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EXPERTS IN TIMES OF PANDEMIC: REFRAMING THE DEBATE IN THE CONTEXT OF STRUCTURAL TRANSFORMATIONS OF THE PUBLIC SPHERE

Peter J. Verovšek and Maruša Gorišek

The Covid-19 pandemic has highlighted the important yet controversial role of scientific expertise in public life. While existing debates focus mostly on necessary changes to (1) how experts are involved in public and political debates or (2) the way science itself is conducted, we conceptualise role of digital technology and the rise of the "new" social media through the theoretical framework provided by Jürgen Habermas. Drawing on Habermas's recent reflections on the new "structural transformation" of the digital public sphere, we identify two areas where science and its interaction in the public sphere can be improved to address declining trust in scientific expertise: namely, digital design and user education. On the one hand, democracies need to focus on the architecture of the public sphere when trying to re-establish trust in science. On the other hand, individual user education addresses the choices individuals are making regarding which information they use when they engage in public debates.

Introduction

Although concerns about "fake news," mis- and dis-information, voter manipulation, polarisation and data misuse predate the onset of the Sars-CoV-2 pandemic (Howard et al. 2018), they have become more salient since March 2020. On the one hand, the largest pandemic crisis in living memory put experts front and centre in political debates, reinforcing calls for more epistocratic governance by those best positioned to understand and react to the threats that were emerging in real time under conditions of radical uncertainty (Žižek 2020). On the other hand, the novel Coronavirus pandemic also led to an unprecedented backlash against these same experts, as public health agencies around the world were accused of unnecessarily repressing their populations and of robbing them of their democratic agency (Agamben 2020). In addition to raising issues regarding the trustworthiness of experts, these phenomena have also led to broader diagnoses of democratic backsliding, as "the signs of political regression are there for everyone to see" (Habermas 2022a, 158).

These interlocking phenomena raise a number of urgent questions. A rich body of academic literature has emerged to analyse the proper place of scientific expertise in governance and public policy (see Babones 2018; Cairney 2016; Choi et al. 2005; Knight 2019; Lavazza and Farina 2020; Runciman 2018; Schudson 2006; Stehr and Grundmann 2014; Stevens 2020). However, despite this scholarship's range and depth, it remains unclear how societies can best make use of expertise in situations like that posed by the Coronavirus pandemic. The fact that such emergencies are likely to become more common as a result of climate change only increases the importance of identifying better interfaces for science and politics.

In reviewing the existing literature, we identify two main camps: (1) those that argue for changes in the practice of science itself, and (2) those that focus on how experts contribute to public discourse. Despite their value, we argue that neither position pays sufficient attention to the broad, theoretical changes wrought by the rise of digital media. While some studies have identified a correlation between lower levels of trust and the use of non-mainstream news sources like social media and blogs (for example, Fletcher and Park 2017), the mechanisms driving this relationship remain underexplored as studies often examine single platforms without an overarching theoretical conceptualisation of the effects of digial technology on the reception of science and expertise.

In order to theoretically reconceptualize this issue, we turn to the work of Jürgen Habermas. Although his original framework based on the "structural transformations" within the public realm is over half a century old, to this day "research on the media and political communication tends to lean, often implicitly, on Jürgen Habermas's work on the public sphere and deliberative democracy" (Karppinen et al. 2008, 6). Building on his (2022c) re-examination and re-application of his work to digital media, we argue that experts must take the fact that science increasingly takes place in public view via MedRχiv and other open-access, pre-peer review repositories (see May 2020) into account *from the start*, rather than treating engagement as something that they have the luxury of ignoring.

In light of the "erosion of the gatekeeper model of mass media" (Habermas 2022a, 160), we conclude that experts have a duty to highlight the fallibility of their results and the difficulties involved in applying them directly to public policy. Doing so would make it harder for scientific work to be misused at a time when anyone can expertise and disseminate their views directly with little to no content regulation (Bickert 2019). Additionally, it would also help to educate citizens in practices of good argumentation at a time when anyone is potentially an author in the public sphere.

