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Googling it: While news search results can affect newsrooms' perception of social issues, journalists mainly rely on it for complementary information

ABSTRACT

This article investigates the ramifications of search engine algorithms for journalism practice and its professional commitment to serving the public interest. Taking a discipline-transcending approach that combines quantitative data analysis with

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recession
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an exploration of the social forces shaping knowledge production in journalism, we examine a case study involving New Zealand media's coverage of economic recession. This inquiry addresses the question of how journalists navigate the terrain of algorithms and respond to the challenges posed by programme-based news production in relation to their professional norms. Our study highlights the significant role of search engines, particularly Google, in shaping the journalistic newsgathering process and, consequently, public understanding of social issues. The computer-assisted analysis of Google's 'recession' news selection revealed distinct patterns in the distribution of news content and geographical bias towards the United States within the selection algorithm. Ethnographic research at one Auckland newsroom revealed that Google Search is a fundamental tool for journalists, albeit used primarily for basic information-gathering and fact-checking rather than in-depth investigative work.

INTRODUCTION

Search engines have evolved into an important element of daily life, helping and altering the ways we find and access information, as well as perceive the world. With Google alone processing over 3.5 billion searches daily and 1.2 trillion annually worldwide (Internet Live Statistics 2024), it is clear that search engines are not only a tool but also a significant player in the acquisition and dissemination of knowledge. As scholars observed almost a decade ago, search engines wield substantial influence over our comprehension of social, political, economic and cultural events (Gillespie 2014).

In this study, we explore the place of search engine algorithms within the realms of news media, with a specific focus on journalism practices. While search engines were once regarded as tools merely facilitating access to the vast expanse of the internet, they have now seamlessly integrated into both personal and professional routines. For journalists, search engines have revolutionized the information-gathering process, offering them the means to uncover data and stories that were previously difficult to uncover. This shift signifies a departure from traditional methods, such as physical visits to archives and libraries, towards a reliance on the knowledge generated by private enterprises in commercial domains. The move from public to commercial repositories of knowledge, from a realm of knowledge understood as a public good to a profit-driven world with knowledge seen as a commodity, has become a common area of inquiry, with considerable attention given to education and social equality, for example (Kauppinen 2014; Stehr 2020), but not more specifically to professional practices such as journalism and its changing information-gathering practices and fast processing of information.

In this study, we explore these implications for journalism practice, focusing on professional commitments to serving the public interest, encouraging dialogue and supporting community engagement. The underlying purpose of search engine algorithms, from journalists' point of view, has been as a support in identifying potential resources for news production. However, the information presented in search results goes beyond this primary goal, offering ready-to-go information that carries the potential to influence the very act of news production itself. Shroeder's (2014) seminal study of Google, which we use as a starting point of the research, was based on the premise that new technologies, embedded in the fabric of social life, are only one component of the larger technological system of the internet – providing access to this system.

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Following Meyer and Schroeder's (2009) call for a discipline-transcending approach that combines quantitative data analysis and analysis of social forces that shape knowledge production, we examine a case study of media coverage of economic recession to address the question: How do journalists deploy professional norms to understand algorithms and meet the challenges of programme-based news production?

To explore the extent to which algorithms enhance the public service function of journalism, we looked at a selection of recession-related stories on Google News (GN), including primary stories and on Google News Full Coverage (GFC), a feature that claims to provide in-depth coverage with more resources, perspectives and context (Snir 2021). Through a combined approach of computer-assisted analysis of 1498 articles listed by Google over one week and an ethnographic study of journalists at the public service broadcaster Radio New Zealand (RNZ) in New Zealand, we focus on the search engine algorithms' impact on journalism practice. We look into the historical development of newsgathering in journalism, the incorporation of automated processing of vast amounts of information, the role of algorithms in newsrooms and Google's significance in the information-gathering process. We then present the case study of economic recession and explore the implications of algorithms on journalism's public service function.

ALGORITHMS, NEWSGATHERING AND PROFESSIONAL IDEOLOGY

The method of assembling news leaves an impact on the news coverage of the issues (Bell 1991), playing a significant role in supporting good, unprejudiced, evidence-based reporting (Holbert and Zubric 2000; Van Dijk 1987). Early calls for a re-examination of the place of newsgathering techniques in the news process (Rupar 2006) resonate strongly in the digital age because the proliferated information-gathering tools are both platform-based and human-based. Transparency of information-gathering tools is now considered to be one of the ways to rebuild public trust in media and democracy (Nelson 2021). Contemporary news production involves the creation of narratives generated, selected and ordered not only by humans but by algorithms too – a change in professional routine that reflects the relationship between technology, media and society (Liuzzi 2024). Journalism has experienced a number of shifts in response to digitalization and the internet, but the presence of algorithms might be the most challenging innovation so far. While some may view the automation of news processes as a natural progression, both the potential and limits of technology are questioned in relation to core journalism functions (Milosavljević and Vobič 2019). Jones and Salter (2011) argued that the industry's history of scepticism towards new technologies traditionally masked the 'intimate relations' that journalists and news organizations have with technologies. When the telegraph was first used, it led to the development of the idea that journalism is all about what matters most here and now – the inverted pyramid structure of news was introduced alongside a more simplified language style to adjust to the cost per word of the technology. The maturing of the current affairs television format in the late twentieth century saw the introduction of the 'cross-cut interview' style, as well as a critical approach and a strong point of view in reporting (Prenger and Deuze 2017) in response to a need to have more visible participation in public affairs. And in more recent years, social media platforms like Facebook and X have reshaped the way journalists engage with their audience. In this way,

journalism and technology are entwined (Preston 2009) and we can see how technology relates to the development of journalism as a profession and as a set of cultural practices today.

Looking closely at the journalism profession and the norms and values that underpin information-gathering practice in the age of algorithms provides insight into the cultural and professional shifts that make up the current media environment. The internet era opened a space for collecting information from a broader range of sources, but enabling journalists to access new archives of knowledge is not a straightforward process. Journalists have been slow to uptake digital technologies (Carlson and Usher 2016) due to the professional belief that traditional journalistic skills like writing and interviewing are more valuable in everyday work (Min and Fink 2021), but their editors and publishers are much less so. A discord between industry discourse that identifies technology as the saviour of journalism and the actual practices of journalism (Min and Fink 2021) led some authors to claim that journalists need to develop new forms of work if they were to effectively respond to challenges of automated knowledge production (Linden 2017). The growing use of algorithms in the news affects journalism as a professional practice and its privileged position in making a call on what information is relevant and what to include or exclude, stress or omit. News aggregators, such as GN, have created algorithms that take away human-centred judgement of relevance of information and the control of domains of knowledge historically defined within the boundaries of the journalistic field (Carlson 2018). Algorithm-driven information systems challenge journalists' ability to engage with these systems without compromising professional norms and values that retain the public service function of journalism (Jones et al. 2022).

