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DISorders

Report on the user needs of fact-checkers

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Executive summary

This deliverable aims to derive and prioritise the user needs of the fact-checkers participating in the NORDIS project. We analyse innovation challenges in fact-checking and, together with fact-checkers, develop our understanding of work processes and the current state-of-the-art technology with regard to the use of artificial intelligence (AI) tools in newsrooms. The report guides our design and development work in the project.

Our research identified four **types** of tools that are needed: social network monitoring, political debate monitoring, claim collection and detection, and verification in context. In addition, our research pointed to concrete **characteristics** and uses for new tools, ranging from the accessibility and readability of fact-checking results to shared databases of checks, tools for monitoring political debates, and the adaptation of tools to Nordic languages. Finally, we highlight four requirements for the **development and design** of new fact-checking tools: the consideration of the journalistic context, the consideration of ethical principles and human values, the consideration of the transparency of the process at work, and the need for a human-in-the-loop approach.

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1. Introduction

The Nordic Observatory for Digital Media and Information Disorder (NORDIS) is a consortium of researchers and fact-checkers from Denmark, Norway, Sweden, and Finland. We are one of the regional hubs of the European Digital Media Observatory (EDMO), a project that supports the independent community working to combat disinformation. EDMO serves as an observatory for fact-checkers, academics, and other relevant stakeholders. It encourages them to collaborate, actively connect with media organisations and media literacy experts, and provide support to policymakers. This helps to coordinate actions in the fight against disinformation.

NORDIS is funded by a grant from the European Commission and led by Aarhus University's DATALAB. Our specific aim is to develop theories, practices, and models that can help counteract digital information disorders – the spreading of misinformation, disinformation, and other forms of harmful information online – and empower citizens in the Nordic welfare states to resist such information by enabling them to enhance their media literacy. We also work closely with the fact-checking community to develop verification tools. The aim of this deliverable is to derive and prioritise the user needs of the fact-checkers that participate in the NORDIS project. We analyse innovation challenges in automated fact-checking (AFC) and, together with fact-checkers, develop the comprehension of work processes and the current state-of-the-art technology with regard to artificial intelligence (AI) tools in newsrooms.

The methodology for this task fits into the perspective of user-oriented design (Veryzer et al., 2005). This report provides an orientation that fosters a deeper understanding of user needs and what constitutes value in practical terms for fact-checkers. It also provides guidance for our development work in the project at the University of Bergen, which involves improving fact-checking technologies and developing new tools for solving specific problems in fact-checking. These tools will be developed as stand-alone applications while considering the potential of their integration into existing platforms devoted to fact-checking, such as Truly Media. Examples of these tools are novel multimedia forensics tools that would allow users to reveal traces of the past processing history of images and videos, supporting data authentication and modification (editing and re-encoding) detection. A pre-prototype (Tran et al., 2022) of the multimedia forensics tool has been presented.

This report especially focuses on professional fact-checking practices in Nordic countries. These have a long tradition of freedom of media and self-regulation for the media, which testifies to strong democratic foundations, and these practices lead to one of the highest levels of daily news consumption in the world (Lundgren et al., 2018; Allen and Pollack, 2019). Professional fact-checking is, thus, developing in what we may consider a particularly favourable context for journalists and media. According to Duke University's Reporters Lab¹, seven fact-checking organisations are currently active in Denmark, Finland, Sweden, and

¹ See: <https://reporterslab.org/fact-checking/>



Norway. They can either work as independent entities or constitute a collaborative network between established media companies (Lundgren et al., 2018). Fact-checking activities are not limited to these specialised organisations alone since they are also part of journalistic routines and may be embedded in newsroom-specific services.

2. Framework and methods

The task of manual fact-checking can be deconstructed in four stages: extracting statements to be fact-checked, constructing appropriate questions, obtaining the answers from relevant sources, and reaching a verdict using these answers (Vlachos and Riedel, 2014). Although the conditions of use of AFC tools are well defined in the scientific literature, there is far less evidence about which specific tools fact-checkers need at each of these four stages or what tools they usually use to perform the primary tasks of monitoring media and capturing content, detecting claims, checking claims, and publishing content (Babakar and Moy, 2016; Konstantinovskiy et al., 2021).

Since users' needs can be explicitly or implicitly expressed, our method relied on a mixed approach that included the following: (1) 19 interviews with journalists and professional fact-checkers, including three newsroom managers and two R&D managers; (2) a critical review of the scientific literature. The aim was to identify and define the outcomes of the research focusing on the uses of AFC tools in a journalistic context. These methods are theoretically framed by an interdisciplinary perspective where journalism studies, science and technology studies (STS), and human-computer interaction (HCI) intertwine.

2.1. *Epistemology of use*

To understand the complexity of the very notion of user needs, we investigated the epistemology of the concept of use and its derivatives. In the field of HCI, the use of a system is related to its effectiveness. According to Nielsen (1994), effectiveness is achieved when “there is a proper balance between the functionality and the usability of the system” (Karray et al. 2008, p. 138). Functionality is described as the set of actions or services provided to the user (Karray et al., 2008, p. 138), while usability refers to the quality attribute for assessing the ease of using a system.

A user-oriented design points out the need for user design consideration in the context of digital product development that transforms a bundle of technology with the ability to provide functionality into a “product” that people desire to interact with and from which they derive benefits (Veryzer and Borja de Mozota, 2005, p. 128). Since the utilisation of this approach requires an extensive understanding of the user, it fosters a deeper appreciation of user needs and what delivers value to users by evaluating problems and proposing solutions in the context of relevant user experience dimensions. The optimal result is products that provide the maximum benefit to users.

According to Nielsen (2012), usability covers the methods for improving the ease of use during the design process. The overall acceptability of a computer system encompasses both its social and technological acceptability, which is translated through the main usability characteristics (whether it is easy to use and memorise, efficient, error-free, and subjectively



pleasant). It is about defining if the system is good enough to satisfy users' needs (Nielsen, 1994, 1999).

The concept of user needs is also strongly related to the "user experience" (UX), which is a multidimensional concept related to the users' overall satisfaction. Three ISO standards consisting of guidelines aiming to improve the efficiency of a product or a service² allow us to better understand the complexity of the scope covered here. The ISO 9241-210 standard regarding the ergonomics of computer systems defines the ability of a system to be used by all types of users under the umbrella of the term "accessibility". To do so, it presupposes a design centred on a human operator while considering their needs and experiences.

The ISO 9241-11³, which is related to the ergonomics of human-system interactions, defines the usability of a system as the extent to which users can use a product or a service to achieve specific objectives with effectiveness, efficiency, and satisfaction in a specified context of use (Abran et al., 2003). The context of use consists of a combination of users, objectives, tasks, resources, and environments likely to influence usability.

Finally, the ISO/IEC 14598-1⁴, which refers to the information on and evaluation of software products, connects the concept of quality, defined as an inherent characteristic of the product, to the concept of quality of use, defined as the extent to which the needs of a user are met under specified conditions. Therefore, the needs of a given user are intrinsically related to the goals to be achieved in a given context, which may vary from one user to another depending on the user's subjective experience.

From an STS (and sociological) perspective, a first distinction can be made between functional and social use, which refers to patterns of use shared by individuals or groups (Proulx, 2005). The idea of a mutual shaping of users and technologies also spread in journalism studies, where the use of digital tools was tackled from the perspective of all its socio-technical components and characteristics (Boczkowski, 1999, 2004). Additionally, the use of the fact-checking tools can be approached either from a functional point of view, such as to verify the origin of a given picture shared on social networks, or from a social point of view, according to which the tool is used since it is developed and/or promoted by a given community with which individuals identify themselves.