Our argument is organised as follows. We start by reviewing the existing literature on the role of scientists and other experts in democratic life. Second, we show that the changes brought about by the digitalisation of the public sphere have fundamentally transformed the ways that expertise is (mis-)used in public debate. In the third section, we argue that interventions focused on the design of digital public spaces and the education of citizens can go some way to mitigating for the loss of gatekeepers in public discourse. The conclusion reflects on the implications of our findings for researchers.

Scientific Expertise in Democratic Life

Warnings about the diminishing trust in science and experts in society have becoming increasingly common in recent years. Tom Nichols (2019) offers one explanation of the

increasing scepticism in a broader tendency to see democracy as a system where everyone has equal rights; as such, seemingly all opinions of each individual must be accepted as equal. With the broad availability of information and the realisation that scientists can also make mistakes, there is an increasingly widespread sense that every individual can form equally valuable opinions, regardless of their actual expertise (Collins 2014). As a result, rejecting expert opinion has become a way of empowering the individual.

This phenomenon also has a class dynamic, as the public usually sees scientists and experts as part of the political elite. This has led Salvatore Babones (2018) to speak of a "tyranny of experts." Similarly, Michael Lind (2020) uses the term "managerial elite" to describe this politically influential class. While democracy is based on the idea, that people shape the collective life by making decisions together, expert knowledge threatens to alter this by representing a rival source of authority in the public sphere (Pamuk 2021).

These discussions have become particularly salient since the onset of the Coronavirus pandemic. During this crisis experts, especially from biomedical fields, were put at the forefront of public discussions and decision-making under conditions of both extreme uncertainly and extreme public policy importance. Despite the need for scientific justification for adopting measures that deeply interfered with people's rights and freedoms, the situation was complex and scientific explanations alone could not be directly used as instructions for decision-making (Stevens 2020). Scientists and experts are not always neutral and their advice goes beyond just finding the best technical solutions and often have big axiological implications (Lavazza and Farina 2020). Epistemic authority is not enough in such situations, where wider social consensus is needed. As Ulrich Beck (in Ekberg 2007) points out, the scientific method cannot answer the question of how we want to live.

It is therefore not surprising that the pandemic was accompanied by a backlash against science and scientific expertise in form of protests, conspiracy theories and polarisation between the vaccinated and anti-vaxxers. As a result, the question of the role of scientists and experts in democratic life has emerged with renewed importance. While the pandemic has made it clear that such dialogue is necessary, there is little consensus on how this can best be achieved. Proposals range from democratising science, narrowing the gap between science and society (or experts and laymen), and establishing better dialogue between these two groups. Despite the broad range of different positions, our review of the literature reveals the presence of two basic positions. The first focuses on reforming science and the practice of doing science. By contrast, the second places attention on how scientists and experts are involved in public and political discourse. We consider each of these in turn.

Rethinking the Ways of Doing Science

Many of these discussions stem from the dilemma whether science actually produces high-quality research. Concerns focus on the prevalence of bibliometric indicators, such as numbers of publications and citations (Abramo and D'Angelo 2011; Boyack and Börner 2003; Nieminen et al. 2006; Reuters 2008). This has led to the creation of a publish-or-perish research culture, in which quantity is more important than quality and where interdisciplinary, ethnographic and long-lasting research is often neglected (De Rond and Miller 2005), which has a profound effect on the quality of outputs (Bohannon 2013). As a result,

several declarations and statements have been made to change how outputs are evaluated (e.g. the "San Francisco Declaration on Research Assessment" [DORA] 2012).

In response, various changes to how science is conducted have been proposed. One popular example is the development of so-called "citizen science." This increasingly popular concept seeks to bring science and the public closer together by directly involving non-scientists in scientific projects, thus ensuring better dialogue between these two groups and deepening the involvement of the public in dialogues around decision-making (Irwin 2002). While this cooperation can enable researchers to gather large-scale or hidden data, it also has an educational value (Adam 2018). Research shows that citizen science approach can increase knowledge about science and scientific processes and increase public awareness of scientific research and its diversity. Furthermore, it can also contribute to social well-being by giving people a voice (Bonney et al. 2016).

