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“Google fracking:” The online information ecology of the English shale gas debate

Imogen Rattle^{1,*}, Lucie Middlemiss, James Van Alstine

Sustainability Research Institute, School of Earth and Environment, University of Leeds, Leeds LS2 9JT, United Kingdom

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ABSTRACT

A strong online response has marked contention on shale gas from the outset, as campaign members link across borders to share information and inform themselves about the impacts of development. In this article, we apply a post-political lens to online activity in the English shale gas debate, to determine how this complex information ecology has shaped the dynamics of protest. Using shale gas development in Lancashire, North West England, as our case study we argue that the seismic events of 2011, in combination with the Government framing of public scepticism as a matter of information deficit led to an online information divide which constrained how effectively the dominant institutional actors could engage. Between 2011 and 2017, three challenges of online information: complexity, overload and loss of gatekeepers, served to perpetuate this division. Anti-shale gas campaigners were less constrained in their activity but the substantial burden of online activism contributed towards perceptions of disempowerment, as improved information access failed to deliver policy influence. The ultimate consequence was to contribute towards the turn to direct action. Applying a post-political analysis to online activity in information-intensive issues yields valuable insights into the varied ways in which internet use may influence the expression of dissent.

1. Introduction

Online contention has been a characteristic of debate over shale gas since almost the outset, and controversial [1] footage of flaming tap water from the documentary *Gasland* [2] has been credited with precipitating the opposition movement [3]. Yet while moratoria have been imposed in parts of Europe, North America and Australia, the Government in England has been slower to respond to public concerns. Post-political theory provides a lens through which to analyse the processes by which dissent is excluded from the political arena [4] and online activism has been mooted as one channel through which it may return [5,6]. Undoubtedly, the internet has changed the ways in which protest movements operate and the context within which they operate, requiring them to navigate an information environment which is increasingly complex [7]. This complexity however, must also be negotiated by those in power and cannot be assumed to work to their benefit [8]. In this paper, we explore these dynamics in more depth, considering their role in the development of contestation over shale gas in England, using the Fylde, Lancashire, as our case study.

We situate our work at the intersection of political geography, energy geography and digital politics, applying concepts from all three

fields to address the following questions. Firstly, to establish how different stakeholder groups used online information to engage in the shale gas debate and to determine what they believed the effects of their own and others' activity to be. Secondly, to identify the challenges of engaging online with an information-intensive issue and how this affected the different groups' activities. Finally, to consider the consequences of online information use for political contestation of an information-intensive issue. Did this activity indeed provide a channel for dissenting voices to be heard or did it have other effects?

Our work reveals how this complex information environment helped shape the dynamics of a protest marked by unprecedented levels of public opposition and billboards urging passing motorists to “Google Fracking.” Drawing from 37 stakeholder interviews, we show how the hydraulic fracturing (fracking) induced seismic events of 2011 led to a phenomenon which we term an *online information divide*, whereby anti-shale gas campaigners were highly active online while industry and government officials were constrained in their activity. Once underway, familiar challenges of the online information environment: complexity, overload and loss of gatekeepers, perpetuated this division. While the long-term effects remain unknown, our analysis suggests that in the short term their primary effect was to cause industry and government to

* Corresponding author.

E-mail address: i.k.rattle@leeds.ac.uk (I. Rattle).

¹ The lead author worked on the Onshore Oil and Gas programme at the Environment Agency between 2014 and 2015.

retreat from online engagement, perpetuate deadlock and, ultimately, fuel a turn to direct action. Shale gas's continued unpopularity undoubtedly contributed to the UK government's recent decision to impose a second moratorium on fracking [9] but a post-political reading suggests the move is driven by pragmatic considerations rather than ideological ones, leaving the way open for the industry's return.

The paper is structured as follows. In Section 2.1, we set out post-political theory as it pertains to the exclusion of dissent, and show how it applies in the case of shale gas. In Section 2.2, we discuss the characteristics of shale gas development which have caused debates about information to come to the fore. In Section 2.3, we introduce the literature on digital politics and online information before summarising the current research on the role of the internet in mobilising opposition to shale gas. Having established the gaps which we seek to address, in Section 3, we introduce our case study and data; in Section 4, we present our results and discussion; and in Section 5, we conclude with limitations and suggestions for further research.

2. Literature review

2.1. Post-political theory

Post-political theory provides a framework by which to consider how dissenting opinions are systematically excluded from mainstream political debate. The concept emerged in the post-Cold War era from the work of a group of philosophers including Mouffe [10], Rancière [11], and Žižek [12]. Uniting their work is a critique of the politics of consensus dominant in the then-current modes of political administration. This focus on generating consensus, they argued, obscured broader discussions about desired societal futures and reduced government to narrow debates over matters of techno-managerial administration, operating within an uncontested framework of neoliberal economics and under the auspices of a liberal democracy which in practice delivered power to the political elite. Questioning this framework was frequently futile, leading to sceptics being labelled as either backwards-looking traditionalists or dangerous fundamentalists, whose complaints deserved to be sidelined [10]. This exclusion of dissenting views, however, could never be assumed to be a permanent state of affairs. According to post-political theory, politics is inherently antagonistic: "the field upon which we deal with fundamental antagonisms, where we determine the basic economic and social coordinates of our shared future," ([6] p. 8). The upshot of attempting to exclude dissent from mainstream political debate is "not *less politics* but rather *more politics*—albeit by other means than those commonly and traditionally recognized as legitimately political," ([5] p. 191, emphasis in original).