A second distinction can be made between use and practice, which refers to contextual social uses (Jouët, 2000). Professional practices share common patterns with appropriation. Also, this form of use is characterised by the "act of constituting a self", as the user is no longer a

² ISO is an independent and non-governmental organisation involving 167 national standards bodies. ISO standards aim to provide guidelines for the implementation of best practices in the context of the development of products or services. They are consensus-based and result from a sharing of knowledge between experts and researchers in their field (Lalonde and Boiral, 2012). Although standards provide methods, they do not guarantee the effectiveness of the product or service (Guler et al., 2002).

³ See: <https://www.iso.org/obp/ui/#iso:std:iso:9241:-11:ed-2:v1:en>

⁴ Revised as ISO/IEC 25040 <https://www.iso.org/obp/ui/#iso:std:iso-iec:25040:ed-1:v1:en>

“passive consumer” but an “actor” who uses a product or a service through the prisms of subjectivity (the user as an individual) and collectivity (the user as a part of a collectivity) (Jouët, 2000, p. 502). The user is then seen as an actor in context corresponding to particular referents and depending on personal history. The context of use as well as the way in which the user represents the technological object and how she/he interacts with the object, which may differ from the representation of its designers, frames the construction of the uses, and this can be tackled both from an individual and a collective perspective (Flichy, 2008; Orlikowski, 2000). These learnings echo the theory of communities of practice (CoP), which was mobilised in journalism studies. It states that technological innovations “are usually embedded in processes of redefinition of group dynamics and work routines in the newsroom in an open process that mutually shapes the technical developments and the professional practices” (Schmitz-Weiss and Domingo, 2010, p. 1160).

A technological tool can be approached according to a scenario that is written by the tool’s designers. This scenario defines a space, the roles, and the rules of interaction for the users act (Akrich, 1991). We can assume that fulfilling the users’ needs is an important part of constructing a successful scenario. Nevertheless, it is much more intricate to tackle the question of the non-uses since it cannot be solely related to the user’s needs. Indeed, a fact-checking tool may answer the need of a given user (for instance, debunking a deepfake), but it won’t be used because the tool requires specific training or because there exists another tool that does the same task and that the user is more familiar with.

2.2. Semi-structured interviews

Defining user needs appears to be a complex task as regards the heterogeneity of the scope of the concept of use. In our case, fact-checkers are integrated into various organisational structures, each of them carrying particular contexts of use. They also have socio-professional (or socio-cultural) backgrounds and technology usage habits that are potentially different from one individual to another. In our previous report about state-of-the-art fact-checking technology, we identified 133 tools⁵ that are on offer for fact-checkers (Lindén et al., 2022). However, we did not assess how many of these were routinely used by fact-checkers on a daily basis. This report contributes to filling this gap through semi-structured interviews of professionals involved in fact-checking activities.

The interview guide included 29 open questions (Annexe 1) based on four central topics framed by our theoretical approach of the epistemology of use:

- 1. Context of use:** It concerns the professional background and skills and aims to define the socio-professional context of the respondent.

⁵ See:

https://docs.google.com/spreadsheets/d/1oIFvwR8b_7v9osdJwueNo4KSBb2p7PuqQQD4XKhO7k8/e dit#gid=0



2. **Perception:** It encompasses aspects related to the ethics and perceived benefits of fact-checking to identify how journalists and professional fact-checkers consider their professional responsibility and relationship with their audiences.
3. **Professional routines:** They are related to the recurring tasks all along the fact-checking process, from gathering information to writing the narrative.
4. **User experience:** It relates to fact-checking as a process, the fact-checking tools users employ for each particular task, known but unused tools, and the expected features of a fact-checking tool. This theme was also essential to assess the critical characteristics connected to the concepts of functionality, accessibility, usability, efficiency, and the satisfaction associated with the pleasure of using a tool.

Fourteen respondents were primarily selected from the newsrooms and organisations participating in the NORDIS project. We have included in our selection five non-Nordic professional journalists and fact-checkers participating in the EDMO project to gain insights into the common patterns of and shared views on fact-checking activities. The aim was, thus, to detect whether there are specificities in fact-checking practices within the Nordic countries where “the Nordic media model” is considered a distinct cluster (Syvertsen et al., 2014).

The average length of an interview was 64 minutes per participant. Their responses were anonymised in our analysis, but we retained the information about the country of origin and the type of media organisation for which they work since this socio-professional context is likely to influence needs and uses (Annexe 2). The qualitative analysis of the interviews relied both on a general inductive approach (Thomas, 2006) and an automated inductive approach to give rise to new explorations and discoveries (Molina and Garip, 2019; Grimmer et al., 2021). The narratives developed in the user stories used a combination of the interviewees’ answers to define the user types that reflected, at best, the diversity of our interviewees’ profiles.

2.3. Critical literature review

Considering that AI-based tools can be viewed as a means to fight information disorders quickly and effectively, our empirical results were put into perspective with the help of state-of-the-art current research on automated fact-checking (AFC). More specifically, it consisted of a systematic literature review that aimed to identify if and how journalists have been considered in the development of these tools and what challenges emerged. Therefore, we collected a corpus of 267 papers about AFC published in academic journals or as book chapters and conference proceedings over the past five years, that is until April 2022, given the recent developments of AFC.

The collection of the corpus was carried out via Google Scholar, Semantic Scholar, and Scopus between 14 March and 31 March 2022. Each query was approached in terms of complementarity to refine the quality of the corpus:



- fact-checking AND "machine learning" (Google Scholar)
- automated AND fact-checking AND journalism (Semantic Scholar)
- ("machine learning" OR "automated") AND fact-checking (Scopus)

These queries returned 918 results. Books, unpublished papers, and dissertations were excluded. Duplicate entries were removed as well as papers falling outside the scope of this research, which primarily focuses on the state-of-the-art AFC systems or tools and then on the integration of a user perspective. A total of 267 papers were kept after the application of the exclusion rules (Annexe 3). We have created a database containing the details about the papers (author, title, year and type of publication, research field, number of citations, and abstract). We supplemented the information with manual annotations of the abstracts and defined whether the publication presented an apparent connection to journalism (to which we link fact-checking activities in our report) and whether it considered end-users. This last step in the selection process allowed us to identify 22 papers that supported our analysis of the conditions of use of fact-checking tools within a critical approach grounded in journalism studies.

2.4. User stories

Our user-oriented design methodology was essentially about bridging communication problems – what do people need and how are these needs expressed and addressed? On one side, there were users (in our case, fact-checkers) with an organisational and skills-based perspective; on the other side, there were researchers and developers with their own preferences who might have lacked domain knowledge and struggled to understand user needs. For the purpose of bridging views, we utilised user stories grounded in interviews with journalists and managers from fact-checking organisations.

User stories explore functionalities that potentially would be valuable for the users of the software (Cohn, 2004). Among the different variations of user stories, Lucassen et al. (2016, 383) identified three aspects that they had in common: "(1) a short piece of text describing and representing the user story, (2) conversations between stakeholders to exchange perspectives on the user story, and (3) acceptance criteria". The user stories written for this report mainly represent the first and second of these aspects. They are based on the interviews conducted with the Nordic fact-checkers and reflect the four categories of fact-checkers that we met. Adding direct quotes to these personas - which consists of a representation of a group of users in a single user (Tomlin, 2018) - makes them feel "real". The function of user stories is to help outsiders, such as researchers without domain knowledge, to gain an understanding of how fact-checkers do their work.

