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(Re)search results: search engines and the logic of efficiency in scholarship

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ABSTRACT

This article uses the search engine as a heuristic for reflecting upon the extent to which knowledge production within the academy both shapes and is shaped by the media that it studies and with which its research is enabled. More specifically, it argues that the *efficiency* that has helped make *search* both a paradigmatic feature of digital culture and a habitual, everyday activity is achieved not just through speediness of results, but through a rationalized, regimented, and standardized structuration of knowledge, ensuring the latter is amenable to computational processing and retrieval. Search engines exercise a crypto-normative function, establishing formal norms and constraints relating to knowledge production, including academic research outputs, at the same time that they furnish one of the principal means by which this research is conducted. The purpose of this article is not to decry bureaucratic modes of conduct, which are central to the responsibilities of academic life, but to stress the importance of scholars reflecting upon their own relationship to the technologies of which they make use and the temporalities these technologies engender.

KEYWORDS

Media theory; knowledge; efficiency; search engines; scholarship; digital culture; normativity

For scholars who work on media, keeping up with the times can seem rather trying. The pace at which media and communications technologies change often feels overwhelming, generating buzz, hype, disquiet, and – along with an ever-increasing number of op-eds – ever more data and content for the media scholar to analyse. This feeling is especially aggravated (and at times aggravating) for those who produce theoretical accounts of media. Indeed, critical theory has lost a lot of ground in recent years to digital research methods – in particular, those premised upon large-scale cultural analytics, archiving, data mining, mapping, and visualization. In the face of such methods, modes of research stemming from the theoretical humanities can give the impression of being unceasingly behind the times.

By the same token, scholars across all disciplines experience time pressures of various kinds, expected to publish more, apply for more grants, and take on more administrative

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responsibilities, whilst increasingly subsisting within undependable short-term positions offering little sense of what the future might hold for them. Today's academy, writes Filip Vostal, demands 'prompt and swift behaviour', and 'an emphasis on performance, outcomes and efficiency' has come to be perceived by many as 'an almost unquestionable aspect of the academic vocation' (2016, 130–131). Compensatory reminders of what work within the university *could* resemble, calling for slow professorship (Berg and Seeber 2016), slow science (Stengers 2018), slow philosophy (Walker 2017), slow scholarship (Karkov 2019), mindfulness in the academy (Lemon and McDonough 2018), and so on have often been chastised as heedless of the realities of precarious academic life and the power dissymmetries that make careful, time-consuming research possible for certain scholars at the expense of others.

Whatever the case, there is no doubt that academics find themselves subjected to the logic of *efficiency* and that this is both enabled and augmented by the digital media platforms that have become standard components of knowledge work. Perhaps the most commonly used of all these platforms is the search engine, which is, as Alexander Halavais remarks, 'at once the most and the least visible part of the digital, networked revolution' (2009, 2). From general-use, web-based services like Google to more specialized citation indexes, library catalogues, and repositories, the *search* paradigm has become ensconced as a crucial feature of scholarship, not only supplanting prior information technologies (such as card catalogues) and reducing reliance upon physical libraries and archives, but fundamentally altering the patterns and rhythms of research. 'The introduction of search engines,' observes danah boyd, 'has radically reworked the ways in which information can be accessed' (2011, 48). In doing so, however, it also reworks the form this information takes and the procedures by which it is produced.

The gradual penetration of the *search* paradigm into the fabric of our daily lives over the past thirty years is surely a result, above all else, of its speed of retrieval. There is simply no precedent for the rapidity with which they enable one to find and filter through information. In this article, however, we wish to argue that the logic of *efficiency* this paradigm typifies involves more than just a straightforward speediness; it also entails a particular relationship to and figuration of knowledge. More specifically, we argue, the proliferation of search as a habitual paradigm has bolstered an instrumentalized principle of efficiency, premised upon ordered, regulated, and uniform processes of collation and retrieval, within knowledge production and reproduction.

