=197)

Among other formats used by the media outlets the respondents work for, newsletters, websites, social media, blogs, podcasts, livestreams and mobile apps were mentioned most often. Journalists produce their content for different formats. The ones most often mentioned included text (online and print), audio, video, social media, blog or photo.
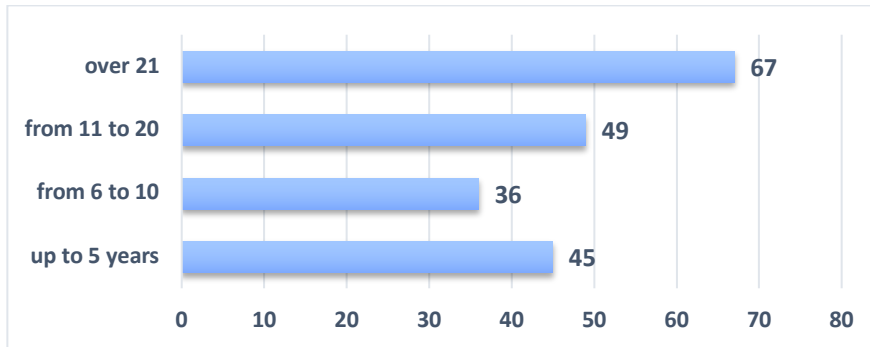
Figure 9. Work experience in years (N=197)

Out of 197 respondents, the majority of the respondents (59%) has more than 10 years of work experience, which makes the survey results even more credible. Every third respondent (34%) had extensive work experience with over 21 years and every fourth respondent (25%) has been working from 11 to 20 years in the news media. 23% of the respondents have been in their first years of media career, while 18% of respondents worked in the sector from 6 to 10 years. The majority of respondents (57%) have a membership within a professional association of journalists.

In the following sections, journalists' responses about their everyday practices, value judgements and current challenges for journalists and media in general are described in detail. Distributions of the responses by country are available on the ERUM website as Appendix 2 to the survey report. Though most differences among the countries are not statistically significant, they do provide quite a few variations.

PROFESSIONAL VALUES AND PRACTICES

Covering complex scientific and controversial topics

Most journalists, who replied to the survey, felt that they have a great deal (45%) or complete freedom (29%) while selecting news stories and only 4% said they have very little freedom while 1% reported no freedom at all (see Figure 10 and Question 16 in Appendix 2). Furthermore, a vast majority (84%) also identified journalistic independence as a major requirement for good journalism (see question 20 in Appendix 2).
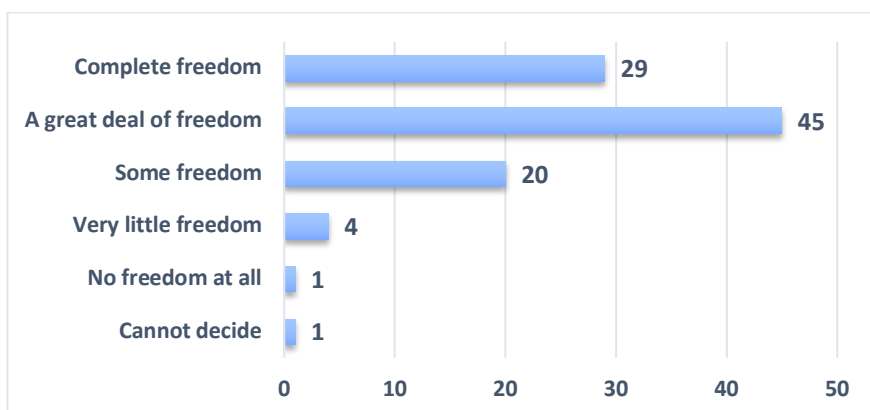
Figure 10. Distribution of responses (%)
Question 16: "Thinking of your work overall, how much freedom do you personally have in selecting the news stories you work on?"

Major challenges within the current state of journalism

Respondents agreed that a lack of attention to the complex issues is the biggest problem regarding the "current state of journalism", when compared to other conditions listed in the question (see Figure 11 and Question 23 in Appendix 2). More than two thirds of the respondents indicated that "too little attention is paid to complex issues" (37% somewhat agreed and 31% strongly agreed with the statement). 61% of the respondents expressed their believes that "there is more plagiarism today than in the past 20 years" (33% somewhat agreed and 28% strongly agreed) and 54% agreed that "the distinction between reporting and commentary has seriously eroded" (37% somewhat agreed and 17% strongly agreed).