3. Identifying users' needs

Identifying users' needs first implies an understanding of the contexts of use of fact-checking tools. Therefore, fact-checking was tackled through the complementary lenses of professional identity and practices. It was also essential to frame the conditions of use, which contributed to explaining why a given tool was used or not. In our epistemological framework, we have seen that the very notion of use is strongly connected to the tool's social and technological acceptability (Nielsen, 2012). Therefore, the aspects related to the automation of fact-checking tasks, either partially or entirely, were also investigated. Finally, we focused on the need for new tools as expressed by our panel of interviewees before detailing practical implications from the perspective of developing news tools to support fact-checking practices.

As a preliminary step, the four user stories developed below aim at explaining in a narrative way how fact-checkers go along with their work and illustrating the diversity of what they do. They are an amalgam of things pointed out during the interviews with fact-checkers and serve as guidance for researchers when exploring their needs.

3.1. Four user stories

3.1.1. Media comment sections are important for spreading disinformation

Lisa is the only person in her three-person organisation that does fact-checking regularly. She is a highly experienced journalist, and she has been working in the field of fact-checking for over 10 years. Her most important source of claims is the comment sections in news media and social media, based on which she can identify what forms of information disorder are spreading and easily measure their impact on public discussion. Lisa thinks that most of the disinformation happens in comment sections. But analysing that content is the most time-consuming part of her work. She believes that a tool that scans comments on posts published online would be useful since she can find posts easily enough but sifting through a lot of comments is harder. She knows that there are tools for Facebook that expand all the comments in a comment section. However, they are full of bugs and slow to use. Moderation of comment sections is problematic for newspapers and media houses. Both researchers and tech companies have shown that it is possible to automate the detection of harmful comments with inappropriate language and offensive remarks instantly⁶.

Another time-consuming part of Lisa's work is searching for content that has been taken down and has disappeared. She uses the Internet Archive Wayback Machine for that, but she lacks access to some form of repository for problematic content that would preserve such content. Lisa thinks that it would be a useful tool and has shared this view with other fact-checkers, as it was mentioned in March 2022 during a workshop on technology with fact-checking developers within the EDMO community. She considers that her most important tool is her

⁶ For example, Brand Bastion: <https://www.brandbastion.com/>; Hive Moderation: <https://hivemoderation.com/>; Ifrågasätt: <https://ifragasatt.com/>



phone since she is constantly in contact with experts with domain knowledge of specific topics. That is a part of her work that is impossible to automate.

3.1.2. Automation still far away

Tore is a journalist and developer with extensive knowledge of fact-checking technology and good technical skills who is working for a larger fact-checking organisation. He mainly uses Python and SQL and some basic HTML and JavaScript, mostly for certain stand-alone projects. Sometimes, it could be relevant to do some web scraping, store the scraped information in a database, and analyse the entries using the right tools.

Tech companies developing fact-checking tools sometimes ask him to test their prototypes. So far, he has seen little of the new technology with added value in terms of the functionalities he is looking for. For instance, the British fact-checking organisation Full Fact has tools for identifying claims. He thinks it could be interesting to try out these tools in a Nordic context as a result of their potential to find more claims to assess and make the information gathering process quicker. He said, “But it’s not something that you could just throw out on your website and not do manual work as well. I think some of these things could be useful in the future as tools for journalists”.

He has been in contact with multiple people who try to provide automatic fact-checking solutions and consider some of them to be useful, such as assessing and scoring articles. He has tested some of the tools, but they do not identify claims or fact-check them, so he thinks AFC is something that might emerge in the future. He has said, “I think we’re quite far away from that being a possibility for the moment.” When judging the importance of a claim or deciding if it is a joke or not, it is impossible to avoid manual assessments. He has said, “I say what we spend the most time on is probably stuff that is hardest to automate. That’s talking to information sources, writing to them, [and] doing the fact-checking work”.

3.1.3. Need to understand society

Martin is the manager of a small team of fact-checkers, and he looks at his colleagues from a human resources perspective. He thinks that the most critical skills for a fact-checker are developing a deep understanding of how society is built, how it works, and how to use social media.

Journalists need to be able to observe problems, ask critical questions, and have advanced knowledge of using spreadsheets and seeing connections in data.

Being a manager means that Martin is also responsible for an important part of the revenue stream, which is the Facebook Third-Party Fact-checking Network. Facebook pays fact-checkers for analysing claims posted by their users. For some fact-checking organisations like Full Fact in Europe, it brings in hundreds of thousands of dollars in revenue. For Martin, who receives public funding in addition, the dependency is much smaller, but it counts. He also receives funding from Google for a media literacy campaign. Facebook and Google are the



main funders of fact-checking activities in the world for separate reasons: Facebook needs to moderate posts, and Google wants to make sure that its query results reach a high-quality level.

However, Martin thinks that Facebook's system for feeding posts to fact-check is too opaque. It seems like some of the problematic posts sent by Facebook are based on what users flag, but there is also an automated feed based on unsupervised machine learning: "We're not being told, but there's definitely an algorithm that also understands Danish phrases, and topics. I don't know if they even know how it works themselves. It's very smart". However, Martin is not comfortable with the fact that Facebook does not allow fact-checkers to verify political claims or political advertisements, as the social media platform tries to stay away from conflicts with politicians around the world. It seems like the algorithm learns to determine if a post is eligible or not and if it is fake, true, or satire from the work of fact-checkers. The algorithm also focuses on Facebook users that have previously been deemed problematic.

The team is also using Facebook's data access service Crowd Tangle, but they get too much "noise" and prefer another service from Norway, Storyboard, which is better at finding problematic content. Due to the funding received from Facebook, a lot of fact-checkers are looking at claims or stories that were spread on that particular platform. Martin would like to use independent tools for analysing the virality of their contents, such as the service Meltwater provides, but it is much more expensive than Crowd Tangle, which is owned by Facebook.

Just like Tore, Martin gets a lot of queries (around twenty a year) from researchers and start-ups that want his organisation to test the tools they have developed. He has said, "Some of those universities that are contacting us to participate in project funding, I'm sorry to say, are totally irrelevant for us".

3.1.4. Blending of fact-checking and media literacy campaigns

Jane is working in a three-person fact-checking team, and her main tools are Crowdtangle for Facebook posts and Tweetdeck for tweets. She has attempted to automate the process of monitoring claims as much as possible. However, the operation is small; with her colleagues, she is publishing around 20 fact-checks a year. The team also works extensively with media literacy campaigns in schools and public awareness campaigns. The fact-checks have an instrumental value in educating the public about how disinformation works. Therefore, she is more interested in the quality or the influence of fact-checks, which can add to public understanding of disinformation, rather than the quantity. That implies a division of labour within her organisation, leaving aside fact-checks on issues like ivermectin or questions such as "Are there Nazis in the Ukrainian government?", simple cases that others have already checked years ago. She sees it as a constant cost-benefit analysis for a small fact-checker who is more interested in how information works than just the detection of disinformation texts. She said, "We try to contribute to a fact-based public debate and information literacy".



Jane's home country is small, and a large study she did on how disinformation spreads showed that a large share came from certain politicians from an opposition party. Jane tries to steer clear of always fact-checking the usual suspects. She says, "We try to avoid it, but what can you do?" Jane highlights that these operators are spreading disinformation regularly, and she believes that these "usual suspects" are not treated as critically as they should be.