To understand the social and political impact of news algorithms, scholars have either looked at organizational factors that encourage/discourage the adoption of algorithmic journalism (Linden 2017) or have examined how stratification and institutional resources create patterns of asymmetry in service to the public (Elliott et al. 2019; Helberger 2019). The emerging scholarship in digital journalism explores some aspects of public interest in data mining (Fernandes et al. 2023) but does not yet address how algorithms relate to journalists' understanding of newsgathering and the ways professional norms resonate in a digital environment. To address this question, we used a case study of 'recession' because, at the time of writing, there was a need to strengthen it as a public top priority in 2022. A case study approach allows for examining contemporary issues in a real-life context (Stake 1978) with the aim of identifying the ways Google algorithms order media coverage of recession. We conducted a two-level analysis to:

1. Examine how algorithms may determine the selection of information about socially significant issues, namely the patterns of Google's selection of news stories about the recession. We grouped articles according to location (New Zealand, Australia, the United Kingdom and the United States), and we looked at the subtopics of recession, namely GDP, employment, sustainability and climate change.
2. Investigate journalists' views on the influence of algorithms behind search engines on their everyday work. We included ethnographic research to test to what extent journalists agree with algorithms' supporters that the underlined coded procedures are neutral and therefore useful in journalists' everyday work.

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METHODS OF ANALYSIS

In this section, we introduce our approach to examining the impact of search engine algorithms on journalism, in the case study of recession-related news stories. Our findings here are based on the analysis of Google Search results about recession-related news stories from the United States, the United Kingdom, Australia and New Zealand. Using the keyword 'recession', we gathered 1498 articles during one week – from 31 October 2022 to 6 November 2022. Of these, 577 were identified as unique, appearing in the search for the first time. Of the total, 1253 articles were gathered from GN (84 per cent) and 245 from GFC articles (16.4 per cent). On average, GN provided daily 179 news articles about recession, and GFC provided 214 articles.

In regard to data collection, several initial approaches to collecting news from Google were tested, including public APIs, self-built web crawlers and browser extension web data extraction tools. The browser extension tool was ultimately selected for its ability to obtain news content by simulating users' behaviours, unlike manually written code, which was frequently blocked. In this way, we employed this tool to collect data from GN and GFC. This tool required inputting specific HTML elements from Google pages to automate data gathering. The extraction tool ran twice daily for seven consecutive days, starting from the search results of the keyword 'recession' on GN, including articles from the GFC section when available. This process captured original article links.

Next, based on the captured original article links, we developed a JavaScript program with an npm package (node-readability) to capture the article content, as well as the additional metadata like article titles. Articles that were not freely accessible or lacked necessary metadata were excluded from the dataset.

In this research, natural language processing (NLP) techniques are applied to summarize text content and detect specific keywords. NLP is a field of artificial intelligence (AI) that focuses on allowing computers to understand, interpret and generate human language. It involves a range of techniques for analysing text, including language modelling, sentiment analysis and text summarization, to facilitate meaningful interaction between humans and machines. Keywords included country names (New Zealand, Australia, the United Kingdom and the United States) and recession-related topics like 'GDP', 'Employment', 'Sustainability' and 'Climate Change'. Detected keywords were recorded in a CSV output file as Boolean values, indicating their presence in articles. These data underwent further refinement and analysis using another JavaScript program.

This study also explored text summarization techniques in computer science, recognizing them as essential for quickly grasping the main ideas from lengthy articles. Two approaches, extractive and abstractive summarization, were considered. Extractive summarization focuses on copying essential document portions into a summary, while abstractive summarization uses sequence-to-sequence models to create concise text based on longer inputs. For this study, we used the PyTorch framework in conjunction with the Transformers library from Hugging Face to utilize Google's T5 (Text-To-Text Transfer Transformer) model for abstractive text summarization of news content from GN and GFC.

The study then employed an ethnographic approach to understand the actual newsgathering methods and search behaviours of journalists. One

researcher spent two weeks at the Auckland newsroom of RNZ, a public broadcaster in Aotearoa New Zealand. RNZ operates to a Charter and its chief principle is to serve the public interest (RNZ n.d.). Public service journalism includes ‘a duty to be independent, objective, unbiased and to make equitable the provision of services to all regardless of social position or geographic location’ (Bardoel and Lowe 2007: 11). RNZ was chosen as the most suitable ethnographic site to understand how search tools might support journalism’s public service function. By focusing on real people and their everyday activities in their natural environment (Stake 1978), journalists’ search practices – including the reporting on recession and their overall knowledge and understanding of search algorithms – could be observed.

We followed Hammersley and Atkinson’s steps in ethnographic research: participants were studied in their usual, everyday context; data were gathered from multiple sources, those being participant observation and informal interviews; the methods of data collection were unstructured; the focus was small scale on one newsroom and data analysis involved a contextual interpretation of the ‘meanings, sources, functions, and consequences of human actions and institutional practices’ (2019: 3). ‘Thick description’ (Geertz [1973] 2008: 34) – where ethnographers do not simply describe participant behaviour but *interpret* the behaviour within a cultural context – positions the findings ‘within the framework of the social group’s view of reality’ (Fetterman 1998: 28). Such contextualization is especially important when researching algorithmic software (Christin 2017), as the aspirational role of algorithms is different to its on-the-ground applications. We not only described the ways in which journalists used search tools in their daily practice but contextualized their use within a constructed reality where news workers interact with algorithmic search tools while fulfilling their public interest functions.

The research occurred over a two-week period in September 2022, taking a ‘snapshot in time of a particular site’ (Jeffrey and Troman 2004: 539–40). The researcher spent time with several news teams to observe the ways that journalists use search tools. These teams included daily news, online, long-form, world and business desks. The researcher maintained a detailed diary of what she saw, as well as interactions and conversations pertaining to journalists’ understanding of search tools. Informal interviews were conducted; participants acted as informants (Bernard 2005: 196), and they often demonstrated their search practices in person. These ad hoc interviews proved extremely insightful, as participants shared their current challenges, uses and aspirations for algorithmic search tools in the newsroom.