The least problematic, according to the respondents, is the connection between journalists and audiences: A bit more than a third of the respondents agreed that "journalists have become out-of-touch with their audiences" (33% somewhat agreed and 6% strongly agreed). Moreover, half of the respondents indicated that "journalists are exposing their personal points of view in their reporting to78o frequently" (42% somewhat agreed and 10% strongly agreed). 45% agreed that "news reports are increasingly full of factual errors and sloppy reporting" (31% somewhat agreed and 14% strongly agreed) and 48% said "There is less diversity in choosing stories for reporting" (35% somewhat agreed and 13% strongly agreed).
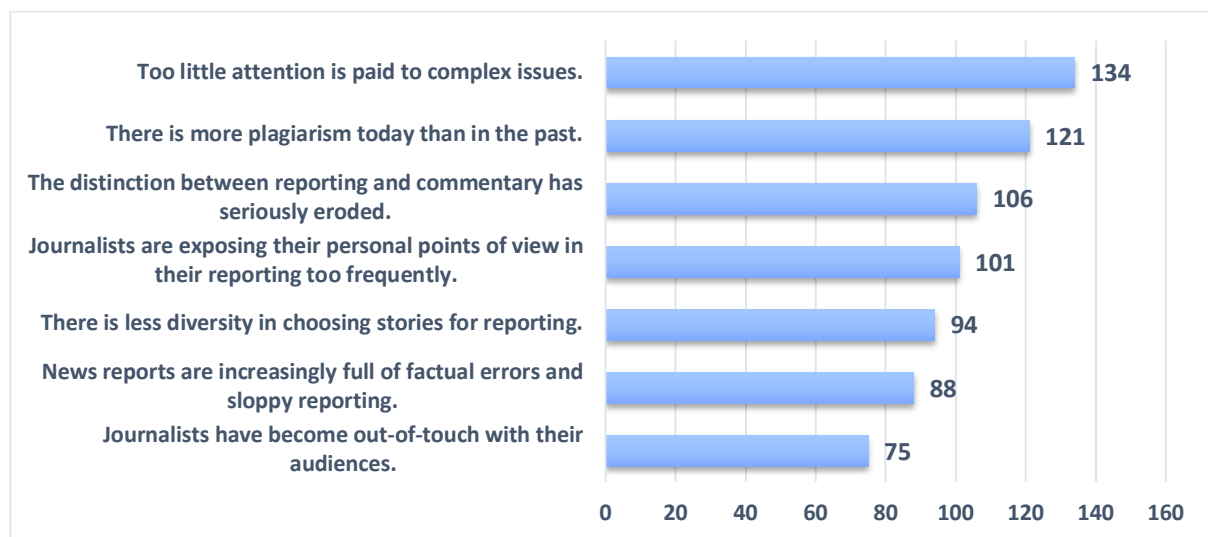
Figure 11. Distribution of responses (N=197)
Question 23: "Please indicate whether you disagree or agree with the following statements about the current state of journalism in relation to the context you are working in." The data in the table reflects the numbers of respondents, who strongly agreed or somewhat agreed with listed statements.

Information sources

While personal contacts (79%) and press releases (69%) were among the most frequently used primary sources by the respondents, scientific research, on the other hand, was the least often used with 43% of respondents saying it is their primary source (see Figure 12 and Q17 in Appendix 2).
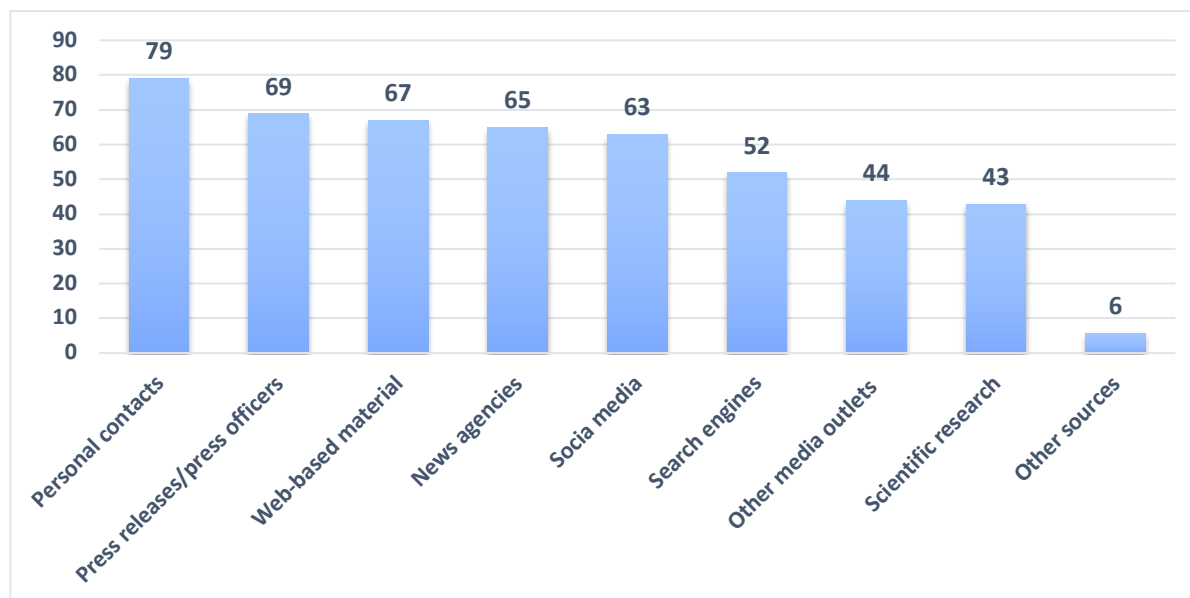
Figure 12. Distribution of responses (%)
Question 17: "What are the primary sources of information you use in your daily work? Select all that apply." Only positive answers from the respondents are reflected in the table.