This broad theoretical underpinning has been elaborated upon by political geographer Erik Swyngedouw who, across a series of works [4,13,14], theorises the processes by which dissent is excluded from debate on environmental matters. Of particular interest to our analysis is his argument that dissenting voices are marginalised through systems of governance which mobilise expert knowledge and methods of risk calculation to reinforce growth-led ideologies. Once the debate has been so framed the only remaining issue upon which the public can engage is how to deliver the agreed solution most efficiently. Post-politics in action therefore elides that contentious issues are contested by actors with uneven power and endeavours to frame fundamental political disputes as primarily matters of problem solving, operating within a broader uncontested framework [15]. This insight has been applied to a number of contentious issues, particularly locally unwanted development projects, giving rise to a body of work providing a post-political analysis of public participation in infrastructure planning [5,16–18] which documents how these processes systematically act to limit the type and scope of arguments which are heard, to the benefit of pro-development stakeholders. Research on shale gas suggests similar dynamics in operation, with broader questions over the societal desirability of developing a new fossil fuel, and the distributive injustices of

shale gas development, expressly excluded from official deliberations [19,20]. As a result, the issue has become increasingly contentious as anti-shale gas campaigners resort to alternative methods of expressing their opposition, ranging from judicial review to direct action.

2.2. Shale gas as an information-intensive conflict

Contention over extractive industries is endemic, however shale gas has particular features which heighten the issue's controversy. Natural gas dispersed throughout low permeability rock formations, shale gas was historically considered uneconomic to extract until horizontal drilling and high-volume, slickwater fracturing (fracking) technologies were developed in the United States during the 1990s. These technologies reversed the fortunes of US gas producers, turning them from an industry in decline to the world's largest producer of natural gas in under four years [21]. However, while the potential for improved energy security and increased tax revenue prompted other governments to investigate their own domestic resources, the negative effects of shale gas development, as publicised by Academy Award nominated documentary *Gasland* [2], led to increasing public concern. These effects were worsened by the pace of the industry's meteoric rise, which left regulators operating in an information deficit [22]; the high spatial intensity of development [23]; and the technology's ability to access previously undeveloped gas fields which brought rural communities into sudden proximity with intensive industrial activity [24]. A raft of research followed documenting the health, environmental and social effects of the industry (e.g., [1,25,26]) and posing broader questions about the climate change effects of a new source of fossil fuel [27].

The extent to which the US experience will be replicated elsewhere remains uncertain since national differences in geology, regulation, infrastructure, supply chain maturity, population density and hydrocarbon ownership regimes all shape the industry's development. Nonetheless, its first adopter status means the US provides the benchmark for perceptions of the industry globally [28] and remains the source of most primary information about its effects. Public debate on the issue is marked by a profound mistrust of official sources and a deeply-felt belief that local interests are disregarded in favour of national economic gain [29–32]. Unsurprisingly, for an issue characterised by scientific uncertainty and mistrust, contests over what counts as legitimate knowledge have come to the fore [33] leading to significant variances between national policy as policy-makers give greater or lesser weight to different criteria [34]. Highlighting the scientific uncertainty which permeates the issue has proved a successful tactic of resistance for anti-shale gas campaigners across parts of Europe and the US, as they invoke the precautionary principle to deadlock development and use the internet to access alternative sources of information to those preferred by the political mainstream [35–37].

In England, where debates over contentious scientific issues have long been marked by an institutional belief that public scepticism is a matter of information deficit which can be addressed by the populace becoming better informed [38], the official presumption in favour of shale gas has been more difficult to disrupt. From 2012 to 2019, the Government position remained that opposition was predominantly due to information deficit [39] and that public disquiet would ease once development was underway, a stance justified by reference to attitude trackers showing almost half the public remained undecided on the matter, primarily because they did not think they knew enough to judge [40]. The belief that development was a necessary pre-requisite to acceptance was made explicit in a leaked 2016 cabinet letter:

One of the hurdles to overcome to develop a more favourable public attitude is that nobody in the UK has seen or experienced a shale fracking operation in their area [...] We need some exploration wells to clearly demonstrate that shale exploration can be done cleanly and safely here.

(quoted in [41])

By framing the issue as one where only UK-specific, expert-generated, technical information would be sufficient to ease the public mind, it appears ministers hoped to distance themselves from the worst of the US experience. However, this approach contained two implicit assumptions. Firstly, that the exploration work needed to demonstrate this position would go ahead. Secondly, that those opposed to the industry would accept government-generated information rather than looking elsewhere to inform themselves. As our analysis will show, neither of these assumptions proved correct, leading to a widening online information divide.

2.3. Internet use in information-intensive conflicts

As internet use increases globally, the increased reach, speed and low cost of digital technologies makes them a useful tool for activists, lowering the barriers to mobilisation, participation and information sharing [42–44]. Changes in the accessibility of information have political importance and the potential to force change upon incumbent powers [45]. Their political effect however, is less clear and an extensive body of academic work considers whether online activism truly empowers protest movements, offering new means of influence, or serves to enforce existing patterns of inequality and power [44,46–49]. Between these two extremes, a third school of thought – the equalisation thesis – suggests the effects are more heterogeneous but primarily serve to benefit outsider organisations rather than dominant institutional actors, serving to level the political playing field [8].