ASSESSMENT OF GN AND GFC DISTRIBUTION

In a comprehensive seven-day study on Google’s news selection, we collected and analysed a total of 1498 articles, distinguishing between those surfaced on GN and GFC. The data revealed a dominant presence of GN articles, which constituted 83.6 per cent (1253 articles) of the total, while GFC articles represented a smaller fraction at 16.4 per cent (245 articles). A graphical analysis (Figure 1) showed a consistent flow of GN articles without significant deviations, whereas GFC articles exhibited considerable variability. The latter ranged from highs of over thirty-five to lows under ten, with intra-day fluctuations – evident from the sixteen GFC articles on the morning of 1 November, which dwindled to none by the evening. Our daily observation averaged 214

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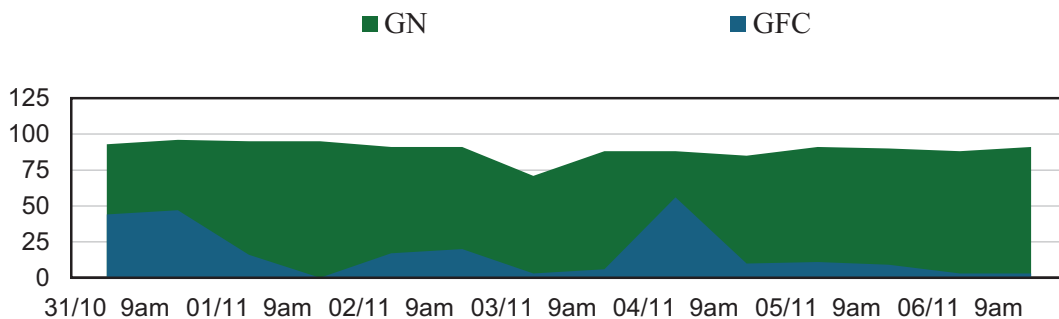


Figure 1: Graphical representation of article quantity. Provided by the author.

articles, with GN articles maintaining a steady output of approximately 179 per day, suggesting a stable and predictable selection algorithm.

In contrast, GFC articles demonstrated significant daily fluctuations, sometimes exceeding 35 articles and, on other occasions, dropping below ten. Notably, on 1 November, sixteen GFC articles were available in the morning, but none were present by the evening, highlighting a dynamic and variable distribution within the same day.

Acting as gatekeepers in automated content moderation (Ruckenstein and Turunen 2019), algorithms' activities resemble a newsroom-designed editorial process: the hard news section, in this case, GN, needs constant updating (Saltzis 2012), while the in-depth stories, GFC, 'give users a complete look at how a story is being reported on from a variety of sources' (Southern 2021: n.pag.). This follows the logic of traditional news ranking because, despite the rhetoric that surrounds automated processes, algorithms do not exist in a vacuum. They are created by humans in a specific social, economic, cultural and professional context. Svensson (2023) illustrates this process in much detail, outlining the tensions and negotiations surrounding the introduction and development of a news-ranking algorithm in a Swedish daily and advocating an approach that looks at algorithms as a culture and everyday socio-institutional practice of making a meaning of reality. While the creation of Google's algorithms remains one of the top secrets in the digital world (Brake 2017), their manifestation is in a public domain, which offers a good start in unpacking their outcomes. In the following subsections, based on our automated content analysis, we outline the logic of Google's list of news stories about economic recession.

The fluctuation in article frequency – predictable selection algorithm in GN and variable distribution within the same day – raises questions about the nature of algorithms at play. Historically, Google's PageRank algorithm, conceived in the 1990s, embodies the notion of cognitive capitalism, wherein the importance of a webpage is democratically 'voted' upon by the linkage it receives across the web. This system inherently capitalizes on human judgement, as clicks are interpreted as indicators of significance, thereby influencing the visibility of news articles. This 'cognitive capitalism' – as Pasquinelli (2009) terms it – leverages the collective intellect and input of web users to determine the value and visibility of information. The system has developed over time both in terms of clarity and transparency. On its own pages, Google explains the ranking of news as a way to 'promote original journalism and expose users to diverse perspectives' (Google Publisher Center Help 2024). The ranking is

determined algorithmically by relevance of content (keywords match), prominence (intensity of coverage, citation, original reporting), authoritativeness (expertise), freshness (currency), location (a place of search influences results) and language (matching the language of original search). The other factors Google refers to are interests, usability and preferences for topics and publishers, but to what extent each determines the results remains less known.

To look closer at the content of stories about the recession, we focused on a unique article collection. Beyond the general distribution, our analysis identified 577 unique articles within the aggregate data – 428 from GN and 149 from GFC, which translates to 74.2% and 25.8% of the unique content, respectively. A notable trend emerged as the week progressed: the daily count of unique articles for both GN and GFC diminished, with GN articles decreasing by 55.7% after the first day and GFC articles showing a sharp 74.1% decrease post the initial day, barring a notable increase on the fifth day. The overall uniqueness of the articles stood at 38.5%, with GN articles being less unique (34.2%) compared to GFC articles (60.8%), as shown in the uniqueness percentage chart.

At the launch of GFC, Google described this feature as being more advanced than GN and able to detect long-running news stories that span many days ‘to help people easily find top news along with additional content like explainers and local coverage that are helpful to understanding these complex stories’ (Snir 2021).

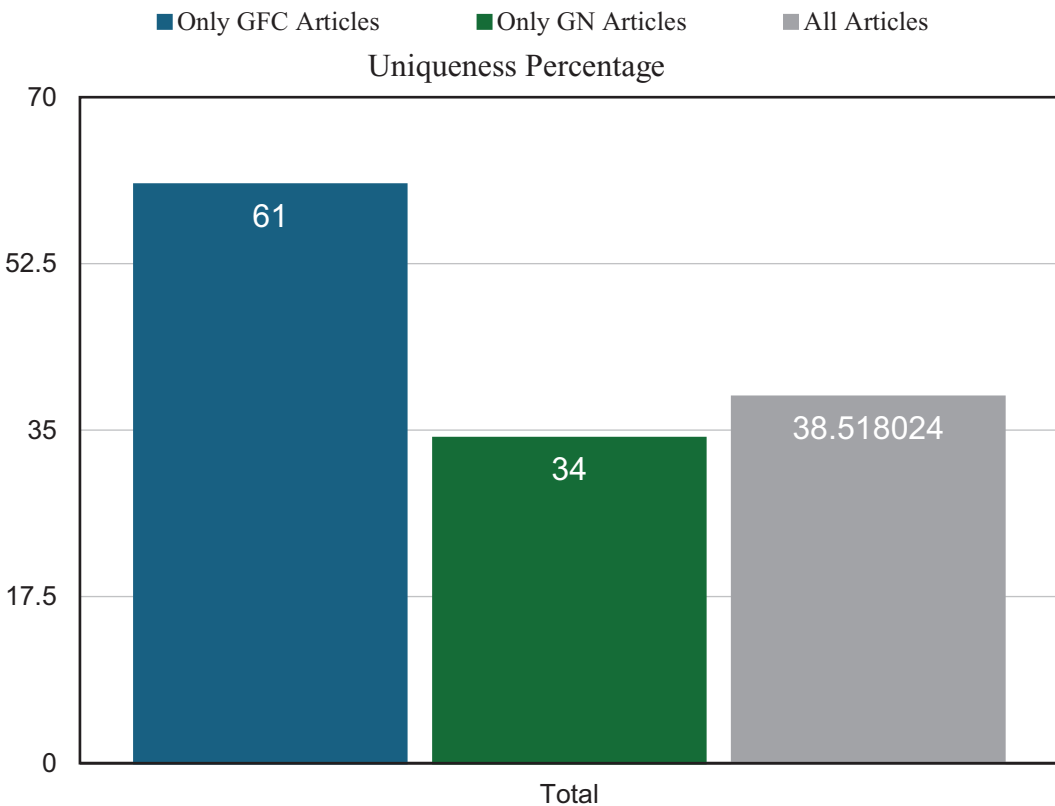


Figure 2: The uniqueness percentages of different article sources. Provided by the author.