We do not wish to imply that all scholars approach research in the same way or that search engines, like any other media technology, are homogeneous in their effects. But there is a basic, unavoidable fact: scholars, to varying degrees and in varying ways, make use of search engines and produce content with the awareness that it will be accessed via search engines. This inevitably shapes not only on the kinds of research scholars produce and the ways in which it is presented, but also how scholars perceive and position said research: scholars both rely upon search engines as a means of furnishing the materials underpinning their research and produce knowledge in forms amenable to indexing and ranking by these same search engines. In doing so, we wish to suggest, such scholars' work is influenced not only by the usual instrumentalities of university life – the routines, practices, and expectations that constitute the academic's professional ethos – but by the algorithmic exigencies and technical rationalities of platforms that seek, in Taina Bucher's words, 'to guide the conduct of people' (2012, 1), attempting to

both facilitate and monopolize users' attention by means of near-real-time data management and retrieval.

A culture of immediacy

Although a perceived acceleration in the pace of daily life is regularly cited as a defining feature of modernity (see Rosa 2013), such claims are only meaningful when localized and contextualized. Especially relevant here is John Tomlinson's depiction of a culture of immediacy, which for him is marked by three main features, firstly, a habituation to 'rapid delivery, ubiquitous availability and the instant gratification of desires', underpinned by 'an economy and an associated work culture geared not just to sustaining but to constantly increasing this tempo of life'; secondly, 'a distinct *quality* to cultural experience' perceived as 'a new kind of vibrancy in everyday life […] an increasing sense of connectedness with others, or as a prevailing sense of urgency'; and lastly, 'the crucial significance of the media in modern culture' (2007, 74). For many of us, this habituation to immediacy has only been further facilitated in subsequent years by the rapid growth in ubiquitous computing and mobile media, combined with seemingly ever-faster broadband speeds, both wired and wireless.

These kinds of observations are not entirely new, of course. We have to take care not to fall back into the crude epochal periodization with which speculative media theory abounds – after all, as Jason Farman (2018) documents, there is nothing new about a disdain for waiting and an astonishment at the capacity of communications technologies to speed up transmission: the uniform penny post, the telegraph, and pneumatic tubes, just to mention a few such technologies, were all perceived at one point as facilitating virtually instantaneous circulation of messages, even though by our standards they would all be unacceptably slow. Likewise, we have to be careful not to presume that any such culture of immediacy is equally distributed or homogeneous in its effects. Indeed, as Sarah Sharma emphasizes, it is crucial to pay attention to 'the differential and inequitable ways in which time both is made to matter and is experienced' (2014, 15; see also Keightley 2012). Keeping all these caveats in mind though, we feel we can still reasonably speak of an appreciable culture of immediacy, understood as a means of describing the combined effects of the rapid transmission times enabled by digital media, shifting expectations around connectedness, responsiveness, and availability, and an intensification of a work ethic that views wasted time (in one's leisure time and social activities as much as in one's work) as deserving of moral condemnation (see Sutherland 2019; Hu 2022). Indeed, we might say, following Anna Kornbluh's lead, that immediacy can be understood as 'a master category for making sense of twenty-first-century cultural production', which 'rules art as well as economics, politics as much as intimacy' (2023, 6). And, even more importantly, as Kornbluh goes on to note, that this reign has 'evaded critical analysis' in part because 'cultural theorists have succumbed to its intoxications' (2023, 8).

'The possibility of immediacy reframes the act of waiting as a kind of inefficiency,' remarks Zara Dinnen, 'and so we are all drawn into the cycle of being always available', generating 'new kinds of impatience so that any wait at all for computation feels like an unnecessary hassle' (2018, 122). Under such conditions, the inevitable gaps, interruptions, and moments of downtime that pervade ordinary acts of communication seem

increasingly frustrating or objectionable – not because they are necessarily rarer than they once were (given how quickly our expectations shift to match the technologies we have available to us, as well as how frequently these technologies fail to live up to their proclaimed capabilities), but because we are encouraged to perceive them as squandering the precious time available to us. Torn between too many competing options, confronted with too many pressures, every pause – even in the most trivial interactions – is liable to become an obstruction, a missed opportunity. Anna Munster's observation that 'immediacy is rarely the actual experience of temporality in online engagements; rather lags, corruption and error returns are the order of the day' (2006, 23) is no less true now, nearly twenty years later. Rather than undermining the normative foundations of this promissory immediacy though, such interruptions tend to just furnish both an anticipation of and justification for further 'innovation' in hardware – faster processor speeds, greater bandwidth, more extensive server clusters, and so on – promising to reduce the delays and intervals that punctuate our usage of these platforms.