Adversarial collaboration is another proposal for addressing the distance between science and the public. The approach encourages researchers with opposing views to work together on a common problem, either by developing a research plan all opposing parties agree on, or individually testing the competing hypotheses. Such collaboration should minimise biases and research design flaws. Daniel Kahneman describes it as a more constructive substitute for the format of the "critique-reply-rejoinder" format. Adopting this as a standard would "contribute to an enterprise that more closely approximates the ideal of science as a cumulative social product" (2003, 730). Adversarial collaboration was recently called the "Next Science Reform" by Clark and Tetlock (2023), who describe it as an answer to the increasing ideological homogeneity (especially in the social sciences) and as a way of increasing the accountability and credibility of social scientists.

Rethinking the Places and Roles of Scientists and Experts

Both the public at large and politicians often expect experts to have concrete answers to every question and to be able to more-or-less accurately predict the future. However, this expectation overlooks the fact that science is a collective process that changes and evolves on the basis of new evidence (Knight 2019). This misunderstanding of science as and the scientific method as both infallible and omnipotent is an important obstacle in the relationship between experts and the public, fuelling growing lack of trust (Löfstedt 2009). In light of these issues, many scientists and public intellectuals have proposed ideas for how to better explain science to the general public through better forms of communication.

In most modern democracies, scientists and experts are included in political decision-making through participation in advisory boards, institutions and brain trusts that feed directly into policy-making at different levels. This technocratic approach seeks to bring information, facts and evidence to the policy process (OECD 2017). However, this evidence-based approach does not prevent the problems discussed above (Cairney 2016). As a result, there is a need to rethink in which way scientists, and experts, are involved in decision-making and public discourse.

For example, Zeynep Pamuk (2021) argues that democratic decision-making should make use of expertise in more democratic and flexible ways. In particular, she highlights the need for a better balance between scientific and democratic authority. This requires greater

acknowledgement of the uncertainty, incompleteness and possible biases of scientific expertise, as well as a discussion of its limitations.

Properly communicating science is particularly difficult in situations like the Corona-virus pandemic, where urgent decisions need to be made on the basis of incomplete and unreliable evidence. In such contexts the idea of "post-normal science" offers a step in the right direction. The approach introduced by Silvio Funtowitz and Jerome Ravetz (2003), calls for greater inclusion of different scientific disciplines and other social actors, where the whole society takes on a role similar to that of peer review. It thus tries to include the role of values and plurality of legitimate perspectives in decision-making, which *normal* science often neglects.

The role that individual scientists and experts play in society and how that can be improved is also an important question. Thus, for example, Andrew Hoffman (2021) writes about the need for "engaged scholars," i.e. researchers who do not perform science only for the sake of the publication and citation counts, but who focus on bringing their work and expertise to society, informing public and political discourse by bringing the worlds of theory and practice together. As he notes, the need for "more socially literate scientific community and a more scientifically literate public," calls for scientists to recog-nise the "inherently political nature of their work when it impacts on people's beliefs and actions" and be effective communicators of their findings (2016, 92–93).

When analysing the case of Giorgio Agamben's controversial public statements during the pandemic, Tim Christiaens (2021) uses Beck's (2009) concept of intra-scientific democratic debate as an alternative to simply rejecting the scientific point of view in fear of technocratic autocracy. While Beck was also critical towards leaving decision-making power in hands of experts (Ekberg 2007), his approach is focused on the collaboration between science and social movements and emphasises the role of scientific pluralism and citizen science. The core idea is to democratise science and create a networked public sphere.

This is in line with some other debates on the role of scientists, experts or intellectuals in societies. In a notable example, Habermas argues for a separation of academic role, focused on searching for truth, from the public interventions of the same intellectual (see Verovšek 2021; 2022). He sees public intellectuals as defenders of universalism, whose job is not to propose policies, but to defend the two-way discourse between centres and civil society and ensure information and thoughtfulness play a role in forming public opinion (Habermas 1994, 99–120).