To examine the extent to which this promise has been fulfilled, we examined the recession news in relation to the key economic indicators, GDP and unemployment, and in relation to social issues that dominate development agenda, sustainability and climate change. Our keywords ‘GDP’, ‘Employment’, ‘Sustainability’ and ‘Climate Change’ featured 724 times across all articles: ‘GDP’ was the most prevalent, appearing in 460 articles, followed by ‘Employment’, with 206 mentions. The occurrences of ‘Sustainability’ and ‘Climate Change’ were comparably lower.

Regarding geographical presence, the United States dominated with mentions in 969 articles, followed by the United Kingdom, Australia and New Zealand with 289, 86 and 67 mentions, respectively. This trend was consistent in both overall and unique article analyses, underscoring a US-centric focus in article distribution.

When dissecting the keyword frequency within GN and GFC articles, we observed that GN articles mentioning ‘GDP’ were more likely to be duplicated, whereas those mentioning ‘Sustainability’ were more unique. GFC articles did not mention ‘Sustainability’ or ‘Climate Change’, which could be attributed to the smaller pool of GFC articles. ‘Employment’ mentions in GFC articles were somewhat repetitive, but ‘GDP’ references tended to be more unique.

The country-specific data showed a parallel between GN and GFC articles, with the overall GN articles being approximately 3.3 times more than unique GN articles. The study also highlighted a similar ratio of country mentions between all GN articles and the unique GN subset, indicating linear repetition across the four countries analysed. However, the GFC data suggested more duplication for articles mentioning the United States compared to those that mentioned the United Kingdom, which was more likely to be unique.

In summary, this investigation into Google’s news selection offers a narrative of discernible patterns in the distribution of news content. The data suggest a geographical bias towards the United States within the selection algorithm (Figure 4).

This study underscores the complexity of news curation in the digital age where ‘Google News and similar services, which aggregate various news sources into one interface and become popular and “authoritative” news channels in themselves, intensify certain perceptions of the World based on the page-ranking mechanism and its popularization of content’ (Segev 2008).

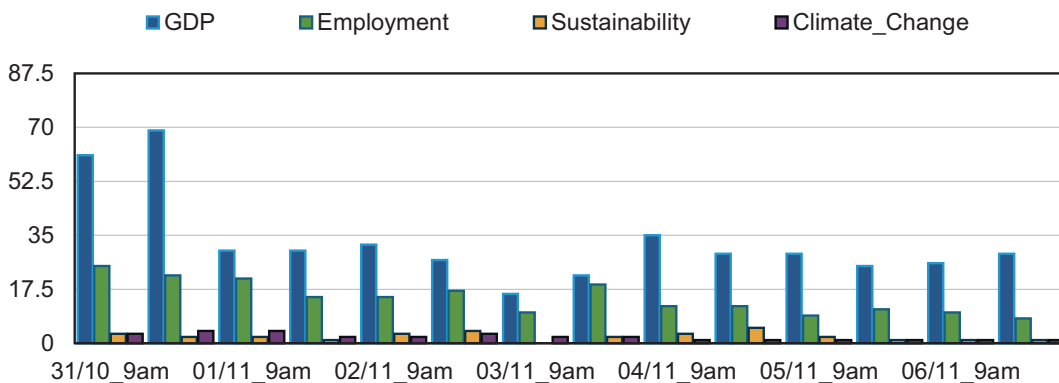


Figure 3: The frequencies of keyword detections from all articles. Provided by the author.

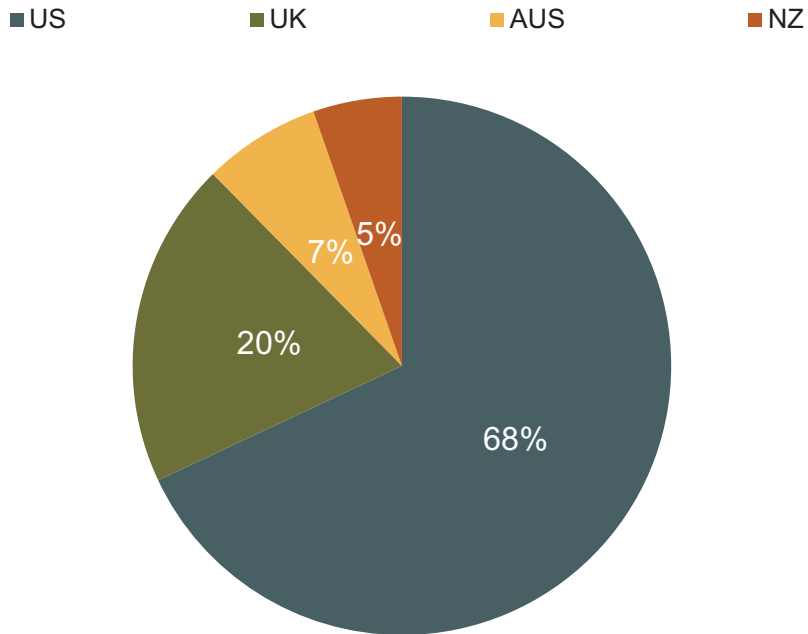


Figure 4: The frequencies of country detections from all GN articles. Provided by the author.

Looking at the top news articles in the world section of GN of the top political news, Segev (2008) found dominance of US-originated stories, both in English and non-English news. While the international news flow has become less hierarchical and US-centred in the past decade, ‘wealthier countries not only continue to attract most of the world news attention, they are also more likely to decide how other countries perceive the world’ (Guo and Vargo 2017: 499).

In most western media markets, Google has a near monopoly in search, and in 2023, it was facing anti-trust trials in the United States. Because of its dominance in search, it has a pivotal role in contemporary news dissemination. How Google promotes or prevents news from appearing in its services can have profound consequences for the news industry and for society at large. Our study of Google’s selection of recession stories in that context confirms Myllylahti’s (2023a) argument that neither Google nor Facebook is inherently interested in the news and the promotion of news on their services due to algorithmic content selection. As discussed above, Google’s search functions and its other tools have become deeply embedded in newsrooms’ daily routines and news production, and publishers are saying that it is hard for them to operate without Google’s offerings as they have become a central part of their news businesses (Nielsen and Ganter 2022; Meese 2023; Myllylahti 2023a).