Early work on the changing dynamics of protest in the internet age argued the environmental movement was well placed to exploit the richer information environment which the internet offered, due to its cross-border links and intrinsic orientation towards information-based campaigns [45,47]. More recent work is less optimistic, cautioning against too instrumental a focus on how environmental activists use information and for more consideration of the broader consequences of this use [50] arguing modern environmental movements have to win on and offline if they are to succeed [51]. As concerns about fake news, misinformation and algorithmic bias proliferate [48,49,52] debates about online information quality have come to the fore, leading to emergent bodies of research on the rise of ‘post-truth’ politics [53] and calls for further research on how protest movements navigate an online information environment of growing complexity [7].

Contention over shale gas incorporates many broader concerns about information quality and content, raising important questions about the political role of online information and how it may operate to perpetuate or curtail dissent. To date however, although the role of the internet in mobilising opposition to shale gas has been noted [3,51,54], research has primarily focused upon how stakeholders frame the issue online [55–57] while recent studies using a post-political framework to study contentious issues [18,58] have noted activists’ use of the internet but have yet to subject this activity to post-political analysis. In this paper, we address this dual gap, focusing our analysis upon the overall effect, rather than specific content, of online information about shale gas, to provide the first account of its role in contesting the issue.

3. Materials and methods

3.1. The Lancashire shale gas debate

Methodologically, we adopted a case study approach [59] using the Fylde, Lancashire, as our subject. Home to the first and, to-date, only active shale gas sites in the UK, the Fylde area has become the test case for the social and technical feasibility of shale gas development. Work initially began in spring 2011, when exploration company Cuadrilla Resources carried out the UK’s first shale gas frack at their Preese Hall site. During this process, fracturing fluid was inadvertently injected into a previously unidentified fault leading to a series of seismic events [60]. A 13-month moratorium followed and the industry has remained

controversial ever since. The moratorium was lifted in December 2012 and in the following year Cuadrilla applied to undertake exploration at two further sites at Roseacre Wood and Preston New Road. Lancashire anti-shale gas campaigners spent four years challenging these proposals through the planning process but by the time of our fieldwork, Cuadrilla had gained permission to drill at Preston New Road where site set-up was underway. Direct action was ongoing outside the site throughout our data collection period.

3.2. Interview data

Our corpus is made up of 37 semi-structured interviews conducted between March 2017 and August 2018, contextualised by attendance at industry conferences, public meetings and planning inquiries. Interviewees were identified through internet searches, event attendance and snowball sampling. Interviews took place either face to face or by telephone/Skype and lasted between 30 minutes and two and a quarter hours during which we asked participants about internet use and shale gas, and their views on the effects of online activity. Data collection continued until we had reached saturation. We focussed our participant recruitment upon those who were active online in relation to shale gas, however we were mindful also to include interviewees who characterised themselves as casual internet users and/or as sceptical about its value. Due to the contentious nature of the issue and small number of individuals involved, we asked participants to choose their pseudonyms to minimise the possibility of identification.

Interviewees were categorised by their stance towards shale gas, as determined by their self-reported views, and their relationship to online content (Table 1). Those pro-shale gas believed development should go ahead; those anti- believed it should be halted; and those neutral, characterised their role as providing or assessing information rather than advocating one way or another. The ten pro-shale gas interviewees were members of the industry; industry consultants; ran websites on shale gas or were academics who had expressed support for the industry. Some interviewees took more than one of these roles. The twenty anti-shale gas interviewees were members of the loose coalition of Lancashire anti-shale gas groups; climate justice activists; worked for environmental NGOs or ran websites on shale gas. Once again, some interviewees took more than one role. The seven interviewees who characterised themselves as neutral worked for regulatory agencies in shale gas related roles; or undertook consultancy or academic outreach work on shale gas. Interview requests were also made to the Whitehall departments involved in the regulation of shale gas, to Lancashire County Council planning department and to Lancashire pro-shale gas groups, however these groups did not respond.

Interviews were recorded, transcribed and analysed using Nvivo 11. The transcriptions were coded using thematic analysis, working from the specific to the general in a series of iterative steps [61] as we tested and refined our ideas against the empirical evidence [62]. To assist in analysis, we categorised participants additionally by their relationship to online content as follows. Creators generated original content on shale gas for online publication. Commissioners had professional responsibility for online content on shale gas but did not create it themselves. Curators ran social media accounts sharing information about shale gas. Recipients had a professional role which meant they were on

Table 1
Interviewees by relationship to online content and stance towards shale gas.

	Pro	Neutral	Anti	Total
Content creators	1	1	4	6
Content commissioners	2	3	1	6
Content curators	1	0	7	8
Content recipients	4	2	2	8
Content consumers	2	1	6	9
Total	10	7	20	

the receiving end of online activity about shale gas. Consumers used online information to research shale gas and to keep up to date with developments. Where interviewees approached online content in more than one way, we characterised them according to their primary relationship. Analysing data through this dual lens allowed us to identify the commonalities underpinning interviewees' often polarised accounts, giving rise to the categories discussed in Section 4.2.