On a similar note, some argue for the indirect involvement of researchers in political debates, rather than a more direct one that arguably "short circuit[s] the democratic process" (Swift and White 2008, 55). They favour a form of involvement, which is not focused on direct advising or active participation in the decision-making process, but instead focuses on debates and discourse within the democratic public sphere, where the autonomy and equality of all participants are respected. In this way, they seek to strike a balance "between truth seeking and democratic responsiveness" (Baderin 2016, 209).

The Digital Transformation of the Public Sphere

The digital expansion of the public sphere has thus created various epistemic uncer-tainties, where citizens are having a harder time telling fact from fiction (Chambers 2021).

All of these suggestions are plausible responses to the current problems of trust in science and experts. However, they do not sufficiently address the fact that the increased digitalisation of the public sphere and the rise of the "new" social media increasingly "homogenize and isolate site users" (Forestal 2021, 28).

In order to theoretically reconceptualize this issue, we draw on Habermas's path-breaking work on the public sphere (see Dommett & Verovšek 2021). Not only did Habermas introduce the idea of "publicity"—using it to replace the previously dominant concept of public opinion—for the first time; in *Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society* (hereafter STPS), he also placed an emphasis on the historical and sociological preconditions for this space, not only on its normative value. Since 1962, Habermas's approach has "set the agenda for a whole new generation of scholarly inquiry" (Cowan 2013, 44).

In September 2022, sixty years after he first published the German edition of STPS, Habermas published *A New Structural Transformation of the Public Sphere and Deliberative Politics* (*Ein neuer Strukturwandel der Öffentlichkeit und die deliberative Politik*). This book, which he refers to as "new engagement with an old theme" (2022c, 7) has been a long time coming. It is significant both given broad reach of the concept of the public sphere and due to the growing interest in how the rise of the Internet and digital media have had on public deliberation and the public realm more generally. In light of the fact that "the signs of political regression are there for everyone to see" (2022a, 158), Habermas focuses his new intervention on "the function of the public sphere in ensuring the sustainability of democratic political community" (2022a, 146).

Much of the existing literature on effects of digitalisation on public discourse has sought to grapple with the fact that "cafés as centers of communication and exchange have been replaced in the late twentieth century and early twenty-first century by technology, by the Internet and social media" (Pinsker 2018, 306–7). Habermas's concerns that the deliberative quality of discourses in the public sphere is being undermined by changes in the very structure of these metaphorical "spaces" is not new. On the contrary, it dates back to SPTS, where Habermas applied his ideas to developments in post-war Europe. As a result of the "massification" of the public sphere due to the spread of literacy, he argues that the distinction between private and public was gradually being eroded. The public sphere thus "becomes a field for the competition of interests," resulting in institutional will-formation that "can scarcely still be understood as arising from the consensus of private individuals engaged in public discussion" (1974, 54).

The "structural transformation" Habermas diagnosed in 1962 had a twofold effect. On the one hand, it pushed companies and other large organisations to negotiate directly with the state, thus bypassing the public sphere altogether. On the other, given that the idealised expectation of democratisation through the public sphere still existed, it also meant that these organisations still sought to "assure themselves of at least plebiscitary support from the mass of the population" (1974, 54), thus further eroding the ideal of the public sphere by turning it into an arena of "opinion management" that operates through the "engineering of consent." This led to what Habermas called a "refeudalization" of modern society, as publicity was once again associated with the "aura" of personal prestige, rather than being a space where "the authority of the better argument could assert itself" (1989, 193–4, 36).

As a result, Habermas argues that advent of corporate news media, which competes for attention in order to sell advertising, rather than serving as a conduit for the dissemination of information as well as opinion-formation, plays a crucial role in this initial "structural

transformation." He fears that the democracies of post-1945 western Europe are becoming "elective monarchies" in which "scientifically-led marketing makes political advertising into a component of a consumer culture for un-political individuals" (1961, 28). He concludes that propaganda and naked, capitalistic self-interest increasingly govern the public sphere, not rational debate about common interest. As a result, "one gets the impression that citizens of the so-called consumer society are also viewed juristically as customers … outfitted with these rights, and as good as excluded from real political power" (quoted in Specter 2010, 68).