LINKING NEWS AND PLATFORM FUNCTIONS

News is increasingly found via search engines and consumed on social media platforms, interlinking news and platform functions tightly together. Meese and Bannerman note that search and social media algorithms ‘make significant decisions around the visibility of news on their service, which can affect

people who want to access news and news outlets who want audiences to reach their websites' (2022: 2). In 2023, it became apparent that the visibility of news has become poorer in Google Search, and news websites have been downgraded in importance (Majid 2023). Additionally, in September 2023, Google yet again updated its search, resulting in many users reporting that AI-generated content was given prominence and that original creator content was pushed down in the search results (Langley 2023). Furthermore, Google Search prioritizes some news and some news organizations over others (Myllylahti 2023a, 2023b). Additionally, news chatbots, including Google Bard, do not offer links to the news content without prompting, and even after prompts, these direct readers to 'wrong sources, wrong stories and random articles' (Myllylahti 2023b).

In this context, our findings suggest that news content offered by Google Search is cyclical and that the number of unique news content in its search function falls in each cycle. The results suggest that in a seven-day cycle, Google Search keeps offering the same content in its search, raising questions about the relevancy and timeliness of its offerings in the news and its algorithmic news selection. The findings also suggest that the search results may carry a geographical bias. Stories about recession were US-centric when compared to other comparable Anglosphere markets, including the United Kingdom, Australia and New Zealand. Australia and New Zealand were substantially less visible in search results, especially in unique content, suggesting that news content from these countries was recycled more in the search results compared to the United States and the United Kingdom. These findings somewhat align with earlier reports and research studies. Trielli and Diakopoulos (2019) also found that the content Google Search algorithms offered in its Top Stories box came from a small selection of news sources. They found that CNN and the *New York Times* dominated search results (Trielli and Diakopoulos 2019). However, in contrast to our findings, they concluded that Google's search impressions 'tend to concentrate on articles that are more recent in age' (Trielli and Diakopoulos 2019: 10), arguing that 85 per cent of articles searched were less than 24 hours old. However, they note that articles that were older were still relevant as they 'describe background or contextual information that remains relevant for an extended period of time (Trielli and Diakopoulos 2019: 12).

In 2021, the UK media regulator Ofcom found that algorithms prefer the English language and favour international and national news content over regional and local content. Ofcom noted that news publishers are concerned about the role algorithms 'play in controlling the prominence and discoverability of news sources on online intermediary platforms and how transparently those decisions are made' (2021: 11). As Menczer (2021) observes, the news recommendation systems have a strong 'popularity bias', amplifying content that is of interest to the public rather than in the public interest. In this context, we argue that while our findings contrast those of Trielli and Diakopoulos's (2019) study in terms of timeliness of content, they show that Google searches may offer less unique content than previously thought, with a strong preference towards larger markets, especially the United States.

The previous section's examination of Google's search results on 'news' and 'recession' illustrates the profound influence of algorithmic prioritization and exclusion on the availability and framing of information. By presenting a curated set of results, Google's algorithms shape the context in which economic issues are understood by both journalists and the public.

This influence underscores the need for a deeper understanding of the algorithmic mechanisms that underpin news production, particularly in terms of how they align or conflict with journalism's foundational commitment to serving the public interest. Our examination of how journalists in legacy media use search engines and search tools in the information-gathering and data-mining stages of journalism was informed and shaped by the previous work on professional values and the role journalism plays in the healthy functioning of democracy (Rupar 2006, 2021; Myllylahti 2023a, 2023b). The news' most important function in a democratic system is to inform and educate citizens and create a platform for public discourse, otherwise known as serving the public interest. However, journalism faces a number of challenges in its efforts to achieve this; the internet has fragmented the public sphere, and social media platforms have not only become a main source of news dissemination but can lead to the creation of filter bubbles or echo chambers (Sunstein 2007).

Compounding this is the highly competitive news media environment, where news organizations operating under commercial models compete for news content, audiences and advertisers for their ongoing survival. As Bourdieu writes, 'the weight of the economy within the field is constantly growing' (2005: 42). Automation in the newsroom is on the rise, with journalists relying on algorithmic tools and AI technologies increasingly in their work. While automation is present in all areas of journalism, including news-gathering, writing and dissemination, this study focused on the use of search engine tools in the newsgathering stage. More specifically, we aimed to identify what search engines and search tools were used by journalists in the newsgathering stage, and how these tools were used, modified and designed to suit their journalistic purposes. In this sense, it is critical to understand how search engines and search tools influence the decision-making of journalists, as well as to imagine what could be done to recalibrate the news algorithms to better support public interest journalism. In the next section, we outline the main results of the ethnographic part of the study.

NEWSROOM REPORT: WHY IT MATTERS (OR NOT)

The ethnographic research identified that external search tools are, perhaps unsurprisingly, wholly embedded in journalistic newsgathering routines. Google Search was the external search engine of choice within RNZ's Auckland newsroom, but to varying levels of use. It was observed that the general news, business, world and the online teams used Google Search to gather basic information such as names of people, places and definitions of unfamiliar terms. In this sense, Google was a *complementary* tool for these teams, used for basic information-gathering and fact-checking, rather than as an investigative one.

In fact, it was observed that journalists in these teams regularly referred to their own internal archive – with stories dating back to the mid-2000s – to understand how a topic had previously been covered or to collect background information on a story. One journalist from the daily news team used RNZ's internal search tool for archival stories and source contacts and used Google only for finding new contacts or monitoring story/event updates. A journalist from the business desk noted that, to them, 'RNZ is the trusted source of news, so we trust our own reporting', and if covering a topic like 'recession', they would first go to the RNZ archive to see what had been previously reported. This indicated a preference for information produced to RNZ's own

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professional journalistic standards over information presented by an external commercial search tool; in this sense, journalists were reinstating journalistic control over the judgement of relevant information and domains of knowledge (Carlson 2018). It should be noted that these attitudes were observed before a member of RNZ's staff was found to be intentionally altering online stories to include pro-Russian sentiment, thereby compromising the accuracy of RNZ's archive. In June 2023, it was discovered that a journalist had edited Reuters wire copy to include Russian propaganda on at least twelve online stories (RNZ 2023). RNZ has since introduced a policy where all wire copy is checked twice before publishing, in line with RNZ's existing requirements for any other story published online and has conducted a comprehensive audit (RNZ 2023).