4. Results and discussion

We present our results in three parts. In Section 4.1, we address our first research question, showing how different stakeholder groups used online information to engage in the shale gas debate. In doing so, we reveal how the tortuous progress of shale gas development in England led to a phenomenon which we term an 'online information divide' whereby the dominant institutional actors were heavily constrained in their online activity, while anti-shale gas campaigners were not. In Section 4.2, we address our second research question and identify how the particular challenges of engaging online with an information-intensive issue affected the different groups. In Section 4.3, we address our third research question and consider the consequences of these findings for political contestation of an information-intensive issue.

4.1. Evolution of an online information divide

4.1.1. Industry inaction: a vacuum in the communications space?

The seismic events caused by Cuadrilla's initial drilling in spring 2011 were the initiating event in the information divide, which was only beginning to be closed by summer 2017, as development activity gained pace. While these initial quakes were not high in magnitude, they catapulted shale gas into the headlines, raising public awareness about fracking. From the perspective of those in favour of the industry the resulting debate was poorly informed, to the extent some that some had felt compelled to take action.

This was back in two thousand and eleven-ish I guess, and the quality of the public debate around shale gas was very poor. You'd see reports in the news and online newspapers, and things that I read, and kind of just pulling my hair up [...] So I started the blog to try and vent some frustration and correct some of what I saw.

Academic Geoscientist

Operators, however, were slow to respond. Our interviewees suggested there were historical, institutional and cultural reasons for this inaction. Historically, the UK oil and gas sector had operated uncontroversially onshore for decades at conventional hydrocarbon sites such as Wytch Farm in Dorset. Many industry members, seeing little practical difference between conventional and unconventional hydrocarbon extraction techniques, expected similar public indifference to shale gas, failing to apprehend they were operating in a very different media environment from that which had applied during the development of these fields, forty years previously.

The companies were coming out of that older perspective of how the oil and gas industry had worked in the 20th century [...] I don't think they had really engaged with, or thought about, the online discourse.

Academic Geologist

This failure to take account of the changed information environment was in part due to the staff profile of shale gas companies which, with the exception of multinational INEOS, were small entrepreneurial businesses made up of a few dozen technical specialists who had limited focus on public engagement. As one veteran industry member reflected, "we'd rather not think about it, because it's much easier to design a pipeline than to try and keep a village happy." As a result, operators reported being unprepared for the significantly more hostile operating environment which greeted them once the moratorium lifted.

Within two years it was like we had never done this before, and it was a whole new thing, and it was super-scary. It was amazing to see how that awareness had gone absolutely to a negative side from our point of view.

Oil and gas industry member

Four years of legal disputes followed, as local campaign groups fought development through the planning system and courts. With exploration work stalled, operators had little new information to share and little spare capital to invest in publicity campaigns. Acutely aware of the newly contentious nature of their work and disinclined to expose themselves to further criticism, they believed the prudent response was to retreat from the public debate until they had something concrete to say.

There was no flow of information coming from industry because we didn't want to say something that we might not end up doing and be seen as being irresponsible or not sharing the facts.

Veteran industry member

In the interim, operators, UKOOG, the industry body, and their respective consultants concentrated their online activity on websites, where they could retain control of their message, and on shoring up government support. Locally, operators focussed on face to face engagement and public drop-in sessions. In retrospect, some wondered how well this online reticence had served them.

There was a vacuum in the communications space and it was completely taken up and controlled by NGOs and anti-groups, and I think the industry was not prepared for that and they just had no response [...] [there was] very little counter-narrative.

Oil and gas industry member

By summer 2017, drilling was underway and concrete information on the progress of the industry became available. Operators experienced a resurgence in confidence and UKOOG began a Facebook campaign in recognition of the industry's need for a broader social media presence. However, even those positive towards development questioned whether it was by now too late to make substantial inroads into public opinion. As one industry supporter commented in 2018:

They have been very slow to get off the bat. They have spent, individually, a fortune all these different companies on PR instead of clubbing together and putting out information [...] they never seemed to get their act together in that sense, and of course it grows legs because of social media.

Local business owner

4.1.2. The regulatory conundrum: nothing's happened for six years

Given the lack of information flowing from industry prior to 2017, the task of informing the public about shale gas predominantly fell to government agencies. Here again, officials were constrained, both in what they could share and the extent to which they felt able to promote this content. The Environment Agency (EA), the English environmental regulator, led on public engagement for government while supporting web content, including fact sheets and blog content was produced by the Department of Energy and Climate Change (DECC), the Oil and Gas Authority (OGA), the Office of Unconventional Gas and Oil, the British Geological Survey (BGS) and the Health and Safety Executive. However, once general information on shale gas had been made available, the lack of on-the-ground activity meant regulators had little substantive new information to add. As one Environment Agency official commented in spring 2017, "For shale gas, more so than for conventional, there genuinely isn't anything happening [...] Nothing's happened for six years," (Environment and Business Advisor B.)

This comment reveals the extent to which framing the issue as one of technical information deficit circumscribed the official discourse. Politically, a great deal had happened in the previous six years.