Interestingly, press releases or press officers (69%) and information from news agencies (65%) were comparably used as web-based material (67%) or information retrieval via search-engines (52%), while other media outlets (44%) were among sources used least often.

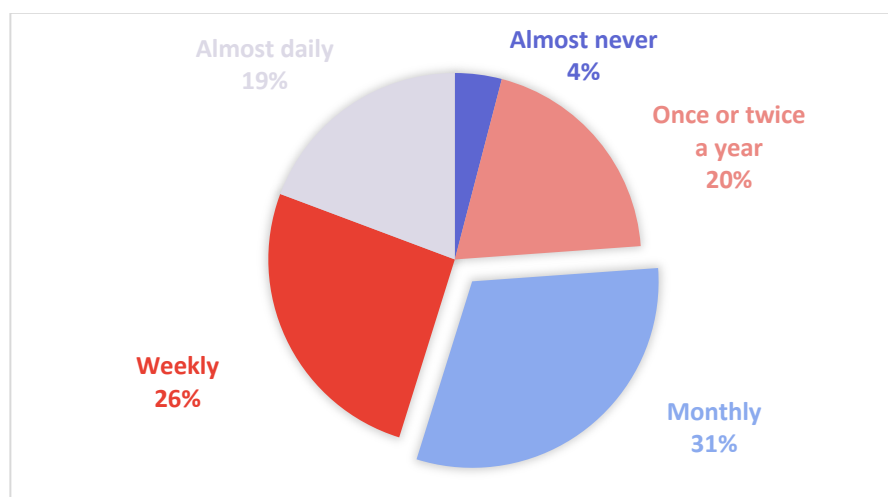**Figure 13.** The use of scientific research (%)
Question 18: "How often do you mention findings from scientific research in your stories?"

Similarly, 45% of respondents reported they refer to scientific research in their stories almost daily (19%) or weekly (26%), while others acknowledged doing it monthly (31%), once or twice a year (20%) or almost never (4%) (see Figure 13 and Q18 in Appendix 2).

Professional values and personal qualities

Professional ethics is one of the most important qualities a professional journalist should adhere to, according to the respondents. When asked "According to you, what makes a good journalist?", 72% of respondents selected ethical standards. Only journalistic independence (84%) and reporting the facts (77%) were chosen more often by the respondents. Also, a vast majority of the respondents (90%) agreed (somewhat agree – 31% and strongly agree – 59%) that journalists should always adhere to codes of professional ethics, regardless of the situation and the context (see Figure 15, Q20).
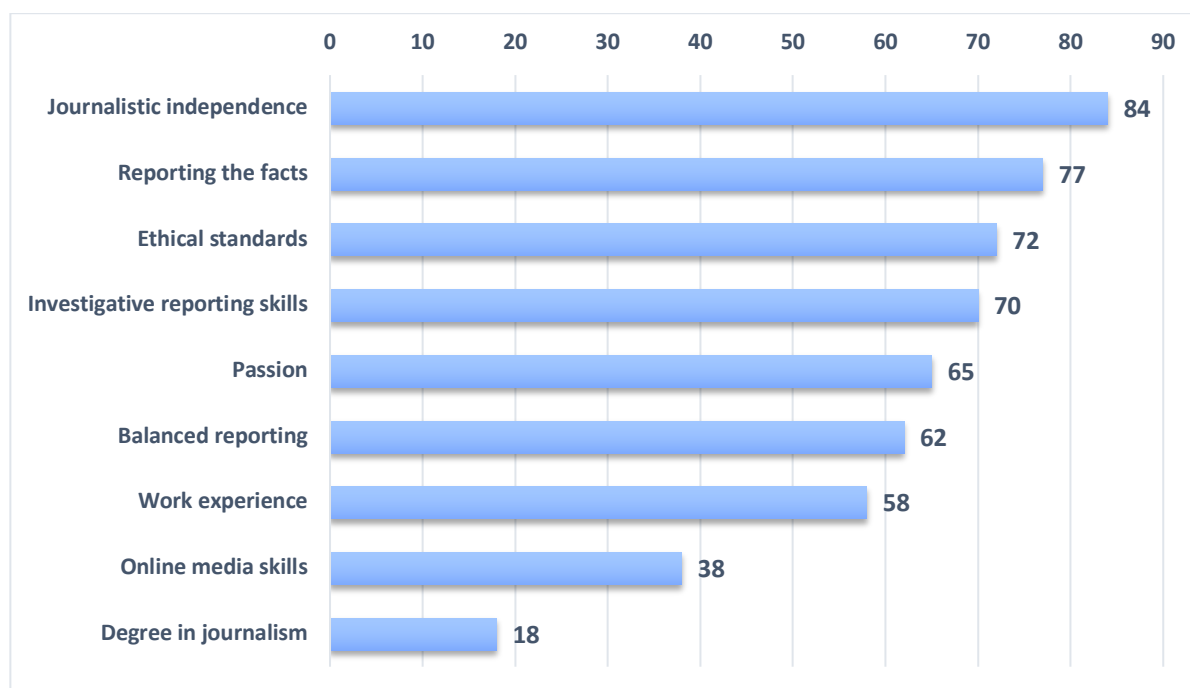

Figure 15. What makes a good journalist? (%)
Question 20: "According to you, what makes a good journalist? Select all that apply." Only selected answer options are reflected in the table. Data presented in percentage.