Our research found that Google Search plays a more significant role within the long-form journalism team. As investigative journalists, members of this team conducted what one described as 'heavy Googling' to gather information on a topic; this included Google Search and, when academic information was needed, Google Scholar. However, finding the required information using Google Search was sometimes challenging. One journalist was observed conducting a high number of Google searches when gathering information – predominantly government reports and releases – for a story on Māori health outcomes. They conducted the search multiple times: they added words to the search query, replaced words, added more context by including '+ MOH' (Ministry of Health), and then added 'filetype xls' to trigger results in spreadsheet format. When asked why they did not simply add the desired year in the search query, the journalist explained that doing so did not always produce reports from that year. Journalists were observed conducting several Google searches and adapted their search query – successfully and unsuccessfully – in their pursuit of information that was contextually relevant and in the desired format. This was summarized by a journalist who stated that 'you have to know what to look for and how to search for it', pointing to a newsgathering practice where journalists must *play the game of search*. While algorithmic news aggregators may have removed a significant level of human judgement regarding information relevancy (Carlson 2018), journalists were observed critically analysing and interpreting the information they were presented and manipulating their search queries to produce more relevant information, thereby demonstrating a high level of journalistic judgement.

Journalists pointed to several other frustrations with Google's search functionality which challenged newsgathering practices, including no option to change results to chronological order within a specified time frame, hindering one's ability to understand how an issue has developed over time; data-set results tended to be US-centric; results did not always reflect the contextual nuances of the region or culture, such as Māori issues; no option to filter results by 'official sources', such as nominated government websites, and paid advertisements were featured in the top results. Regarding the latter point, advertisements were marked as such on the results page, but one journalist described how they were sometimes 'tripped up' by advertisements for 'dodgy websites'. Another stated that the corporatization of Google meant that the search tool was 'less useful than it was ten years ago'. Google's ability to control the available knowledge on a topic – like the recession – may influence a journalist's ability to see the 'full picture'; a key issue considering journalistic reputation rests on the ability to gather and report on news factually (Alexander 2006). This reiterates the concern that algorithmic tools

1. We should acknowledge that some of the journalists' frustrations with Google Search may have arisen because the information simply does not exist online – a responsibility of archival institutions, and not the search platform. However, journalists repeatedly stated that the required information was indeed present within a website but presented in a way that made it 'unsearchable'.

challenge journalists' ability to fulfil the public service function of journalism (Jones et al. 2022). Yet there was evidence that journalists were aware of this issue. One journalist stated that similar to media releases from corporate companies, 'Google colours the way you see the story [...] they make you see things a certain way and then you have to challenge what you've seen'. Operating within a commercialized algorithmic newsgathering system, journalists actively and consciously responded to the limitations of news aggregator search results.¹

This speaks to the requirement for a strong digital archive literacy. As the search engine of choice at RNZ, Google holds significant power over journalists' access to digital archives; Google determines 'what is preserved in an area where the public can (or is likely) to access it and what is consigned to stagnant digital backwaters' (Treanor 2009: 296). And in today's digitalized world, one might argue political and economic power is determined by who controls the records. As of March 2023, Google dominated the global desktop search market with a share of 85.53 per cent (Bianchi 2024) and has significant control over visibility of digital archives; Google's relevancy algorithm can push certain websites up or down the results list. In other words, a journalist cannot solely be guided by what Google's algorithm determines is relevant to their research. The ability to find information and determine relevancy is an important newsgathering skill; one journalist reported that their Google search skills had stagnated and that this had become a barrier to professional development.

A digital archive literacy is also necessary for journalists to find and interpret information within archival institution websites. It was found that journalists preferred to go directly to 'official' sources, such as government websites, for more culturally relevant information, yet several journalists expressed frustration with the search functionality of these sites: information was difficult to find or poorly indexed, and data were sometimes 'buried deep'. To illustrate, one journalist was investigating food-borne diseases in New Zealand and a Google search provided a link to an online PDF report from the Ministry for Primary Industries (MPI). Wanting to find reports from previous years, the journalist could not access the report database using the URL and had to trawl through the MPI website to find the full report directory. In another example, a journalist showed how data within the Statistics New Zealand website were embedded across several files and spreadsheet tabs, making it particularly difficult to find using Google Search and Statistics New Zealand's internal search tool. Several journalists expressed that they felt there was a reluctance from official sources to provide open and searchable information online. One journalist spoke about New Zealand's Plain Language Bill – which requires all public service agencies and crown agents to use plain language in official documents and websites (Plain Language Act 2022) – and said they wished there was an equivalent bill for plain data to ensure public entities presented data in accessible ways. Indeed, a more transparent, open collaboration between producers of digital archives and news organizations would support journalism's democratic functions of informing the audience and holding those in power to account. However, access to archives is not transparent and the information within them is ambiguous, as they operate 'at the intersection of the visible and the invisible' (Treanor 2009: 291). Instead, an understanding of the structure and accessibility of material within digital archives allows journalists to make informed interpretations of the available data (Bødker 2018) – vital when performing the public service function of journalism.

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CONCLUSION

Our study highlights the significant role of search engines, particularly Google, in shaping the journalistic newsgathering process and, consequently, public understanding of social issues. The computer-assisted analysis of Google's 'recession' news selection revealed distinct patterns in the distribution of news content and geographical bias towards the United States within the selection algorithm. Ethnographic research at RNZ's Auckland newsroom revealed that Google Search is a fundamental tool for journalists, albeit used primarily for basic information-gathering and fact-checking rather than in-depth investigative work. Journalists frequently relied on RNZ's internal archives for comprehensive background information, demonstrating a preference for content produced under their own professional standards over that surfaced by external commercial search engines. The investigative team at RNZ, however, engaged in extensive use of Google Search, adapting queries iteratively to locate specific information such as government reports and academic sources. This practice underscores the necessity for journalists to possess advanced search skills to navigate and extract relevant data from the vast digital landscape. Despite these efforts, journalists faced significant challenges with Google's search functionality, including difficulties in accessing chronological data, US-centric results and the presence of misleading advertisements.

The findings reveal a critical tension between the journalistic need for comprehensive and diverse information and the algorithmic biases inherent in Google's search results. This tension is exacerbated by Google's control over digital archives and the visibility of news content, which can undermine journalists' ability to provide a full and accurate picture of events. Journalists at RNZ displayed a conscious awareness of these limitations, actively questioning and verifying the information presented by Google. This highlights the importance of a digital archive literacy to enable journalists to critically assess and interpret search results and ensure that their reporting adheres to high standards of accuracy and public service. As search engines continue to dominate the information landscape, it is imperative for news organizations to develop strategies that mitigate algorithmic biases and enhance the transparency and accessibility of digital archives, thereby supporting the democratic function of journalism.

ETHICS STATEMENT

The ethnographic part of the study was approved by the Auckland University of Technology ethics Committee on 24 May 2022 (Ethics Application 22/94 'Journalism, Search Engines, and the Public Interest').