Significant events included the Balcombe anti-shale gas protests of 2013; the Infrastructure Act 2015, which removed the right of land-owners to veto drilling beneath their property; Lancashire County Council refusing planning permission to Cuadrilla in 2015; the Lancashire planning inquiries of 2016 and the Communities Secretary's subsequent decision that exploration should go ahead at Preston New Road. These events generated extensive media coverage but did not provide the type of content which regulators could share.

The place-specific nature of geology, and ministers' insistence that the UK had a world-leading system of oil and gas regulation [63] compounded this issue, since once the UK had been positioned as an exceptional case, it was difficult to plug the information gap using case-studies of good practice from abroad. The task was further complicated by the complexity of the subject matter, which did not lend itself well to engaging online content. Recognising this issue, BGS, the organisation tasked with advancing geoscientific knowledge in the UK, took steps to make their website content on shale gas more 'iPad-friendly' (Senior Scientist, BGS) but, as they acknowledged, their content was not intended to address the broader policy question of whether shale gas development should proceed. EA interviewees concurred and added that shale gas's contentious nature limited the extent to which they could promote their own online content while maintaining public trust in their impartiality. In addition, the resource implications of producing high quality content and engaging online were significant and had to be balanced against core regulatory functions.

4.1.3. The anti-shale gas campaign: do you want to know more about fracking?

Unlike the industry and government, who were constrained in their internet activity, for those opposed to shale gas, going online was often an important first step in becoming involved in the campaign. Most local residents reported hearing about shale gas through pre-existing community networks in the aftermath of the 2011 seismic events. Almost invariably, having had their interest piqued, their next action was to go online to find out more.

I saw a thing about, "do you want to know more about fracking?" Yes, I did. So, I went along to a meeting and heard enough there that I wanted to go away and draw my own conclusions. And that's actually what [the speaker] said [...] having had your interest prompted perhaps, go and do some research. So, I did, and in the process, I set up the website [...] to log some of the things that I had found.

Anti-shale gas blogger

Information painting shale gas in a negative light was ubiquitous, but information from the industry was not so easy to find. While operators portrayed their reticence as sensible prudence in the face of uncertainty, anti-shale gas campaigners were more likely to perceive it as indicating they had something to hide.

I looked at the Cuadrilla website a long time ago, in the early days, and I thought it was very slick. What was interesting about the content of the website wasn't what they were telling you, it was what they weren't telling you and how they framed the arguments. I thought it was very interesting. They are very careful about the information that's on there and they don't say too much, which is also very acute because if you don't say anything, then you can't be accused of anything.

Frack Free Lancashire campaigner A

Government websites were more informative but campaigners tended to use these selectively. Supporting web content such as videos and information sheets, which government officials were more likely to refer to when discussing their online engagement strategies, were mostly disregarded or bypassed.

We use the reports and things that are on there. I wouldn't say we

always go directly to the website. It's often that one person has found the report, and then sends it by email to their network.

Renewable Energy Activist

Interviews with campaigners confirmed the extent to which information-sharing was a major motivating factor in their online activity. Just as some industry supporters reported feeling obliged to provide information about shale gas, so many who opposed it also perceived a moral obligation to share what they knew. The target of this activity was variously described to us as the 'missing middle' 'the 'undecided' or the 'fifty percent', in reference to government polls which consistently showed half of the public to be undecided about shale gas [40]. Few local campaigners had any interest in trying to engage with politicians directly, believing government support of shale gas was entrenched. Having themselves gone online to find out about shale gas, their hope was that their neighbours too would read, and having learned more, be persuaded to act.

In contrast to the dominant institutional players, while local campaign groups had websites, most interviewees considered them tangential to their efforts, particularly given the absence of funds to pay for eye-catching design and search engine optimisation. Campaigners on the whole did not consider themselves expert internet users – rather the contrary. Social media, in particular Facebook, which was free to access and familiar to many already, became the movement's platform of choice. While dictated more by pragmatic considerations than any strategic imperative, one effect was to move the local debate about shale gas onto a platform where the speed and informality of interaction made it difficult for industry and government to engage, as one commentator reflected:

I think one of the contrasts between government and industry and the rest is that they're just slow, cumbersome. [...] UKOOG did this with questions about shale – I don't think they really understand how people use the online and how people use social media. And it always comes across as your parents trying to dress like you. It's a bit clumsy and not quite there.

Reporter on Oil and Gas

Compared to government and industry therefore, anti-shale gas campaigners were less constrained in their choice of online platform, could draw from a wider variety of sources domestically and abroad, and could share a wider variety of content. This relative freedom, however, did not mean engaging online with an information-intensive issue was straightforward, as the next section will detail.

4.2. Challenges of navigating the information age

4.2.1. Complexity

There was a common understanding amongst our interviewees that shale gas was a notably complex topic. This complexity arose from two main sources: (1) the technical and operational uncertainties associated with extraction and regulation, in many cases unanswerable unless or until the industry began commercial operation; and (2) the range of potential effects: on local environment, health and amenity, on climate change and on local democracy. For the academics, public officials and industry consultants tasked with public engagement, the effect was to increase the number of tangible threats or 'mobilisation targets' [64] around which public concern condensed.