Further results indicate a more nuanced opinions in relationship to professional ethics: 43% of respondents thought that "what is ethical in journalism depends on a specific situation" (34% somewhat agreed with the statement and 9% strongly agreed), almost a quarter of respondents believed that "what is ethical in journalism is a matter of personal judgement" (19% somewhat agreed and 6% strongly agreed), and more than a quarter of respondents acknowledged that "it is acceptable to set aside moral standards if extraordinary circumstances require it" (21% somewhat agreed and 6% strongly agreed). For differences across countries see Table 1.

Table 1. Statements about professional ethics

Question 21: "The following statements address different approaches to news coverage in terms of ethics. For each of them, please select, on a scale of 1 to 5, how strongly you agree or disagree." The data in the table reflects respondents, who strongly agreed or somewhat agreed with the listed statements:

	Austria	Cyprus	Greece	Lithuania	Other	Total
1. Journalists should always adhere to codes of professional ethics, regardless of the situation and the context.	87%	91%	93%	92%	89%	**90%**
2. What is ethical in journalism depends on a specific situation.	48%	67%	32%	50%	16%	**43%**
3. What is ethical in journalism is a matter of personal judgment.	19%	38%	25%	27%	16%	**24%**
4. It is acceptable to set aside moral standards if extraordinary circumstances require it.	17%	43%	36%	29%	5%	**27%**

Other characteristics. When asked "According to you, what makes a good journalist?", 65% of the respondents said passion, 58% selected work experience and only 18% agreed that a degree in journalism would be an important quality. Respondents also listed transparency, responsibility, trust, honesty, independency, confidence, and other characteristics as important criteria for a good professional journalist (see Table 3).

Relations with the audience

Respondents believed that most of the readers do not have the necessary skills to verify news items when reading and sharing them online, while only 13% agreed to the opposite position. A vast majority acknowledged that helping readers to develop media literacy skills in order to approach online news critically could help strengthen news media organisations' ability to provide reliable reporting and tackle fake news (84%).
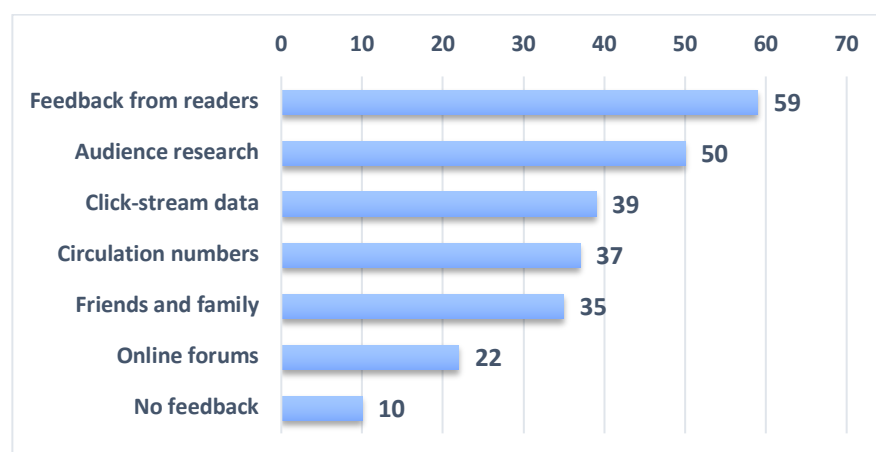

Figure 16. Ways of learning about audience (%)

Question 19: "How do you get information about your audience? Select all that apply." Only selected answer options are reflected in the table. Data presented in percentage.

However, when asked "How do you get information about your audience" almost 10% reported they do not get any feedback about their audience. Some added: "That's not a journalist's job" (see Figure 16).