On one level, the new structural transformation Habermas diagnoses in this latest volume bears some similarities to one he describes in the latter half of STPS. While he acknowledges the anti-authoritarian motivations and egalitarian potential of the "new" media enabled by the rise of the Internet, in practice these developments have only reinforced Habermas's worries about the commodification of the public sphere. He therefore speaks of the "libertarian grimace of world-dominating digital corporations' emerging from Silicon Valley, in which the algorithmic control of communication" feeds a growing "concentration of market power of the large internet corporations." Whereas the already distorted post-war public sphere of corporate media was driven by the desire to sell advertising alongside the news, in the digital public sphere the flows of communication are mere by-products of what these companies are really after, namely "the personal data their customers leave behind on the internet … .which they sell for advertising purposes" (2022a, 160, 167, 163).

This development is clearly important, but it seems to be more a matter of degree—"a further advance towards the commodification of lifeworld contexts" (2022a, 163)—rather than a fundamental transformation. Getting at what he thinks is actually revolutionary about digital media, requires moving beyond the issue of commercialisation. Instead, Habermas argues that what truly explains the dangers posed by developments at the start of the twenty-first century is the platform-based character of these "new" media. In fact, unlike even the increasingly commercialised and corporatized media of the twentieth century, these new platforms do not produce content at all. Instead, they merely provide a network that allows users to form direct connections between each other. Because they do not help to crystalise arguments, fact-check information or take responsibility for what is "published" on their sites, Habermas notes that these "new media are not "media" in the established sense" (2022a, 159).

Despite the clear benefits offered by these changes, digitalisation has equally obvious drawbacks for both of the key characteristics of the public sphere, that is "the *inclusiveness* of the formation of public opinions and the *rationality* of the prominent opinions in the public sphere" (2022a, 157–8). While the "gatekeeper function" played by journalists and editors within traditional media could also be problematic due to the undeniable elitist tendencies of these groups, they did provide for "the professional selection and discursive examination of contents based on generally accepted cognitive standards." This not only ensured that the information conveyed was accurate, but also that all good arguments —not merely those voiced by celebrities or that spread due to their outrageousness— received a fair hearing. By contrast, platforms do little or nothing to ensure that what is posted on their sites meets "generally accepted cognitive standards," thus "profoundly alter[ing] the character of public communication itself" (2022a, 160, 159).

It is certainly true that one can find much excellent information on platforms like Twitter, where many experts offer profound insights in an unmediated, direct fashion. The problem is that deciding which of these experts is worthy of trust is left up to the user. Editorial decisions once done by humans, are now automated and left to the

algorithms (Pasquale 2018). While this does empower individuals to "do their own research," it also increases the chances that they will be led astray by bad information— as was clearly visible during the Coronavirus pandemic (Llewellyn 2020). On the one hand, their individualised, algorithmically fragmented network is programmed to only offer them opinions from those who confirm their pre-existing inclination; on the other, experts are increasingly incentivized to become influencers whose opinions "go viral" because they stand out from the orthodoxy of their fields and tell individuals what they want to hear, not because of their accuracy or the quality of their arguments.

This issue could be ameliorated by the fact that most users of these platforms still get their news from traditional newspapers and other media, even if it increasingly comes in digital form. However, this potentially reassuring piece of information is undermined by the fact that social media has shattered the economic base of classical journalism by redirecting advertising and audiences to their platforms, where articles are posted for free without compensating the journalists and editors that produced them. In addition to undercutting the "demand for quality programs and professional services" (Habermas 2022b, xviii), these platforms have also changed how media works. In the wake of the "audience turn," social media are pushing traditional sources of information to cater to the desires of their customers, rather than to the discursive opinion- and will-formation of citizens. As a result of the growing importance of what is happening on digital platforms, news organisations now spend much of their time reporting on what is trending on social media, rather than on fulfilling their gatekeeper role by ensuring "the *scope* and the deliberative *quality* of the offerings" in the public sphere (2022a, 156, emphasis in original).