The legacy media contribute to the problem of information disorders as they spread claims that are not true. Jane calls it "junk news" instead of "fake news" and points to the fact that journalists should know better than to uncritically publish unverified and unfounded statements. However, Jane and her colleagues maintain what they call a "strategic silence", as they do not want to provide visibility to certain actors. Instead of confronting problematic spreaders and saying that something is outright false, they apply a softer approach where they propose that the scientific understanding of a claim is that it is not true or only partly true. They also publicly acknowledge that there is a political dimension to fact-checking.

Jane says, "Then we explain from where this understanding comes, and we go into detail in saying that. It can be more demanding for our readers, but we believe in an open society where our public also wants to better understand how facts are constructed in society or where facts come from". Her small organisation has a long-term strategy of contributing to some sort of behavioural change or critical thinking. Individual fact-checks have a limited impact, but when combined with an information literacy approach, they might attract more attention. All in all, Jane and her team see little potential for automating fact-checking, except maybe for monitoring claims.

3.2. Contexts of use

As shown in the four user stories above, the professional profiles of our panel of fact-checkers encompassed a variety of experience and professional skills, ranging from a traditional connection to journalism to skills broadening into computing practices. However, all agreed that they belong to the social world of journalism and, in particular, to the subworld of fact-checking, which is characterised by the practice of slow journalism in contrast with fast and instantaneous journalism (Le Masurier, 2015) that tackles claims or facts already made public. Nevertheless, fact-checkers may discard the time pressure, while publishers may be stressed by it (Himma-Kadakas and Ojamet, 2022).

"Fact-checking is part of journalism. It's [a] genre, it's part of the field of investigative journalism. We use the same tools, very much the same skill sets, the same approach (...)

We do not discover new things, but we revise."

JFC1, Norway

Most of our interviewees stated that they follow the journalistic code of conduct applicable in their respective countries, which indicates their commitment to the world of journalism. Their identification with the subworld of fact-checkers can be considered as a claim about their



professional identity (journalist and professional fact-checker), which is also transferred to their adherence to International Fact-Checking Network (IFCN) principles. These were specifically developed in the context of fact-checking and are intertwined with the ethical principles of journalism. Emphasis is placed here on transparency, fairness, and accuracy, which are identified as the pillars of any fact-checking process and any fact-checking narrative. IFCN principles consist of five commitments⁷ that aim “to promote excellence in fact-checking”: (1) commitment to non-partisanship and fairness, (2) commitment to the transparency of sources, (3) commitment to the transparency of funding and organisation, (4) commitment to the transparency of methodology, and (5) commitment to an open and honest correction policy.

In comparison with the IFCN principles, the four Nordic codes of ethics⁸, the principle of fairness is the most prominent, while reliable sources and the correction of errors are also emphasised. Ethical principles of journalism go far beyond the IFCN principles; the latest study conducted for the Alliance of Independent Press Councils of Europe (AIPCE)⁹ emphasised that the four Nordic ethical codes for journalism encompass six core principles and more than 40 sub-principles. However, our interviewees reported seeing no big differences between the ethical principles of journalism and the IFCN principles:

“The IFCN rules and the press ethical rules of Denmark, more or less, are the same.”
JFC12, Denmark

Frustration arises when the journalist or fact-checker is not able to check a claim or receives no answer from her/his information sources, when the fact-check does not reach as many people as the original claim despite the amount of accomplished work, and when it comes to writing according to a repetitive narrative structure. These reasons highlight two other characteristics of fact-checking activities: their limitations, as it is impossible to fact-check every public statement, and the repetitive and time-consuming nature of the work.

“Frustration is mostly based when I’m writing, I think. And then, using the same formula, the same words again and again, and the same sentence because we structure our articles in the same way often.”
JFC14, Denmark

The examination of the tasks deemed repetitive and time-consuming allowed us to identify that monitoring and claim detection activities are associated with the most boring tasks and,

⁷ Source: The commitments of the code of principles, IFNC, Poynter, <https://www.ifncodeofprinciples.poynter.org/know-more/the-commitments-of-the-code-of-principles>

⁸ The Norwegian, Finnish, Danish and Swedish ethical codes are available in English on the website of the Alliance of Independent Press Councils of Europe <https://presscouncils.eu/ethicalprinciples/index.php>

⁹ Source: Raymond Harder, Raad voor de Journalistiek, *Ethical principles of journalism, ethical codes database*, Media councils at the digital age, Alliance of Independent Press Councils of Europe (AIPCE), <https://presscouncils.eu/ethicalprinciples/index.php>



in some cases, the writing too. It can be explained by the strict narrative format followed in several newsrooms; the patterns follow the ethical principles of transparency, explainability, and reproducibility of the results.

Viewing fact-checking activities as the sum of repetitive and time-consuming tasks remains challenging. They encompass a variety of practices embedded in particular organisational contexts, while professional routines may vary from one fact-checking organisation to another. Nevertheless, the four general tasks associated with fact-checking activities described by Vlachos and Riedel (2014) apply to the responses we have received from all our interviewees. The same applies to the primary tasks defined in the scientific literature although the nature of the claim has a potential impact on the workflow.

“And when we start to investigate the claims, the process for how we deal with that, it obviously depends on the claim, but I guess [we] try to assess where the best sources for this claim are.”

JFC5, Norway

Fact-checking tasks refer to the use of various tools and techniques, which may depend on the initial training (or professional background) and technical skills of the fact-checker, the nature of the sources to be mobilised, and the format of the information to be fact-checked (a text, an image, audio, or a video). In this process, all of our interviewees underlined the necessary human input in terms of creativity and intuitiveness.

The implicit need of users identified regarding contextual factors is related to reducing the most boring part of the jobs, which may be interpreted differently from one fact-checker to another and which require human input. In addition, fact-checking activities cannot be reduced to the sum of their parts, especially since they also encompass ethical principles and human values that also have to be considered.

3.3 Conditions of use

Whatever the type of tool used, it does not make a fact-checker. Tools are considered means that contribute to achieving the purpose of verifying a claim, while fact-checking activities require human expertise and a necessary human relationship to the information sources. Therefore, fact-checking tools have not replaced the good old tools of journalism, which are the telephone and email.

“The tools, in general, are not magic wands. So, most of the time, you don’t get any good results back when you use them. So, basically, it’s kind of like making a puzzle. So, you use one tool and then you get a small fragment of information. And then you go to try another tool and you get another small piece of information, and then you gather all the small pieces together, and then you see what it tells you.”

JFC11, Finland



Another primary condition of use pertains to trust in the tool: “If I don’t trust the tool, I will not use it”, summarised a fact-checker (JFC19). “You have to trust the machine”, said another one (JFC3). The observations made in our critical literature review also highlighted the need for trust, whereas automated tools are often considered black boxes (Zhou et al., 2019; De Haan, 2022). Therefore, the trust goal may be reached through an usable interface design that can be used with a minimum of technical knowledge to reduce cognitive load (Nakov et al., 2021).

It can also be reflected in the level of explainability provided by the tool (Middleton et al., 2018; Demartini et al., 2020), which consists of describing how and why the information system has arrived at a given result. It differs from the concept of transparency as it encompasses notions of intelligibility and accountability (Bartneck et al., 2020). The other advantages of explainability is that it helps users make sense of the process at work.