Complexity was an issue for all those tasked with creating and commissioning online content on shale gas: "What we actually realised after a while was that some of the research papers you could not simplify to a point that was understandable by everybody," (Academic Geoscientist). It made engaging on social media particularly taxing since the rapid-fire nature of the medium and low character limits left little room for nuance, with exchanges often dissolving into acrimony. Anti-shale gas campaigners, by contrast, had less need to engage with the technical and operational uncertainties of extraction, since they

were not required to justify why the industry should proceed. They dealt with the range of potential effects by dividing issue areas amongst themselves and focussing their research upon the aspects of shale gas which experience and education best equipped them to address. Even so apportioned, their task was not straightforward. The available material was highly technical, sometimes conflicting and on occasions incomplete. Facing a polarised and sceptical public, interviewees from across the board expressed a strong preference for face to face communication when discussing the issues. However, public meetings could become heated, putting off more moderate groups from attending, and in any case were only accessible to those with the time, motivation and means to take part.

Despite these challenges, local campaigners believed that engaging with this complexity was a necessary evil in order to be recognised as legitimate participants rather than NIMBYs or scaremongers. The burden of participation was exacerbated by a complex regulatory system, involving multiple government agencies and policies. Being able to go online and find out this information for themselves was a necessary first step in being able to participate, but the complexity of the subject matter made it a time-consuming, frustrating and often thankless task.

You're not just fighting with getting to know well integrity, and what shale gas fracking is, and the volumes, and health and safety, you're trying to fight with all the government and the bureaucracy and the administration.

Resident, Lytham

4.2.2. Loss of gatekeepers

This complexity was compounded by the variety of sources available online, leaving anti-shale gas campaigners with little need to access company and government websites other than for the purpose of engaging in the planning process, or to monitor the general tenor of official communications. For those undertaking public engagement, the effect was twofold. On the one hand, the prevalence of negative online information about shale gas, combined with a lack of quality control led to polarised views about the industry which were difficult to address. However, as a general principle those running public consultations also expressed the belief that the public was informed about shale gas to an extent which would not have been possible without access to online information. Their concern was how lay people might best navigate the increased variety of sources in the absence of gatekeepers. This stance differs somewhat to that revealed by previous research where officials have characterised public resistance to shale gas as a matter of information deficit [39]. Here, it was framed instead as a matter of information literacy:

It is good to have diversity of information but you need to have authority. Otherwise, how are people going to make any decision? How are they going to become informed? They can't.

Senior Scientist, BGS

Amongst the anti-shale gas campaign, NGOs also perceived their role shifting from a more hierarchical model of information dissemination to a less formal, networked approach, reflecting previous work on the effect of digital technologies on social movement organisation [43].

We are not the information provider that perhaps we were on some campaigns. [...] people are finding out the information for themselves and we are working out what our role is in this new, relatively new, online campaigning world.

National Campaigner, Friends of the Earth

This dual loss of gatekeepers presented challenges for the anti-shale gas campaign. The ability to access alternative sources of information empowered members to build their own community of experts, however this more equal access came at a cost. This was partly logistical:

with no intermediary layer to filter information the burden of undertaking quality control fell onto individuals, increasing the chances of overload and the risk of spreading misinformation. Other effects were more emotionally draining: having access to information about the dangers of shale gas but without any apparent means to halt the industry's progress added to the stress and anxiety already prevalent in communities facing shale gas development [30]. The failure of government to acknowledge it was now only one online voice amongst many, and adjust its approach accordingly, contributed to local alienation and re-enforced the narratives of bad governance which underpinned local opposition [32].

4.2.3. Abundance

Complexity and a lack of gatekeepers led to information abundance as online content about shale gas proliferated, affecting different stakeholder groups in different ways. Government officials had little need to go online to seek information, believing they were kept sufficiently informed by merit of their position. From their perspective, information abundance predominantly manifest via mass responses to online consultations which regularly numbered in the tens of thousands. While campaign members believed these activities had a broader role to play in registering strength of opposition, those involved in the consenting process downplayed their importance. Responses were often template letters with limited relevance to decision-making and their sheer quantity led to so-called 'cheap-talk' effects, whereby the volume of response weakened the overall message [45]. In the early stages of development, the unprecedented volume of online response placed regulators under significant strain, but by the time of our data collection it was perceived as the new norm. As one Environment Agency official commented: "It did attract a lot of attention certainly internally to the project. But I think it's - I think it's starting to be a lot more normal now [...] I don't know if it would necessarily do that in future," (Environment and Business Advisor A).

Industry members, likewise, reported little need to seek information online. From their perspective, the effects of information abundance were twofold. First, the sheer volume of online information made it possible to find content which supported almost any view of shale gas. "They'll say, 'Google fracking' but if you Google 'toothpaste' you can find enough reasons it will kill you," (Production Manager, oil and gas industry). This issue was compounded by the negative connotations of the term 'fracking' [65]. A second, linked effect was the increased regulatory scrutiny which the subsequent public concern engendered. This added to their costs, and once underway tended to perpetuate itself, leading to further delay.

Everything is as it should be but it creates a massive amount of noise and nuisance and you then open yourself up to the next level of argument which says, "Well, there have been all these objections, and there's no smoke without fire."