Building trust

When asked "What kind of measures do you think are important to increase audience trust in news media? Select all that apply", respondents selected listed measurements rather equally: fact-checking (76%), separate news and opinions (67%), more transparency (67%), less clickbait (65%), use primary documents/sources (65%), use more sources (62%), focus on public interest stories (52%) (see Figure 17).
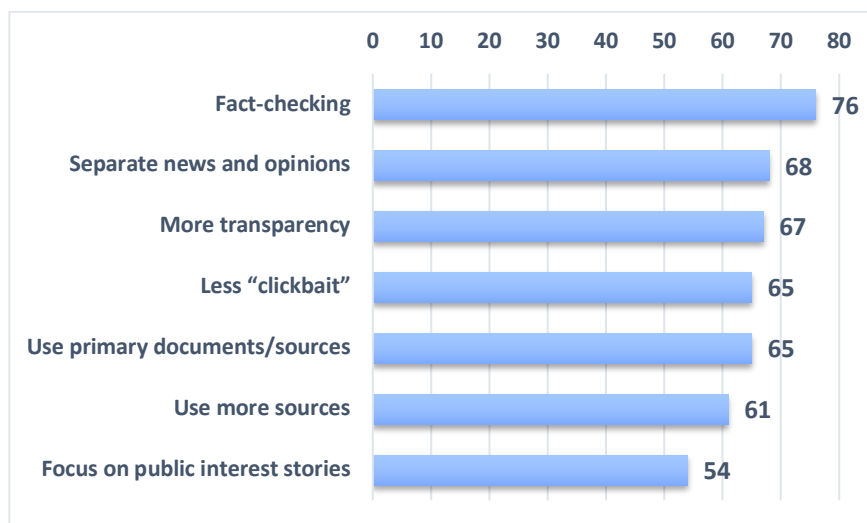
Figure 17. Most often selected measures to increase audience (%)
Question 31: What kind of measures do you think are important to increase audience trust in news media? Select all that apply.

Reporting in times of crisis and permanent change

The impact on daily journalistic routines during the global COVID-19 pandemic

Respondents agreed that the global pandemic had a significant impact on setting the agenda and reporting the news. 76% of the respondents stated that "Other issues have been ignored because of COVID-19" (41% somewhat agreed and 35% strongly agreed). It also affected their own focus and agendas – 72% agreed that their "focus shifted to COVID-19 coverage during the pandemic" (37% somewhat agreed and 35% strongly agreed). Besides, journalists face information overload as a result of pandemic: 41% somewhat agreed and 28% strongly agreed with the statement (see Table 2).

Other effects of the pandemic on journalistic work include: difficulties to understand and explain scientific information about COVID-19 (37% somewhat agreed or strongly agreed with the statement); accessing information from the government and officials (41% somewhat agreed or strongly agreed with the statement); harder to get hold of verified information because of the restrictions in place (43% somewhat agreed or strongly agreed with the statement); difficulties finding independent

sources (30% somewhat agreed or strongly agreed with the statement); 38% of the respondents faced financial problems (due to job loss, salary cuts, cancellation of commissions).

Table 2. Statements about the challenges during the pandemic
Question 33: "The global COVID-19 pandemic has boosted disinformation and increased the need for reliable reporting. How has your work changed due to the pandemic? For each of the following, please select, on a scale of 1 to 5, how strongly you disagree or agree." The data in the table reflects respondents, who strongly agreed or somewhat agreed with the listed statements:

	Austria	Cyprus	Greece	Lithuania	Other	Total
My focus shifted to COVID-19 coverage during the pandemic.	66%	62%	85%	75%	58%	**72%**
I have encountered difficulties to understand and explain scientific information about COVID-19.	37%	62%	39%	27%	26%	**37%**
I have encountered growing difficulties in accessing information from the government and officials.	35%	48%	43%	45%	37%	**41%**
I have faced information overload as a result of the pandemic.	67%	52%	64%	77%	79%	**69%**
Other issues have been ignored because of COVID-19.	77%	57%	83%	75%	74%	**76%**
Due to the pandemic, it was harder to get hold of verified information because of the restrictions in place.	27%	43%	57%	47%	47%)	**43%**
I have faced difficulties in finding independent sources.	24%	27%	36%	29%	37%	**30%**
I have faced financial problems (due to job loss, salary cuts, cancellation of commissions).	33%	33%	53%	37%	21%	**28%**

Changing media landscape: dealing with fake news

A vast majority of respondents believed that "disinformation has become a major problem for the news industry" (41% somewhat agreed and 39% strongly agreed) and more than a half of them said that "disinformation affects my day-to-day work" (41% somewhat agreed and 14% strongly agreed). However, respondents were optimistic about their ability to distinguish between quality and unreliable information: 87% somewhat agreed or strongly agreed with the statement "I can distinguish between quality and unreliable research/information" and only less than 6% disagreed. On the other hand, only 13% believed "Readers have the necessary skills to verify news items when reading and sharing them online". For differences across the countries see Table 3.

Table 3. Statements about disinformation and fake news
Question 29: "The following statements describe different approaches to disinformation and fake news. For each of them, please select, on a scale of 1 to 5, how strongly you disagree or agree." The data in the table reflects respondents, who strongly agreed or somewhat agreed with listed statements:

	Austria	Cyprus	Greece	Lithuania	Other	Total
1. Disinformation has become a major problem for the news industry.	81%	86%	94%	60%	84%	**80%**
2. Disinformation affects my day-to-day work.	44%	52%	72%	42%	69%	**54%**
3. I can distinguish between quality and unreliable research/information.	98%	57%	91%	87%	84%	**87%**
4. Readers have the necessary skills to verify news items when reading and sharing them online.	15%	29%	11%	10%	5%	**13%**

Applying technologies in solving the biggest challenges of journalistic work

While investments (94%) and improving public media skills (84%) were identified as the most important areas to fight fake news, technological solutions were seen as the least effective: 53% of respondents believed the investment in technological solutions to strengthen content verification capabilities, for user-generated content in particular, would be helpful in order to not contribute to the proliferation of fake news.