The tool’s reliability is identified as another condition for using an AFC tool. It can be guaranteed to the users by shared expertise between the human and the machine (Berendt, 2021). This can, for example, be achieved by including journalists and professional fact-checkers in the design process of automated tools, such as supporting the labelling of training datasets for supervised or semi-supervised machine learning tasks. Integrating the users’ knowledge also improves the system’s transparency and enhances its trustworthiness (Nguyen et al., 2018; Showkat and Baumer, 2021), which are strongly connected to the concept of reliability. The reliability of a fact-checking tool also consists of its ability to provide accurate and reproducible results, also considering that journalism is about delivering reliable information to audiences.

Accuracy is identified as another condition of using a fact-checking tool. It is essential in the context of investigative journalism (Stray, 2019) to which some fact-checkers from our panel established a link by considering professional practices that require time to be performed. Despite the promises of automation to help speed up the fact-checking process, machine learning experiences in fact-checking do not always lead to high accuracy levels. In our critical literature review, we found 21 papers referring to the results of the F1 score, which is used to evaluate the accuracy of a classification model. These ranged between 12% and 95.5%. Still, the models’ accuracy, which is commonly used as an error rate, remains very generic and can be considered a weak estimator for uncertainty remaining in a specific outcome (Klås and Vollmer, 2018). In addition, “automated fact-checking works well in some cases”, but its generalisation “still needs improvement prior to widespread use” (Lazarski et al., 2021, p.42).

The quality of training datasets also has a considerable impact on the efficiency, accuracy, and complexity of machine learning-based tasks (Gupta et al., 2021). In data science, data quality is often defined as the ability of data collection to meet the users’ requirements or needs, which may be implicitly or explicitly expressed (Cappiello et al., 2004; Boydens and van Hooland, 2011). From this perspective, the limitations of the available datasets are related



to particular geographic, social, or political contexts. They are rarely multilingual and mainly in English. Some datasets are also processed through crowdsourcing annotation projects that may include non-experts (Pathak and Srihari, 2019).

In addition, as a result of having easy access to the data, computer scientists might be tempted to develop training datasets based on data extracted from Wikipedia, as was the case in nine papers in our corpus of academic publications dedicated to AFC or semi-automated fact-checking, which raises the same potential quality issues as any other user-generated content, either in terms of accuracy or trust, as there are no guarantees about the user's expertise.

"I think Wikipedia is a very useful tool, but you can't use it as a source.

You have to use the sources that are in the Wikipedia article and go and see what they are saying. And surprisingly many times, it's not exactly the same."

*"I cannot trust what 's written in this Wikipedia post, because (...)
anyone can write that."*

JFC8, Sweden

The examination of the conditions of use highlighted the implicit need to technically translate ethical principles and human values in terms of trust and the reliability and accuracy of the tool. That requires focusing on the transparency of the process as well as on the explainability and reproducibility of the results.

3.4. Framing uses and non-uses

Among the wide range of available fact-checking tools, some are more used than others by our panel of interviewees. To better understand how they integrate these tools within their professional practices, we have created a table that includes the type of task undertaken, the tool's name, and the percentage of users using them (Annexe 4). We have excluded from the list of our respondents the two R&D managers, whose activities are less related to the daily practices of fact-checking. We did not consider the use of statistics websites or specialised databases, as these resources are less related to specific fact-checking tools such as search engines. We have also excluded direct monitoring on social networks, as it does not rely on a particular tool.

Here also, we did not see any differences between our Nordic and non-Nordic respondents, which made us suppose that fact-checking routines are commonly shared. It may be explained by common access to resources and toolboxes dedicated to fact-checking. Furthermore, we have also observed that the tools used by our respondents are common in the context of digital investigative journalism.



“If we didn't have the internet, for example, I couldn't fact-check anything. Bad example, but you know what I mean. So, we need these tools and we have to be able to use these tools.”

JFC3, Norway

Six categories of tasks are covered by these tools: audio transcription, image and video verification, geolocation, searching and verifying content, social network monitoring, and translation from one language to another. Google tools were the most frequently quoted tools, particularly the Google Search Engine, along with Facebook's CrowdTangle for the monitoring of social media and reverse image search tools such as TinEye.

Only four professional fact-checkers among the 19 we interviewed said they had skills in computer programming – mainly Python and R but also HTML coding and SQL – with different levels of mastery or knowledge. One of the most advanced users (JFC4) considers that these skills “are not very important for fact-checkers specifically” and that being able to use the available tools is more essential. According to our interviewees, the core skills needed for fact-checking are grounded in digital literacy, where one should master the techniques of monitoring social networks, performing relevant and efficient searches, analysing data, and explaining facts. This balanced cocktail should be spiced with curiosity (JFC3 and JFC4), critical capacity (JFC14), common sense, and being aware of one's limitations (JFC8).

A third of our respondents claimed to use open-source intelligence (OSINT) tools, which are developed outside the journalism community and, thus, might not always correspond to the ethical standards of the profession. OSINT refers to “the gathering of intelligence through exploiting publicly available resources”, which must be “legally accessible by the public without breaching any copyright or privacy laws” (Hassan and Hijazi, 2018, pp. 1–3). OSINT practitioners are related to heterogeneous application domains such as intelligence services, military departments, UN agencies, business corporations, civil societies, or news media. Therefore, the tools used by OSINT practitioners may have been developed internally for serving specific purposes or externally, as are a wide range of online research tools (Hassan and Hijazi, 2018).

“I think that's the big thing with OSINT, the more tools you use the better, because you don't get the same results.”

JFC13, Denmark

The use of a specific tool is potentially framed by its availability or its ease of access; for instance, InVID consists of a Chrome extension, while CrowdTangle is available through a Chrome extension and an application programming interface (API). The tool answers a specific need. For the selection of interviewees, it was considered that the main qualities of a fact-checking tool are being trustable and useful. Providing acceptable levels of security and privacy comes in the second place although these two aspects receive mitigated opinions. Indeed, some journalists/fact-checkers seemed to be less aware or concerned about it. The



availability or ease of access of a tool can also be approached from the angle of price, especially since most of our respondents declared using open-source tools. However, paying a subscription for accessing a tool does not seem to be an obstacle for an organisation as long as the tool corresponds to its needs.

We also found that journalists/fact-checkers with more technical skills do not pay much attention to the characteristics of intuitiveness and simplicity contrary to the other respondents. Moreover, it was unanimously recognised that the pleasure of using a given tool is not at all a requirement.

Taking into account all of these aspects is not sufficient for explaining the non-uses of numerous fact-checking tools. The first part of the answer might be that these tools are simply not known in the journalism world.

“I got a question to do a survey, where they had listed a lot of tools, and asked if we used them or not. I didn't recognise one of them. So, I assume that there are a lot of fake news-checking tools that we don't use. But I don't know anything about them.”

JFC8, Sweden

The lack of available time to master the tools used (or recommended) in the context of OSINT is another factor that was identified. In addition, there is a profusion of tools, many of which require a substantial time investment to be mastered, and our respondents are already involved in time-consuming professional activities. Furthermore, as one of our interviewees mentioned (JFC12), why use a new tool when another one already exists and does the job?

“We've thought that it takes some time to learn how to use them and [we will have] to invest our time in them.”

JFC9, Finland

The explicit needs expressed by the users are related to the intrinsic characteristics of the tool in terms of achieving the goals for which it was designed. The implicit need is the necessity to consider the specificities of journalistic practices when it comes to defining the end-users' profiles.