Veteran industry member

By contrast, anti-shale gas campaigners were directly affected by online information abundance and the aligned expectation that they would remain abreast of developments. Information came from four main sources. Firstly, official planning documents. Without these residents would have been unable to engage in formal consultations however, the volumes of information involved were significant and online access led to unrealistic expectations of local groups.

There's no way normal residents can wade through four and a half thousand pages of documentation, understand it and come up with comments on it, and respond in four weeks.

Member of local residents' group

Secondly, the campaign generated significant volumes of in-group electronic chatter which members, particularly those responsible for curating information, needed to monitor. Thirdly, there was a constant supply of newly published academic and grey literature to digest and

share. Finally, there were postings from pro-fracking groups to consider. The volume of data placed a significant burden on participants, and their personal relationships, and a number expressed the opinion that information acquisition was a process subject to diminishing returns.

Compounding this issue was the problem of misinformation which added to the volume of information and increased the effort required to manage it. Poor information quality has long been a defining feature of internet content [52] and campaign members were acutely aware of contemporary debates about fake news, realising that distributing incorrect content had the potential to delegitimise their claims. The requirement to undertake quality control on the information they were sharing – to act as digitally literate citizens – increased the burden of participation, and the networked leaderless nature of the protest meant they had no way to reign in those who were less circumspect. Many industry supporters believed the anti-shale gas campaign knowingly spread incorrect information in order to increase fear and distrust. Those who were neutral about the industry reserved judgement, observing that making unsupported claims was not the sole preserve of either side. Whatever the motivation behind its spread, however, all parties agreed that the proliferation of online misinformation about shale gas was almost impossible to address.

4.3. 'Google Fracking' online information and the post-politics of shale gas

Online information may have the potential to level the political playing field but the dynamics in our case appear more complex. Government strategy on shale gas sought to frame public concerns as predominantly due to unfamiliarity with the technology, rather any more fundamental doubts about the distributive injustice of development or the desirability of a future societal trajectory based upon fossil fuels. Arguably, similar dynamics are apparent in accounts from industry supporters which positioned opposition to shale gas as a result of the industry's initial failure to get to grips with online engagement rather than any broader concerns about the industry itself. But no matter how they were framed, the combined effect of this technical focus and organisational inaction, was to constrain how effectively the dominant institutional actors could engage online. However, more favourable online conditions did not deliver immediate offline dominance to the anti-shale gas movement. Rather, it appeared as though the post-political consensus in favour of development had prevailed when Cuadrilla began fracking at Preston New Road in October 2018, shortly after our data collection concluded.

Post-political theory provides us with two means with which to interrogate these dynamics. The first is to focus our attention upon the insuppressible nature of dissent [5,11,12]. Accepting that contention can never be entirely excluded from politics leads us to examine the multiple and sometimes unexpected ways in which it may reappear. From the operators' perspective, the most obvious consequence of the heightened public awareness engendered by online activity was an increase in regulatory oversight incommensurate with the risk they believed their activities entailed. The increased scrutiny led to increased costs, deadlocking development and causing some to wonder if the industry would ever take off.

You know that everything is going to be scrutinised to the nth degree. Unfortunately, what it means is you put a rocket or airline investment into what is probably a family Escort. [...] And at some point you think to yourself, "the project won't support this, I can't do it."

Veteran industry member

In the interim, operators retreated from the online and focussed their effort on shoring up support from potential supporters. For government, the consequence was six years of delay as the planning process ground to a halt. Unable to demonstrate shale gas's safety until development was underway, ministers began a consultation on a raft of

planning reforms including making development a Nationally Significant Infrastructure Project [66], and therefore subject to less extensive public consultation than the existing regime. Such responses reflect findings from previous work on the post-politics of planning [17] which reveal an institutional retreat to more easily controlled arenas when public contention cannot be contained.

Campaign members had a more ambivalent relationship with online information. On the one hand, going online to become informed had been a necessary prerequisite to being recognised as legitimate participants. On the other, it contributed to feelings of disempowerment by revealing the extent to which decision-making framework excluded some voices and privileged others. Having access to a range and depth of information previously only available to policy elites raised expectations that those in power would be responsive to their concerns but delivered little in the way of substantive influence, leading eventually to disenchantment. The unwillingness of the dominant institutional actors to engage online heightened perceptions of a lack of transparency and democratic deficit.

Perceptions of bad governance and procedural injustice have been a potent force in motivating opposition to shale gas in Lancashire since the outset [29–32]. The official retreat from online interaction added another layer to these dynamics, appearing to substantiate the belief that there was little local people could do to influence policy. Having failed to halt development through officially sanctioned routes, many of our interviewees concluded that direct action was, if not something they personally wanted to engage in, nonetheless the only remaining option to express their opposition.

The industry with its lobbyists can cruise the corridors of power, have meetings that we know nothing about, have their voices heard right at the heart of government. The only place that people who oppose it can have their voices heard is out on the streets.

Campaigner, St Anne's

The most immediate effect of the online information divide therefore was not to give greater political prominence to dissenting voices but rather to expose the extent to which they were excluded from official arenas. The result was to galvanise the turn to direct action, with protesters at Preston New Road demonstrating under the banner 'you left us no choice.' As Žižek argues, the "suffocating closure" ([12] p. 204) of the politics of consensus does not foreclose dissent, rather by precluding the expression of dissenting voices it generates the impetus towards further antagonism.