REFERENCES

- Alexander, Jeffrey C. (2006), *The Civil Sphere*, Oxford: Oxford University Press.
- Bardoel, Jo and Lowe, Gregory F. (2007), 'From public service broadcasting to public service media: The core challenge', in G. F. Lowe and J. Bardoel (eds), *From Public Service Broadcasting to Public Service Media*, Goteborg: Goteborg University, pp. 9–26.
- Bell, Allan (1991), *The Language of News Media*, Oxford: Blackwell.
- Bernard, Emily (2005), 'Teaching the n-word', *American Scholar*, 74:4, pp. 46–59.
- Bianchi, Tiago (2024), 'Global market share of leading desktop search engines 2015–2024', 22 May, <https://www.statista.com/statistics/216573/world-wide-market-share-of-search-engines/>. Accessed 22 August 2023.

- Bødker, Henrik (2018), 'Journalism history and digital archives', *Digital Journalism*, 6:9, pp. 1113–120.
- Bourdieu, Pierre (2005), 'The political field, the social science field, and the journalistic field', in R. Benson and E. Neveu (eds), *Bourdieu and the Journalistic Field*, Cambridge: Polity Press, pp. 29–47.
- Brake, David R. (2017), 'The invisible hand of the unaccountable algorithm: How Google, Facebook and other tech companies are changing journalism', in J. Tong and S. H. Lo (eds), *Digital Technology and Journalism: An International Comparative Perspective*, London: Palgrave Macmillan, pp. 25–46.
- Carlson, Matt (2018), 'Automating judgment? Algorithmic judgment, news knowledge, and journalistic professionalism', *New Media & Society*, 20:5, pp. 1755–72.
- Carlson, Matt and Usher, Nikki (2016), 'News startups as agents of innovation: For-profit digital news startup manifestos as metajournalistic discourse', *Digital Journalism*, 4:5, pp. 563–81.
- Christin, Angèle (2017), 'Algorithms in practice: Comparing web journalism and criminal justice', *Big Data & Society*, 4:2, pp. 1–14.
- van Dijk, Teun A. (1987), *Communicating Racism: Ethnic Prejudice in Thought and Talk*, London: Sage Publications.
- Elliott, Marianne, Berenson-Shaw, Jess, Kuehn, Kathleen, Salter, Leon and Brownlie, Ella (2019), 'Digital threats to democracy', SSRN, <http://www.digitaldemocracy.nz>. Accessed 1 March 2023.
- Fernandes, Elizabeth, Moro, Sergio and Cortez, Paulo (2023), 'Data science, machine learning and big data in digital journalism: A survey of state-of-the-art, challenges and opportunities', *Expert Systems with Applications*, 221, <https://doi.org/10.1016/j.eswa.2023.119795>.
- Fetterman, David M. (1998), 'Ethnography: step by step', *Applied Social Research Methods Series*, 2nd ed., London: Sage Publications.
- Geertz, Clifford ([1973] 2008), 'Thick description: Toward an interpretive theory of culture', in T. S. Oakes and P. L. Price (eds), *The Cultural Geography Reader*, London: Routledge, pp. 29–39.
- Gillespie, Tarleton (2014), 'The relevance of algorithms', in T. Gillespie, P. J. Boczkowski and K. A. Foot (eds), *Media Technologies: Essays on Communication, Materiality, and Society*, Cambridge, MA: MIT Press, pp. 167–95.
- Google Publisher Center Help (2024), 'Ranking with Google News', <https://support.google.com/news/publisher-center/answer/9606702?hl=en>. Accessed 18 June 2024.
- Guo, Lei and Vargo, Chris J. (2017), 'Global intermedia agenda setting: A big data analysis of international news flow', *Journal of Communication*, 67:4, pp. 499–520.
- Hammersley, Martyn and Atkinson, Paul (2019), *Ethnography: Principles in Practice*, London: Routledge.
- Helberger, Natali (2019), 'On the democratic role of news recommenders', *Digital Journalism*, 7:8, pp. 993–1012.
- Holbert, R. Lance and Zubric, Stephen J. (2000), 'A comparative analysis: Objective & public journalism techniques', *Newspaper Research Journal*, 21:4, pp. 50–67.
- Internet Live Statistics (2024), 'Google search statistics', <https://www.internet-livestats.com/google-search-statistics/>. Accessed 18 June 2024.
- Jeffrey, Bob and Troman, Geoff (2004), 'Time for ethnography', *British Educational Research Journal*, 30:4, pp. 535–48.

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- Jones, Janet and Salter, Lee (2011), *Digital Journalism*, London: Sage Publications.
- Jones, Bronwyn, Jones, Rhianne and Luger, Ewa (2022), 'AI "everywhere and nowhere": Addressing the AI intelligibility problem in public service journalism', *Digital Journalism*, 10:10, pp. 1731–55.
- Kauppinen, Ilkka (2014), 'Different meanings of "knowledge as commodity" in the context of higher education', *Critical Sociology*, 40:3, pp. 393–409.
- Langley, Hugh (2023), 'Some Google users see their Google site rankings decimated', *Business Insider*, 20 September, <https://www.businessinsider.com/google-search-helpful-content-update-results-drop-ai-generated-2023-9>. Accessed 27 August 2023.
- Linden, Carl-Gustav (2017), 'Algorithms for journalism: The future of news work', *The Journal of Media Innovations*, 4:1, pp. 60–76.
- Liuzzi, Alvaro (2024), 'Algorithm will be the message', Predictions for Journalism, Nieman Lab, December, <https://www.niemanlab.org/2023/12/the-algorithm-will-be-the-message/>. Accessed 18 June 2024.
- Majid, Aisha (2023), 'How Google has downgraded importance of news websites in search results', *Press Gazette*, 2 February, <https://pressgazette.co.uk/media-audience-and-business-data/news-publishers-lose-google-search-visibility-2022/>. Accessed 23 August 2023.
- Meese, James (2023), *Digital Platforms and the Press*, Bristol: Intellect.
- Meese, James and Bannerman, Sara (2022), 'Introduction: Governing the algorithmic distribution of the news', in J. Meese and S. Bannerman (eds), *The Algorithmic Distribution of News: Policy Responses*, Cham: Springer International Publishing, pp. 1–24.
- Menczer, Frances (2021), 'Facebook whistleblower Frances Haugen testified that the company's algorithms are dangerous – here's how they can manipulate you', *The Conversation*, 8 October, <https://theconversation.com/facebook-whistleblower-frances-haugen-testified-that-the-companys-algorithms-are-dangerous-heres-how-they-can-manipulate-you-169420>. Accessed 1 August 2023.
- Meyer, Eric T. and Schroeder, Ralph (2009), 'Untangling the web of e-Research: Towards a sociology of online knowledge', *Journal of Informetrics*, 3:3, pp. 246–60.
- Milosavljević, Marko and Vobič, Igor (2019), 'Human still in the loop: Editors reconsider the ideals of professional journalism through automation', *Digital Journalism*, 7:8, pp. 1098–116.
- Min, Seong Jae and Fink, Katherine (2021), 'Keeping up with the technologies: Distressed journalistic labor in the pursuit of "shiny" technologies', *Journalism Studies*, 22:4, pp. 1987–2004.
- Myllylahti, Merja (2023a), *From Paper to Platform: How Tech Giants are Redefining News and Democracy*, Wellington: BWB.
- Myllylahti, Merja (2023b), 'Now you see it, now you don't – how generative search engines and chatbots offer news and how these may affect news publishers', in *Artificial Intelligence and Communication Symposium*, Auckland: Auckland University of Technology, 6 September.
- Nelson, Jacob L. (2021), *Imagined Audiences: How Journalists Perceive and Pursue the Public*, New York: Oxford University Press.
- Nielsen, Rasmus K. and Ganter, Sarah A. (2022), *The Power of Platforms Shaping Media and Society*, New York: Oxford University Press.
- Ofcom (2021), 'The future of media plurality in the UK', 25 March, <https://www.gov.uk/find-digital-market-research/statement-the-future-of-media-plurality-in-the-uk-2021-ofcom>. Accessed 23 August 2023.