3.5. Relationship to automation

While many of our interviewees are aware of the potential of automation to support fact-checking activities, not all of them know if they have already used machine learning or another AI-based system simply because they do not always know what technology the system relies on. We have not observed any opposition to using automation to speed up a fact-checking process or take charge of “boring” tasks. Automation should be approached as an “enabler” rather than a complete solution. The challenge to automate a process that varies from one fact-checker to another and depends on the type and the format of the fact to be checked remains challenging due to the limits of the current technologies. Additionally, AI technologies may still lack accuracy, they may cause “false positives”, and the datasets on which they rely do not always present sufficient qualitative characteristics (JFC19). However, computers are seen as being “very good” when taking “large volumes of information, classifying it, grouping, finding patterns, and creating that kind of meta stories which are extremely important” (JFC15). Another advantage relies on the technological possibility to deal with different languages with regard to the multilingual capacities of natural language processing. The myth of a neutral or objective technology (Gillespie, 2014) that would be opposed to the human subjectivity of the journalist/fact-checker is another reason put forward for integrating more automation in workflows.

“I think for the future of fact-checking, AI is really interesting because this is where fact-checking goes from being like completely neutral to that [where] we, as fact-checkers, have to make a human choice. Because what’s viral is very measurable.”

JFC1, Norway

The use of automation technologies is not the norm in the newsrooms we studied, mainly due to a lack of resources and the difficulty of integrating them into the workflow. These observations correlated with the results of a study conducted in Scandinavian newsrooms where the lack of right skills and knowledge about AI were the two frequently quoted obstacles to implementing these technologies (Wiik et al., 2022). In Norway, there is also a recognised need for automating some parts of the work, especially claim collection, but the corollary is the need of understanding better how machine learning works. Doubts were also expressed about the usefulness of a fully unmonitored product (JFC5).

“So, it’s important for me to have at least a basic understanding of how these things work to be able to be properly conversant with the people involved in the project and (...) [be] able to steer them in the right direction. Knowing what results I can expect and what results I can ask for and so on (...)”

JFC4, Norway

The experience of using technology matters in the overall perception of utilising automation in fact-checking. Additionally, we found that the more the professional profile of the fact-checker is oriented towards computing technologies or the more a newsroom is involved in developing tools, the more automation is perceived as valuable. Yet it remains impossible to address the



relationship between fact-checkers and automation without focusing on humans, whose knowledge, expertise, and less accessible factors like creativity and intuition are considered essential. The human touch is also about feeling, while a machine “cannot interpret this human touch (...) because it is not mathematics” (JFC1). Additionally, we also found an emotional relationship with fact-checking activities, when respondents said they love their job.

“I love my job. Don't make it too much automated.”

JFC3, Norway

Although, in recent years, news automation has emerged in several Nordic newsrooms “as a technology with the potential to provide a new means of production” (Sirén-Heikel et al., 2019, p. 48), the writing of fact-checking pieces remains confined to human activity. Nevertheless, some fact-checkers emphasised this “boring” or “repetitive” part of the job. None of our respondents mentioned the possibility of automating this particular task, whereas new automation refers to tools with the potential to save journalistic effort by providing first drafts that are to be enriched with human expertise (Lindén et al., 2019; Dierickx, 2020).

For all of these reasons, our analysis of the human-machine relationship in the context of fact-checking in journalism highlighted an implicit need for keeping humans in the loop. Associating the fact-checker with the design of the tool or with annotation activities that require human expertise as well as providing first drafts participates in this logic.

3.6. The need for new tools

The need for four types of fact-checking tools was explicitly expressed by our panel of interviewees:

- tools for the monitoring of social networks, especially TikTok, Telegram, and YouTube, which are considered the most difficult to monitor;
- tools for the monitoring of political debates broadcast in the audio-visual media;
- tools for claim collection and detection on social networks and audio-visual news media (radio and TV), eventually providing links to fact-checks already published;
- tools for verifying with context, especially for YouTube and video fact-checks.

Four other peripheral needs were also explicitly expressed:

- the accessibility of the tool on mobile devices as well;
- the clear presentation of the results to improve their readability;
- the provision of resources for archiving problematic content published on the web, already published fact-checks, or links to trustworthy websites;
- the need for developing resources or providing tools more adapted to the Nordic specificities and languages.



3.7. Practical implications

On an operational level, the implicit and explicit needs expressed by our panel of users can be addressed through two complementary design approaches: 1) ethical design, which allows for the embedding of end-users' values within the technology (Mulvenna et al., 2017); 2) user-centred design, which puts the end-users at the centre of the process (Veryzer and Borja de Mozota, 2005). Such integrative approaches allow us to keep humans at the centre of the process and align fact-checking technologies with the three main journalistic requirements that we identified in this study: trust, reliability, and accuracy.

This human-in-the-loop perspective aims to rely on human intelligence to perform complex tasks (Demartini et al., 2020). For instance, it can be achieved by including journalists and professional fact-checkers when designing machine learning tools or labelling training datasets (Berendt, 2021). Integrating the users' knowledge also improves a system's transparency and enhances its trustworthiness (Nguyen et al., 2018; Showkat and Baumer, 2021). Moreover, transparency can be considered the first condition for using a fact-checking tool due to the emphasis often placed on this specific need when fact-checking, which correlates with the use of open-source tools.

In a study conducted at a large scale in Swedish newsrooms on the use of fact-checking tools, Edwardsson et al. (2021) found that the lack of time and knowledge are two obstacles to introducing new verification routines. The use of technology to manipulate images or create deepfakes implies that journalists need to be trained to identify this form of disinformation or take advantage of the available tools (Vizoso et al., 2021; Katsaounidou et al., 2020). This suggests that the availability of the tools is not sufficient in itself. It must be complemented by human know-how, mainly since AFC tools help detect falsehoods without eliminating the need for human intervention (Bañon Castellón, 2021). We did not find any arguments to contradict these statements; in our results, the time factor was underlined on several occasions. Therefore, the necessary and available time should be considered seriously either in the design process or in relation to the use of the tool.

4. Conclusion and way forward

Our interdisciplinary perspective, encompassing both theories and a mix-methods apparatus, allowed us to tackle the end-users' needs through the lenses of professional activities where technical and social aspects intertwine. Beyond the explicit needs expressed for specific tools for accomplishing particular tasks, we detected implicit needs strongly connected to the intrinsic characteristics of the job, where the social responsibility of the fact-checkers is to deliver reliable and accurate information to audiences. The respect for ethical principles of journalism, to which a parallel can be drawn using the IFCN principles, frames the professional activities characterised by the transparency of the fact-checking process, which also appears in the narratives.



Fact-checking practices require journalistic and digital skills, which are likely to vary from one fact-checker to another according to initial training, personal interests, and professional experiences. It still requires both knowledge of the digital ecosystem and journalistic skills (Himma-Kadakas and Ojamets, 2022), which is also related to human creativity or intuition. Therefore, the use of online tools for monitoring and detecting claims, verifying images and audio-visual content, or searching for background information are the parts of a process that can only be decomposed into its primary stages. The origin and the format of the piece of information to be checked (text, audio, or video) also make it complex to decompose this process more granularly since different types of tasks can be mobilised from one fact-check to another.

Only a minority of the fact-checkers we interviewed either practise a programming language or are used to working with programmers. The majority of our respondents tend to use the same popular tools within their professional routines; these were described as time-consuming due to the investigative nature of professional fact-checking where the human aspects of the job are considered essential.