The second insight offered by post-political theory is its ability to alert us to the deeply political ways in which governance arrangements may operate to exclude dissenting opinions, and the consequences of structuring decision-making in this way. In this instance, the official position that resistance to development was predominantly a matter of information deficit proved fundamentally flawed. Once Cuadrilla resumed fracking in October 2018, the seismic events returned at increasing intensity. Rather than demonstrating the process was safe, first-hand experience of shale gas exploration re-enforced public concerns that the process was dangerous. Opinion polls showed opposition increasing amidst particular concerns about earthquakes [40]. Direct action continued throughout 2019, but it took a combination of financial unprofitability, political expediency, and technical infeasibility to disrupt the presumption in favour of development. Within a period of ten days, a National Audit Office report on the high costs and limited progress of the shale gas industry [67] was followed by the announcement of a snap General Election to break the Brexit deadlock and an OGA report concluding it was not possible to accurately predict the magnitude and likelihood of future tremors at Preston New Road [68]. In response, the Government announced a moratorium on hydraulic fracturing in November 2019, "until compelling new evidence is provided," [9] and shelved the proposed planning reforms.

Does this signal the death knell of shale gas in the UK? A post-political reading urges caution. Development has not been suspended

because the Government accepts continued fossil fuel development is incompatible with desired future societal trajectories. While the UK Parliament has declared a climate emergency and passed legislation to achieve net zero greenhouse gas emissions by 2050, the Executive's approach to shale gas remains fundamentally unchanged. The matter continues to be adjudicated upon within narrow technical frameworks of expert knowledge and risk calculation, specifically related to the seismic events. Ministerial statements on the moratorium reiterate shale gas's potential to provide a bridge to a low carbon future [9], a motif which dates back to the first moratorium [31] and which is typically post-political in its use of discourses of sustainability to cloak the substance of a policy focussed upon economic growth [4]. In response, Cuadrilla have undertaken "to work constructively with the OGA to provide further detailed data [...] to address concerns so that the moratorium can be lifted," [69]. Ongoing public opposition, as expressed on and offline, has played an important role in delaying development and making shale gas politically unacceptable in the run up to a General Election. The ongoing uncertainty will doubtless unnerve potential investors. The underpinning ideologies which provided the impetus towards development however, appear unaltered, and while they remain, the industry's fate hangs in the balance.

5. Conclusion

This paper provides the first assessment of online information use in the English anti-shale gas campaign. It addresses a to-date under-researched aspect of the issue, but contains a number of acknowledged limitations. Firstly, the highly charged nature of the topic meant several key individuals were unwilling to be interviewed, or would only speak off-the-record. This was a particular issue for Lancashire residents in favour of shale gas. Secondly, while interviewees' accounts covered 2011-18, data collection took place towards the end of period and their recollections may be incomplete. A study of website and social media content relating to shale gas over the same time-frame would help elaborate upon and substantiate our account of an online information divide. Thirdly, shale gas is a fast-moving topic; the political context changed over the course of our research and continued to do so during write up. Our paper is accurate as of November 2019 and the passing of the second moratorium but, as we have argued, the long term outlook for shale gas in England remains unclear and the influence of online information use on the debate cannot yet be definitively stated.

As with all issues within the energy-environment nexus, shale gas is a complex topic and online information only compounds this complexity. Contestation over which knowledges count as legitimate and who has the right to interpret them have a long history in disputes over contentious issues [33] but with the increasing ubiquity of online information, the dominant institutional belief that a better informed citizenry will necessarily become a more acquiescent one appears increasingly untenable. Nascent industries in particular are likely to find themselves in the position of English shale gas operators, unable to engage effectively in an online environment where they hold no privileged position and their voice is only one amongst many. Governments may find that their attempts to depoliticise an issue have unintended consequences [70] and that conventional tactics aimed at reducing conflict no longer work as they did in the pre-internet era. Conversely, the ubiquity of online information cannot be assumed to operate straightforwardly to the benefit of citizens attempting to influence public policy. While it may enhance their status as legitimate participants it may also increase their challenges, as they seek to navigate an increasingly complex information ecology. New areas of contestation are likely to emerge as knowledge disputes expand to incorporate claims and counter-claims about information literacy. Post-political theory alerts us to the nuances of these arguments and how they too may be operationalised to bypass dissent.

Social conflict is a characteristic of all energy projects [71]. As internet use increases globally, and particularly in the Global South,

research on contentious technology and resource development will benefit from considering the political effects of this changing information environment. Useful avenues for further research include comparative work across jurisdictions to assess how specific features of the resource, in combination with local histories, technologies, political and cultural contexts influence how changes in information access shapes the development of these conflicts. The post-political thesis argues that dissensus can never be permanently excluded from politics but as this article shows, neither does internet activism provide a straightforward channel for its return. Online activity did not level the political playing field for the anti-shale gas campaign, although it may have highlighted to campaigners the extent to which it was uneven and galvanised a turn to direct action. Understanding the varied ways in which internet use influences the expression of dissent will become an increasingly important aspect of the study of contentious energy issues in the twenty-first century.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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