Despite this, data show that respondents use a good number of tools to tackle fake news and verify information, however, most of them are used by a limited number of journalists. Most often (40%) respondents verify information using reverse image search tools to check the source of photos and other images (such as Google Image Search): 27% said they often make use of such tools and 13% answered always. One third of the respondents use fact-checking websites, such as Factcheck.org, Politifact (21% of respondents use them often and 10% always); tools for identifying trusted news sources, such as Google Fact Check Tools, Fact Checking hints on social media (23% of respondents use them often and 10% always); tools for verifying photos and videos such as Google Earth Pro, Tin Eye (22% of respondents use them often and 8% always); and recording apps for interviews with sources, such as Google Automatic Call Recorder (22% of respondents use them often and 9% always). Least used were tools for tracking contact details for content uploaders, such as Pipl (9% of respondents use them often and 2% always). For more detailed results, please see Table 4.

Table 4. The use of fact-checking and information verification tools

Question 30: There are different tools for verifying information sources. Which tools do you use to assess the quality of information used to produce news content? Please evaluate each of the following measures on a scale from 1 to 5.

	Never	Rarely	Occasionally	Often	Always
Tools for identifying trusted news sources (such as Google Fact Check Tools, Fact Checking hints on social media)	14%	23%	30%	23%	10%
Reverse image search to verify the source of photos and other images (such as Google Image Search)	12%	19%	29%	27%	13%
Fact-checking websites (such as Factcheck.org, Politifact)	20%	21%	27%	21%	10%
Tools for verifying photos and videos (such as Google Earth Pro, Tin Eye)	24%	23%	22%	22%	8%
Tools for detecting plagiarism (such as Grammarly, Copyleaks)	32%	22%	23%	19%	5%
Social media verification platforms (such as Storyful, Dataminr)	43%	23%	18%	13%	4%
Recording apps for interviews with sources (such as Google Automatic Call Recorder)	36%	17	17%	22%	9%
Tools for identifying fake news websites (such as KnowNews, NewsGuard)	37%	25%	17%	15%	6%
Fact-checking and verification resources (such as Verification Handbook, Verification Junkie, First Draft News)	38%	22%	19%	15%	5%
Tools for tracking contact details for content uploaders (such as Pipl)	53%	18%	17%	9%	2%

According to the respondents, investments are needed in order to provide reliable reporting and to effectively tackle fake news. 94% of the respondents agreed it is important to "invest more in different types of journalism (i.e., evidence-based, investigative journalism) to offer reliable reporting and more in-depth analysis" and this could have moderate impact (37%) or strong impact (57%). Respondents also believed the issue could as well be addressed by helping readers develop media literacy skills to approach online news critically (84%); supporting civil society organisations and participative platforms to improve monitoring and debunking of disinformation (e.g. social media councils as proposed by ARTICLE19) (76%); by increasing cooperation with other media organisations (71%); introducing regulatory measures at the policy level to combat disinformation (e.g. through legislation) (63%) or by investing in technological solutions to strengthen content verification capabilities, in particular for user-generated content, in order not to contribute to the proliferation of fake news (53%) (see Table 5 and Q32 in Appendix 2).

Table 5. Measures addressed to strengthen media resilience

Question 32: How effective would the following measures be in strengthening news media organizations' ability to provide reliable reporting and tackle fake news? Please evaluate each action on a scale from 1 to 4.

	No impact	Low impact	Moderate impact	Strong impact
Invest more in different types of journalism (i.e. evidence-based, investigative) to offer reliable reporting and more in-depth analysis	1%	5%	37%	57%
Increase cooperation with other media organisations	3%	27%	44%	27%

Help readers develop media literacy skills to approach online news critically	3%	13%	36%	48%
Support civil society organisations and participative platforms to improve monitoring and debunking of disinformation (e.g. social media councils as proposed by ARTICLE19)	1%	23%	44%	32%
Invest in technological solutions to strengthen content verification capabilities, in particular to user-generated content, in order not to contribute to the proliferation of fake news	3%	19%	52%	26%
Introduce regulatory measures at the policy level to combat disinformation (e.g., through legislation)	6%	32%	39%	24%

While it is evident from the earlier data, that complex and controversial issues are lacking quality coverage, respondents provided a number of recommendations to deal with this challenge (see question 34). Respondents were asked "When you are preparing a story that may be controversial, what would be your advice to a young journalist to adopt when dealing with controversies?". While a majority of the respondents focused on research, sources, and reporting, others also highlighted professional and personal characteristics and relations with the audience (please see the table 6).