Nevertheless, our panel of professional fact-checkers was far from reluctant to use technologies and AI-driven tools. They are open to new tools that will facilitate their job or answer their specific needs for monitoring, detecting claims, or verifying multimedia content. AI applications were recognised for their potential. Making these technologies more accessible to fact-checkers may be achieved through the transparency and reliability of these information systems. End-uses are also likely to be facilitated by incorporating the needs of end-users and their professional values into the design process although we have no guarantee for effective and regular use of the tool. However, keeping the humans in the loop may allow fitting the system to the fact-checkers requirements and, by doing so, facilitate their end-uses. It may also contribute to a better understanding of what machine learning is and favour the trust in the tool while also considering the potential benefits of the explainability principle.

Being aware of how the system works also means being aware of the possibilities and limits of machine learning technologies, which rely on different families of algorithms to make sense of large amounts of data. These computational models are trained on empirical data to mimic human intelligence by transforming inputs into results based on mathematical relationships that are difficult to derive using deductive reasoning or simple statistical analysis (Klås and Vollmer, 2018). One of the main challenges in this field is related to the assessment of data quality, which is a complex task and requires human expertise (Gudivada et al., 2017). Another challenge when end-users take part in a design process is to cooperate with professionals from different backgrounds who may have a different vision of what journalism is (Dierickx, 2020; Sirén-Heikel et al., 2022).

Among the profusion of fact-checking tools, only a few are used. This observation may be connected to another challenge, which was identified in our critical literature review: research on fully and semi-automated solutions for fact-checking often aims to answer a social problem rather than to take into account human fact-checkers' needs or invite them to participate in the



research process. We posit that most of the available fact-checking tools are not used by our panel of Nordic fact-checkers for at least three reasons: 1) since they are not known in the social world of journalism, 2) since they do not take into account sufficiently the specificities of the journalistic context, or 3) or since they are not adapted to the Nordic context of languages. Therefore, our findings open operational perspectives for further development that aim to support Nordic professional fact-checkers in their daily practices. This also highlights the need for supporting fact-checking organisations and fact-checkers according to the sociocultural Nordic specificities within a global world where national and regional contexts still matter.

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Annexes

Annexe 1. Interview guide

Topic	Questions
<p>Context of use</p> <p>Professional background</p>	<p>Q1. Name, age, years of experience in journalism Q2. Do you consider yourself a professional fact-checker? Q3. How is this different from “classical” journalism? Q4. Did you follow a particular form of training for fact-checking activities?</p>
<p>Context of use</p> <p>Skills and collaborations</p>	<p>Q5. What are the key skills for a fact-checker? Q6. Do you know some programming languages? Q7. Do you work with programmers or other specialised professionals? Q8. Do you intend to learn new skills? If so, which ones and why?</p>
<p>Perception</p> <p>Trust/Ethics</p>	<p>Q9. What are the main ethical principles you follow? Q10. When and how do you consider that an information source is not trustable? Q11. Do you think the use of an edited image in a specific context) is deceptive? If so, in which contexts? Q12. Have you ever fact-checked articles written by other journalists, and do you feel comfortable with it? Q13. Is it possible to fact-check everything, and what are the limits of this activity? Q14. What are the benefits of fact-checking activities for journalism? Do you consider that it is only about trust?</p>

<p>User experience</p> <p>Uses/Non-uses (tools)</p>	<p>Q15. Can you describe all parts of the fact-checking process? Q16. How do you document the process? Q17. Which technologies or tools do you use for the following: - Gathering information - Verifying information - Analysing information - Photo/video editing information - Explaining/justifying information Q18. Do you use fully automated fact-checking tools, and why? Q19. Do you know other techniques or tools that you don't use? If yes, why don't you use them?</p>
<p>User experience</p> <p>Usability/ Accessibility</p>	<p>Q20. What's the most important for using a tool? (<i>Semi-open question, with an evaluation from 1 to 5 on a Likert scale</i>) - Usefulness - Intuitiveness - Simplicity - Privacy - Price - Time - Trust - Pleasure (hedonist dimension) - Reproducibility - Other</p>
<p>Professional routines</p> <p>Tasks</p>	<p>Q21. Which activities are the most repetitive? Q22. Which activities are the most time-consuming? Q23. Do you think that your fact-checking activities require, at a certain point, human creativity or intuition? If yes, how? Q24. Are you sometimes frustrated with your work, and why?</p>
<p>Professional routines</p> <p>Narrative</p>	<p>Q25. Do you follow a particular pattern when you produce content? Q26. How do you explain or underline your fact-checking activities in your narrative?</p>
<p>Perception</p> <p>Audiences/Meaning</p>	<p>Q27. Do the audiences influence the choice of the subject that you will dig into, or do other factors guide it? Q28. Do you interact with your audiences, and how? Q29. How do you consider that it impacts audiences? How do you measure this impact?</p>

ID	Country	Role	Type of organisation	Date	Duration / Context
JFC1	Norway	Newsroom manager	Online news fact-checking	22.03.2022	01:29:00 Face to face
JFC2	Norway	Journalist/ Fact-checker	Online news fact-checking	22.03.2022	46:42 Face to face
JFC3	Norway	Journalist/ Fact-checker	Online news fact-checking	22.03.2022	47:38 Face to face
JFC4	Norway	Journalist/ Fact-checker	Online news fact-checking	23.03.2022	54:41 Face to face
JFC5	Norway	Journalist/ Fact-checker	Online news fact-checking	22.03.2022	52:41 Face to face
JFC6	Norway	Journalist/ Fact-checker	Online news fact-checking	23.03.2022	01:10:50 Face to face
JFC7	Norway	Journalist/ Fact-checker	Online news fact-checking	23.03.2022	53:24 Face to face
JFC8	Sweden	Journalist/ Fact-checker	Online news fact-checking	13.04.2022	59:47 Face to face
JFC9	Finland	Newsroom manager	Online news fact-checking	03.03.2022	1:09:41 Zoom
JFC10	Finland	Journalist/ Fact-checker	Online news fact-checking	03.03.2022	1:09:41 Zoom
JFC11	Finland	Journalist/ Fact-checker	Online news fact-checking	03.03.2022	1:09:41 Zoom
JFC12	Denmark	Newsroom manager	Online news fact-checking	22.04.2022	01:24:41 Face to face
JFC13	Denmark	Journalist/ Fact-checker	Online news fact-checking	22.04.2022	36:47 Face to face
JFC14	Denmark	Journalist/ Fact-checker	Online news fact-checking	22.04.2022	52:10 Face to face
JFC15	United Kingdom	R&D manager	Online news fact-checking	26.01.2022	50:52 Zoom meeting
JFC16	Belgium (French)	Journalist/ Fact-checker	Newspaper	17.03.2022	50:00 Face to face



JFC17	Belgium (French)	Journalist/ Fact-checker	Public Broadcaster	21.03.2022	01:05:28 Teams
JFC18	France	R&D manager	Press Agency	23.03.2022	02:36:10 Face to face
JFC19	Belgium (Dutch)	Journalist/ Fact-checker	Magazine Public Broadcaster	04.04.2022	01:14:14 Teams