The direct impact of social media on traditional news coverage also influences the position of media and role of journalists in science communication. What Brüggemann, Lörcher, and Walter (2020) call post-normal science communication is moving away from journalists being neutral observers and reporters of the "pure scientific work" towards both journalists and scientists taking roles as advocates of common good and brokers of dialogue. Emergence of new media is making them both more proactive in communication with the public and providing interpretations beyond facts (Brüggemann, Lörcher, and Walter 2020). As seen during the pandemic, social media can either support these roles by enabling faster spread of knowledge and giving stage to more expert opinions, or interfere with them through equally fast spread of misinformation (González-Padilla and Tortolero-Blanco 2020).

These reflections lead Habermas to his ultimate and most interesting diagnosis of this "new structural transformation." Although Johannes Gutenberg's invention of the printing press is mentioned only once in the original text (1989, 185), it plays a crucial role in this follow-up. In one of the most insightful passages, Habermas notes, "While the invention of the press gave every potential addressee the chance to eventually learn how to read, the digital revolution immediately turned *readers into potential authors*" (2022b, xviii). This transition is crucial, because much like reading, writing is also a skill that needs to be learned. While a "politically appropriate perception of the author role … tends to increase the awareness of deficits in one's own level of knowledge" (2022a, 160), Habermas worries that just the opposite is happening on digital platforms, where users are encouraged to give unpremeditated hot-takes rather than engaging in the kind of critical self-reflection that the role of the author requires.

Reflecting on the impact of the printing press and what the history of the revolutionary creation of potential readers can teach us about the effects of the digital creation of potential authors, Habermas (2022b, xviii) notes,

> In Western countries, it took more or less 300 years until the bulk of the population learned to read and thereby acquired the requisite skill for participating in mass communication. How long will it take us – the educated citizens of the early 21st century and first generation of Internet users – to learn how to organize the new media and use them in the right way?

This is an interesting point. After all, learning to argue on the basis of convincing evidence is a skill that can only be acquired with time and effort. The fact that authorship on social media is driven less by quality and more by the amount of attention one is able to draw, as most authors today are paid for clicks by advertisers, means that nuance and good argumentation often take a backseat to snappy phrasing and controversial positions that go against the grain.

In this sense, there has indeed been a structural shift away from "the unforced force of the better argument" towards fake news that "can no longer even be identified as such" (2022a, 167). The fact that even the established media that still have gatekeepers often have to respond the claims to fake news, thus only serving to spread it further by repeating it, means that the public sphere today is saturated by these claims. As a result, Habermas is concerned that the "great emancipatory promise" of the public sphere is "being drowned out by the desolate cacophony in fragmented, self-enclosed echo chambers" (2022a, 159), in which fake news, mis- and dis-information and conspiracy theories are able to flourish.

These problems are compounded further by the increasing individualisation or personalisation of the public sphere. First, it means that everyone's experience of the digital public sphere is unique. Unlike printed newspapers, in which everyone read the same news, the platforms that shape the consumption of news today present a different picture of the world to every individual; each news page or timeline on the new digital media is different, since it is shaped by an algorithm designed to maximise engagement (not the quality of the information presented) in order to sell ever more personalised advertising at a higher price. As a result, it is increasingly difficult for the digital public sphere to serve as the grounding for a common "world" that can "direct the citizens' attention to the relevant issues that need to be decided and, moreover, ensure the formation of competing public opinions" (2022a, 167).

Second, this individualisation of the public sphere also means that it is left up to every participant in the public sphere to decide for themselves what information they consider reliable on their own. While previous media were able to engage in vetting processes that were costly both in terms of time and money, this process has also been outsourced to the solitary neoliberal citizen. Moreover, any click on an unreliable source is compounded by the fact that it leads the algorithm feed the user further information that reinforces this claim. As a result, the problem is so much the loss of "the hitherto customary conceptual *distinction between private and public spheres*" (2022a, 165) that Habermas bemoans, but the fact that the connectivity enabled by social and digital media has created individuals that are increasingly isolated and unable to build the common social and political "world" that is necessary for political life.

Following Habermas (2022c), we argue that moves away from the gatekeeper functions of traditional media are actually crucial drivers of the increased public scepticism towards science and experts that has come to the fore over the course of the Coronavirus pandemic. As a result, these problems cannot be resolved simply by changing the way science is done or how experts communicate with public. Instead, we argue that these issues must be addressed on two levels: (1) digital design and (2) user education.