Table 6. Recommendations from respondents regarding controversial topics

	Qualities and principles identified by respondents
Research and sources:	Listen; Dig deeper; Be critical/sceptical of everyone; Check your facts; Be aware of fake news; Acknowledge controversial aspects; Listen to those with different opinions (even if you think they are wrong); Keep your mind open; Investigate all the angles; Trust science; Look for primary sources (e.g., scientific data, peer-reviewed articles); Adopt technological solutions for content verification. **Sources**: Look for trustful and independent sources; Check your interviewee's background – always be critical; Look for more sources; Including check all the angles; Don't rely on anonymous sources.
Reporting:	Be objective; Do not take sides; Do not oversimplify; Provide evidence / strong arguments; Clarify; Balanced but fair reporting; Only choose focus/frames after careful research; Be open – tell what you do not know; Be interesting but avoid sensitization; No personal opinion; Report verified personal stories; Always be precise; Explain different angles.
Relations with the audiences:	Know your audience; Understand the impact on the public and be responsible for it; Get along with scientists.
Professional values and personal characteristics:	Transparency, responsibility and trust; be open about your lack of knowledge; Constantly educate yourself; Always be open; follow the ethics; Honesty; Independency; Confidence; Doubt in yourself; Love to yourself; Stay detached; Stay calm; Stay strong; Be fearless.

Based on answers from question 34: COVID-19, climate change, 5G technology, vaccines, migration, abortion, nuclear power, and many other topics have a controversial angle. When you are preparing a story that may be controversial, what would be your advice to a young journalist to adopt when dealing with controversies?

It should be mentioned that some of the recommendations are opposing one another. For instance – "be confident in yourself" vs. "always doubt yourself". Also, further clarifications have to be made regarding "balanced but fair reporting" and "verified personal stories".

Reflections on the future of journalism

Finally, the respondents were asked how they feel about the future of journalism and whether they would advise a journalism career to a young student. The question on the future of journalism was the one that divided the respondents into three, relatively similar, groups, i.e., optimists (36%), pessimists (30%) and neutrals (34%). For country specific results, please see Question 25 in Appendix 2.
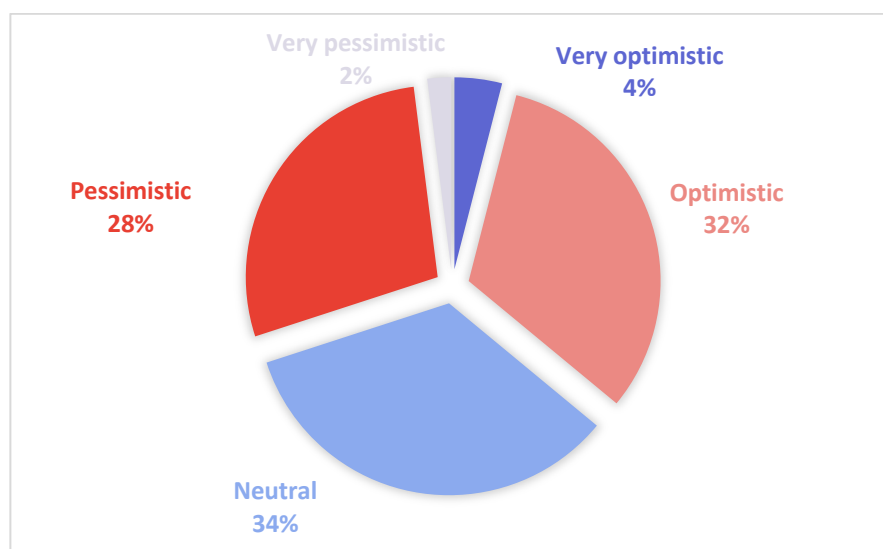
Figure 18. Distribution of responses (%)
Question 25: How optimistic are you about the future of journalism?

However, a majority of the respondents (57%) felt they would rather encourage a young person to become a journalist than not (38%) (see Figure 19). More reflections and insights on the role of media and journalism in the changing communication ecosystem are provided in Table 7.
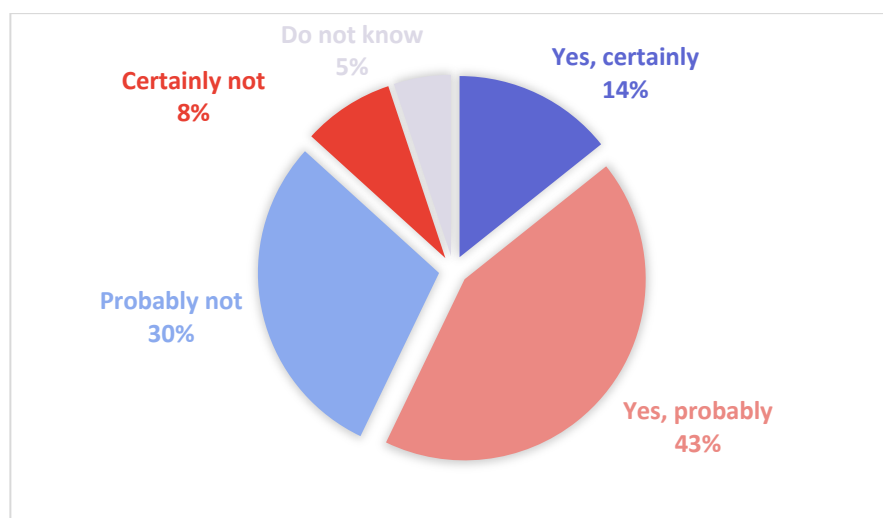

Figure 19. Distribution of responses (%)
Question 27: Would you recommend a journalism career to a young student?