Annexe 3. Characteristics of the corpus

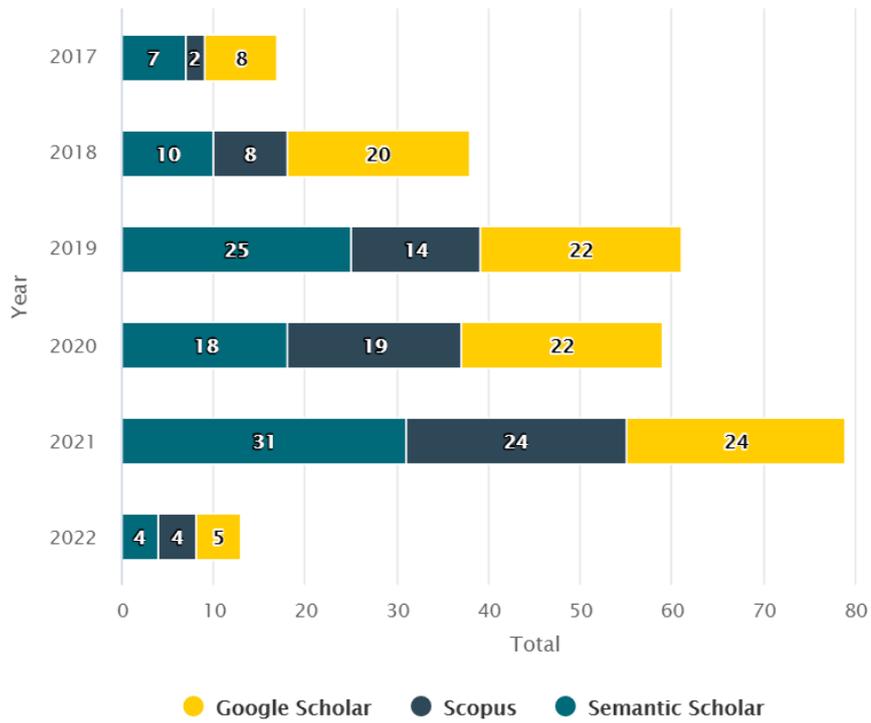


Figure 1. Distribution of the corpus by year

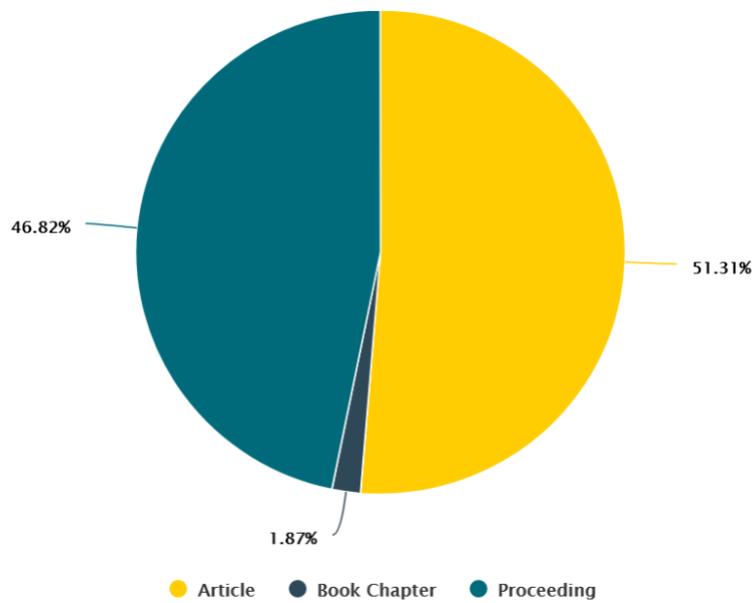


Figure 2. Distribution of the corpus according to the type of paper

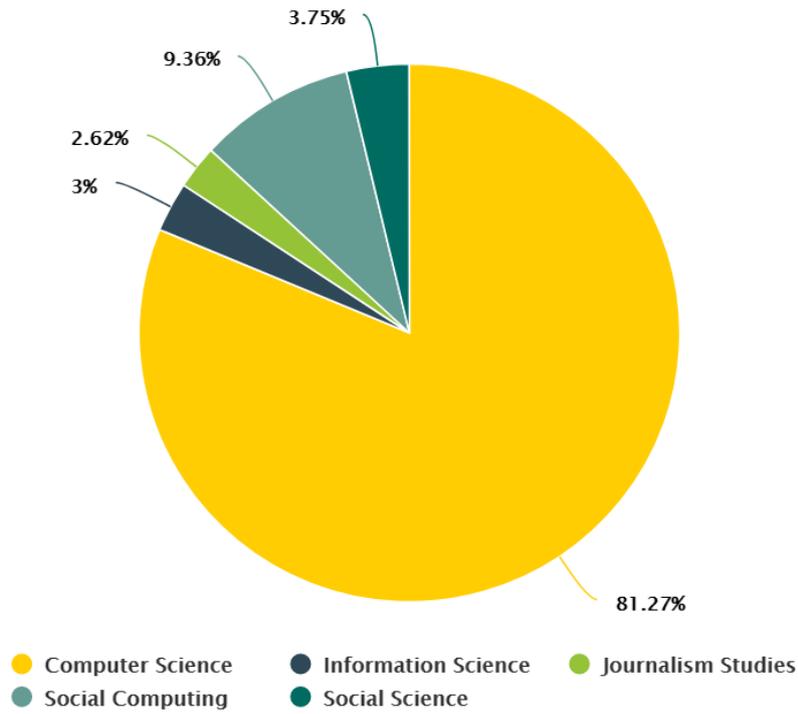


Figure 3. Distribution of the corpus according to the field of research

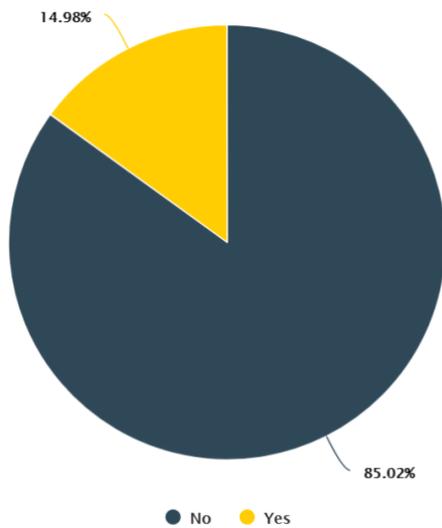


Figure 4. Research considering journalism

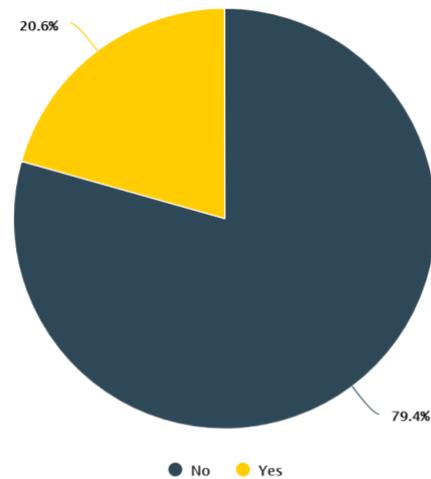


Figure 5. Research considering end-users

Annexe 4. Use of fact-checking tools

These tools were spontaneously cited by our panel of interviewees (see also question 17 of the questionnaire, Annexe 1).

Task	Tool	Users (% , N = 17)
Audio transcription	Amberscript	11,8
	oTranscribe	5,9
Image and video verification	TinEye	41,2
	InVID	29,4
	Google Image	23,5
	Citizen Evidence	5,9
	PimEyes	23,5
	Deepware	5,9
	Geolocation	Google Earth
Searching and verifying	Google Street View	5,9
	Google Maps	11,8
	OSINT Tools	35,3
	Google	52,9
Social networks monitoring	Google Cache	5,9
	WayBack Machine	41,2
	CrowdTangle	70,6



	Storyboard.news	23,5
	Twitter Advanced Research	5,9
	TweetDeck	23,5
Translation	Google Translate	11,8