Achieving Trust Through Design and Behaviour

In considering how trust in experts can be re-established, we turn to digital design and user education as areas where intervention is possible and most likely to have a salutary effect. At a collective, political level, democracies can try to re-establish trust in science by focusing on the architecture of the public sphere. This is an old idea, as the layout of space has long been recognised as a factor in politics and public debate more generally (Goodsell 1988). Translating this insight into the digital world, Jennifer Forestal notes that "the design of digital platforms can have enormous implications for how, and how well, we collectively practice democratic politics" (2021, 28; Halpern and Gibbs 2013).

The importance of this insight is highlighted by the different practices and discourses around science visible on different digital platforms. For example, design differences on Twitter and Facebook cause change how they approach and use science. More specifically, empirical research has found that good "deliberative attributes – linking to supporting material, using numbers and statistics to support one's point, and offering a legitimate counter-argument – were more frequent on Facebook, than Twitter" (Oz et al. 2018, 3415–6). Additionally, the impact of design is clearly evident given the fact that "the information management capabilities afforded by new ICTs [information and communication technologies] could ultimately yield some desirable changes in people's political information exposure" (Garrett 2009, 279). This suggests that platforms could be designed—or could be legally forced to design their interfaces—in order to promote information in line with certain ideals of science and expertise.

In other words, although digital media companies are driven by "competitive motives rather than a public service orientation" (Carlson 2018, 14), this does not mean that they are immune from political regulation. For instance, legal interventions could be used to force the "new media" to take responsibility for what is posted on their platforms through fact-checking in the same way that traditional media have to do. There are many calls for regulation of social media in terms of ensuring greater transparency and accountability (Caplan and Boyd 2016; Crilley and Gillespie 2019; Pasquale 2018) while rethinking the role they play in political communication. Additionally, the state could recommit to providing high quality public broadcasting and support journalism in its democratic role (Bimber and Gil de Zúñiga 2020). Public media approximate Habermasian ideals by providing "a neutral space responsive to the interests of all in society, where matters of the public good can be debated, considered and ideally agreed upon" (Karppinen et al. 2008, 13).

In addition to highlighting the importance of design, our analysis also points to the significance of individual user education as a key variable, given that the digital public sphere leaves it up to "individuals [to] select online content and sources" themselves (Vaccari et al. 2016, 3). This insight highlights the importance of individual choice was a significant determinant of the kinds of information individuals are exposed to and draw on in their debates on social media (Stromer-Galley 2003). It also directs our attention to the impact of individual action, suggesting that the choices citizens make in regards to what information they use when they engage in public debates.

In light of these considerations, it is crucial for states and democratic policy makers to promote programmes of civic education designed to educate and inform citizens about how science is done, how to recognise mis- and dis-information, and what it is realistic to expect science to do, especially under fast-changing conditions of extreme uncertainly,

as was seen at the beginning of the coronavirus pandemic. Recent study shows that more meta-reflexive people, which includes younger and people with tertiary education, seem to respond to disinformation and fake news more actively and fact-check more. It is notable that this response has already been advanced by policymakers. For example, in the UK there have already been calls for young people to be provided with "the knowledge, confidence and literacy skills they need to actively engage with today's plethora of news sources and to thrive in this digital age" (Commission on Fake News and the Teaching of Critical Literacy in Schools 2018, 3), and for digital literacy to become the "fourth pillar" of education (House of Lords Committee on Communications 2017).

Academics and public intellectuals have also sought to empowering users "to independently test the contours of their own filter bubble, to find out for themselves how algorithmic personalisation affects their digital experience" in order to foster the "responsible use of social media" (Milan and Agosti 2019). Such education could be achieved both through formal programmes or by using digital moderators, who work in real time to establish norms of user behaviour and the veracity of information (Fishkin 2009). Deliberative citizens could therefore be encouraged "to provide some kind of justification of evidence, some kind of argumentative or evidential support for statements or judgments, explanations or proposals, some kind of anticipation of doubt, openness for questions and objections, recognition of fallibility" (Peters 1997, 35). By thinking about how to inform and affect user behaviour we therefore argue that policymakers have the opportunity to try and shape the dynamics of public debate online.