Table 7. Reflections/insights shared by the respondents

	Recommendations
Role of media:	*"The media is still setting the agenda for the political actors and is the main means of communication between the official and the wide audiences. Also, such situations as COVID-19 pandemic are especially proving that **media is vital in covering the situation and making sure that the transparency is guaranteed in the governing processes**."* Editor from Lithuania with 6-10 years of experience ***"We need journalism as a compass and a ship in the ocean of information, fake news and disinformation."*** Freelance journalist from Lithuania with 21 years of experience
Changing journalism:	*"I have the impression that, despite all the significant problems mentioned above, there are great reporting projects being published every month, sometimes with deeply reported stories, sometimes with very innovative ways of presenting these stories. And one thing that makes me somewhat optimistic, as well, is that **cross-border collaborations** seem to be now a lot easier than before, we see many such investigations published in the EU and USA, mostly, which I think is good because a better approach can be offered to common issues."* Freelance journalist from Greece with 6-10 years of work experience *"The post-Covid-19 media world – like the rest of society – is going to be more data-driven, more algorithmically-powered. So it's vital for journalists to get across these trends. But they can't do it alone anymore. **They need support to protect journalism values and to innovate.** We are now in a phase where journalism is going to become much more distributed, much more diverse in terms of the organisations, and much more devolved in terms of how people get their information. The financial models are changing, there's less money to cover the news as it's been done traditionally. For some news industry managers, they can legitimately get rid of the expensive journalists, take an amateur's copy for free and make in the profits. The ecosystem of quality work extends far beyond what we've traditionally called journalism. In recent years, business publishers have pioneered a whole range of new platforms and techniques that that were subsequently adopted by mainstream media. The vision of a journalist-free future that's taking shape within the sector may soon prove relevant in the wider world, too."* Self-employed journalist from Greece with over 21 years of work experience
Training of journalists:	*"The world needs **well trained journalists to provide ethical and unbiased information**. Despite the challenges media is facing today, journalism career provides the possibilities to really make a difference in the world, as well as it ensures endless possibilities for personal growth other careers don't."* Freelancer from USA with 11-20 years of experience
Professional values and standards:	*"There is no special advice for controversial stories. Almost every story is controversial – otherwise it is no story. Check your facts. Hear different sources. Report what is. You should use the same standards on every story and use no special mindset for stories which might be more controversial than others."* Editor from Austria with 6-10 years of experience

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CONCLUDING REMARKS

1. *Journalistic freedom and coverage of complex topics.* Journalistic independence and freedom were highlighted as major requirements for high quality journalism. The fact that the vast majority of journalists experience great freedom in choosing their topics for coverage sounds encouraging. However, participants also strongly agreed that the lack of attention to the complex issues is one of the biggest problems in today's media and journalism. Though the data cannot provide an answer to this question, it would be important to explore it: What are other reasons and challenges concerning the reporting on complex issues, while having the freedom of choice yet noticing insufficient coverage of complex topics?

2. *Sources of information.* Traditional sources for journalistic research, including personal contacts, press releases, and news agencies, are still important, but some of the new channels, including social media, web-based materials, and information gathered via search-engines, are becoming more and more prominent. However, the truthfulness and validity of those sources have to be taken into account while reporting. More importantly, scientific research as a primary source was selected two times less often compared to social media or personal contacts.

3. *Dealing with fake news.* While respondents acknowledged that fake news is becoming a big issue in journalism, they also seemed to be optimistic about dealing with it. Interestingly, technological solutions were not seen as being effective to fight fake news, nor have they been used on a regular basis to verify information.

4. *Media audience.* Respondents were pessimistic about their audiences' abilities to assess the quality of information; however, they also understand it is important to improve citizens' media literacy, but it seems that not enough attention is paid to the journalist-audience relationship, and it is not considered as a significant issue for journalists.

5. *Journalistic qualities.* Respondents agreed that professional ethics is one of the most important assets of high-quality journalism. But they also reported a rather mixed approach and understanding regarding professional ethics: while answering the general question about professional ethics, the majority supported a deontological approach to ethics. However, more specific questions – about situational or personal aspects – disclose another side, which is closer to situational ethics. While our data cannot provide deeper insights, it would be important to explore if such "ethical flexibility" can affect coverage during times of crisis or controversies, when the pressure is high, and it becomes more difficult to make ethical choices.

6. *Passion.* Data indicated passion is considered as more important than work experience or a degree in journalism.

7. *Reporting news during crisis.* The pandemic had a strong impact on agendas by shifting the coverage towards COVID-19 issues and ignoring other topics, which normally would have been covered.

8. *Changing media ecosystem.* The survey outcomes reassure the future of professional journalism is not so much about information dissemination being first, but instead about being reliable and trustworthy, maintaining high standards of professional integrity, and responsibility.

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