- Pasquinelli, Matteo (2009), 'Google's PageRank algorithm: A diagram of cognitive capitalism and the rentier of the common intellect', in *Deep Search: The Politics of Search beyond Google*, Vienna: Studienverlag, pp. 152–62.
- Plain Language Act (2022), New Zealand Legislation, 21 October, <https://www.legislation.govt.nz/act/public/2022/0054/latest/whole.html>. Accessed 23 August 2023.
- Prenger, Mirjam and Deuze, Mark (2017), 'A history of innovation and entrepreneurialism in journalism', in P. J. Boczkowski and C. W. Anderson (eds), *Remaking the News: Essays on the Future of Journalism Scholarship in the Digital Age*, Cambridge, MA: MIT Press, pp. 235–50.
- Preston, Paschal (2009), 'An elusive trans-national public sphere? Journalism and news cultures in the EU setting', *Journalism Studies*, 10:1, pp. 114–29.
- RNZ (2023), 'RNZ chief executive apologises after pro-Russian sentiment added to stories', 12 June, <https://www.rnz.co.nz/news/national/491824/rnz-chief-executive-apologises-after-pro-russian-sentiment-added-to-stories>. Accessed 25 August 2023.
- RNZ (n.d.), 'The Radio New Zealand Charter Te Tūtohunga o Te Reo Irirangi o Aotearoa', <https://www.rnz.co.nz/about/charter>. Accessed 21 August 2023.
- Ruckenstein, Minna and Turunen, Linda L. M. (2019), 'Re-humanizing the platform: Content moderators and the logic of care', *New Media & Society*, 22:6, pp. 1026–42.
- Rupa, Verica (2006), 'How did you find that out? The transparency of the newsgathering process and the meaning of news: a case study of New Zealand journalism', *Journalism Studies*, 7:1, pp. 127–43.
- Rupa, Verica (2021), 'Revisiting the notion of public interest: Journalism and the global immigration crisis', in S. Ward (ed.), *Handbook of Global Media Ethics*, Berlin: Springer, pp. 695–710.
- Saltzis, Kostas (2012), 'Breaking news online: How news stories are updated and maintained around-the-clock', *Journalism Practice*, 6:5&6, pp. 702–10.
- Schroeder, Ralph (2014), 'Does Google shape what we know?', *Prometheus*, 32:2, pp. 145–60.
- Segev, Elad (2008), 'The imagined international community: Dominant American priorities and agendas in Google News', *Global Media Journal*, 7:13, pp. 1–34.
- Snir, Itamar (2021), 'Get the full news story with full coverage in Search', Google Blog, 8 March, <https://blog.google/products/news/get-full-news-story-full-coverage-search/>. Accessed 23 August 2023.
- Southern, Matt G. (2021), 'Google search results updated with "full coverage" for news', *Search Engine Journal*, 8 March, <https://www.searchenginejournal.com/google-search-results-updated-with-full-coverage-for-news/398254/>. Accessed 23 August 2023.
- Stake, Robert E. (1978), 'The case study method in social inquiry', *Educational researcher* 7:2, pp. 5–8.
- Stehr, Nico (2020), 'Knowledge as a public good and knowledge as a commodity', *Epistemology & Philosophy of Science*, 57:4, pp. 40–51.
- Sunstein, Cass R. (2007), 'The polarization of extremes', *The Chronicle of Higher Education*, 54:16, 24 December, <https://www.chronicle.com/article/the-polarization-of-extremes/>. Accessed 24 September 2023.
- Svensson, Jakob (2023), 'Logics, tensions and negotiations in the everyday life of a news-ranking algorithm', *Journalism*, 24:7, pp. 1518–35.

- Treanor, Brian (2009), 'What tradition, whose archive?: Blogs, Googlewashing, and the digitization of the archive', *Analecta Hermeneutica*, 1:1, pp. 289–302.
- Trielli, Daniel and Diakopoulos, Nicholas (2019), 'Search as news curator: The role of Google in shaping attention to news information', *Proceedings of CHI '19: CHI Conference on Human Factors in Computing Systems*, Glasgow, Scotland UK, 4 May, New York: ACM, pp. 1–15.

FURTHER READING

- Carlson, Matt (2019), 'News algorithms, photojournalism and the assumption of mechanical objectivity in journalism', *Digital Journalism*, 7:8, pp. 1117–33.
- Donsbach, Wolfgang (2014), 'Journalism as the new knowledge profession and consequences for journalism education', *Journalism*, 15:6, pp. 661–77.
- Gavaghan, Colin, Knott, Alistair, Maclaurin, James, Zerilli, John and Liddicoat, Joy (2019), 'Government use of artificial intelligence in New Zealand', *New Zealand Law Foundation*, <https://www.cs.otago.ac.nz/research/ai/AI-Law/NZLF%20report.pdf>. Accessed 1 March 2023.
- Hammersley, Martyn (2016), *Reading Ethnographic Research*, London: Routledge.
- Myllylahti, Merja (2017), 'We need to talk about metrics', in V. Rupar (ed.), *Themes and Debates in Contemporary Journalism*, Cambridge: Cambridge Scholar Publishing, pp. 87–104.
- New Zealand Government (2020), 'Algorithmic charter', 30 July, <https://data.govt.nz/assets/Uploads/Draft-Algorithm-Charter-for-consultation.pdf>. Accessed 18 June 2023.
- Schudson, Michael (2019), 'Where we are and whither, we are tending', *Journalism*, 20:1, pp. 77–79.

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