Conclusion

In this paper, we discuss the place and role of scientific expertise in public life in light of the effects of the Covid-19 pandemic. On the one hand, this situation put experts in the centre of political debates. However, on the other, they were received with a backlash from a significant part of societies. A large literature already addresses various societal consequences of the new, digital public sphere, to date less attention has been paid to the role of science and experts in this new reality.

We begin our discussion from the thesis, that the changed conditions of the public sphere need to be taken into account when discussing the role of experts. These "structural transformations" are characterised by "new media," which do not produce content themselves, but which instead merely provide a "platform" that allows users to form direct connections between each other. The public sphere is, therefore, increasingly individualised and personalised within fragmented and self-enclosed echo chambers. In practice, this means that every individual is left to decide what information they consider reliable, and which experts are worthy of trust.

Furthermore, platforms are changing the way traditional media works, pushing them towards catering to the desires of their customers as opposed to the discursive will-formation of citizens. Instead of critical self-reflection, spontaneous "hot takes" are promoted through algorithms designed to maximise user engagement. These automated processes do not take the accuracy of the information and the quality of arguments into account, only their potential to spread and increase the amount of time that customers spend on the platform (and thus the number of advertisements they see). This is the new reality in which scientists and experts must work, whether they like it or not. Simply

changing the way researchers "do science" or how scientists are included in public discourse and political decision-making does not change or challenge this new reality.

Taking these structural transformations as our point of departure, we identify two levels of how to address this—digital design and user education. On the one hand, democracies need to focus on the architecture of the public sphere when trying to re-establish trust in science. This includes rethinking the role of social media and ways of their regulation. On the other hand, individual user education addresses the choices individuals are making regarding which information they use when they engage in public debates. Here, scientists and experts should be considered as users as well and need to consider how their findings can be used and also misused by the non-experts. They too need to understand the changes in the public sphere and learn to adapt to them. As Habermas (2022a) points out, it is increasingly up to them to ensure professional selection of the content and examine the discourse based on the generally accepted cognitive standards.

These changes will not happen overnight. In fact, they may not happen at all. In the meantime, scientists must recognise the new reality they are working in and must be aware that their findings are liable to misuse. Scientists therefore have a duty to do their best to ensure that their findings are not misused. For example, this implies that researchers should perhaps think twice before posting papers with controversial findings that have not yet been peer reviewed or replicated to open-source digital archives like MedRχiv, where they can be accessed and can be misused—either intentionally or unintentionally—by individuals outside of the scientific community who want to influence public policy.

Furthermore, implementing more open and cooperative research approaches, such as participatory research design, focused on collaboration with directly impacted individuals with the purpose of action (Vaughn and Jacquez 2020) should be further supported in this regard. Participatory research design can have beneficial results not only in the quality of research outcomes, as it enables scientists to incorporate knowledge from community, but also in their transferability as the research findings have a dimension of local applicability (Macaulay et al. 1999).

This approach is not new and it has been used for decades in some fields, such as social sciences, education and medicine (see Jagosh et al. 2012; Tuhkala 2021). While the idea of non-scientist participation in scientific research is being revived through the promotion of Citizen Science, before mentioned as one of the approaches aimed at rethinking how we do science, we believe that participatory design approach is worth pointing out separately, because it is not only a way of doing science, but also a shift in the way scientists think about science. Sanders (2002) explains the logic by pointing out that participatory design approaches represent "shift in attitude from designing **for** users to one of designing **with** users." It goes beyond methodological design as it includes a common language between scientists and non-scientists thus building a bridge between them.

While individual researchers cannot hope to fully address the structural problems we have identified, they can take some steps to try to minimise the risk that their work will be misinterpreted and badly applied to public policy. In the meantime, platforms and researchers of those platforms should seek to address the broader, systemic issues of digital design and user education by working to ensure that these platforms live up to their claims about fostering debate and communication, instead of merely serving mechanisms to spread engaging viral, but often incorrect and potentially dangerous information to as many users as possible.

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