In the context of a culture of immediacy, search engines stand out as something of a double-edged sword. On the one hand, provided one has access to a stable internet connection, they present an almost seamless example of instantaneous data retrieval. Of course, this real-time retrieval of archived data is not actually instantaneous, even when accessed via high-speed broadband, a fact often obvious to the end user. Google informs us, on every search page, not only how many results have been retrieved, but in what fraction of a second this retrieval has taken place, both boasting of their query index's efficacy and reminding us that immediacy does not equal instantaneity. Immediacy is about more than just speediness, measured in terms of latency time between a search query being entered and the results being furnished. It is also, for one thing, about *ease*: about not having to physically make one's way to a library; not having to thumb through card catalogues; not having to pore over indexes and directories; not having to consult hardcopy dictionaries, thesauruses, and encyclopaedias; not having to sit for days in archives, jotting down quotations and references; not having to request back issues or order interlibrary loans; not having to fruitlessly follow trails of hyperlinks across various web pages, and so on.

Perhaps most significantly, the combination of rapid data retrieval and a well-calibrated crawling/indexing system (incorporating sophisticated and opaque machine learning techniques) means not having to trawl through pages of results to find the answer for which one is looking. Anyone who experienced using early crawler-based search engines (e.g. AltaVista, HotBot, Excite, etc.) can surely attest that these platforms, regardless of how quickly a query might have been returned, could not have been described as efficient, given the superfluity and irrelevance of most of the results they delivered. Early web users 'trying to make their way through the noise to find what they were looking for,' notes Jodi Dean, 'had to presuppose not only that what they wanted was out there (a promise of abundance) but that they could find it (a promise of access)' (2010, 42). The success of Google (and Alphabet, its parent company) can, in large part, be attributed to the PageRank algorithm and its capacity to, from an end user's perspective, seemingly fulfil this promise of access, giving them the answers they seek (even if they do not really know the question they are asking).

On the other hand, though, search engines have the unintended upshot of making everything else feel sluggish and ineffectual in comparison. David Beer argues that the

rise of 'big data' and the data analytics industry forms part of 'the building and deployment of a rationality of speed, a rationality in which we are made to feel our slowness and where we are led to believe that we need to speed-up and be more agile' (2017, 31). Search engines, it could likewise be argued, represent an earlier stage in the emergence of this rationality, claiming to not only bring some level of order to the wild frontiers of the nascent world wide web, presenting the meandrous browsing (or 'surfing', as it used to be called) once characteristic of its usage as unproductive and undesirable in the face of systematically ranked search results generated on the basis of plain text keyword queries, but to organize the world's information more generally, to the extent that any other mode of research (including those involving the traditional hardware of academic scholarship) is likely to suddenly seem cumbersome and frustrating.

Efficiency and the bureaucratic ethos

The immediacy to which search platforms give tangible form is not just built upon speediness, but a specific model of efficiency that, according to Sean Cubitt, has been 'associated since Weber with the bureaucratic-rationalist ethos' (2002, 7). Which is to say, the speedy and apparently accurate returns search engines like Google provide depend upon a very specific conceptualization of what knowledge is and how it is best accessed. For Max Weber, 'bureaucratic administration means rule through knowledge', which gives it 'its specific basic rational character' (2019, 352), and this is achieved at least partly through a peculiar *organization* of knowledge, which principally takes the form, in his account, of written documentation and paperwork, combined with standardized processes, applying objective, precise, and rationally calculable rules to these files in an impersonal, dispassionate manner. Though we do not wish to slavishly hew to this definition, it does help get at the ways in which 'efficiency' is so often tied up with procedures for structuring and ordering knowledge, allowing both people and machines to get the job done, so to speak.

Search's proliferation as a habitual paradigm of knowledge reproduction has resulted in the transposition of a principle of efficiency, premised upon ordered, regulated, and standardized processes of collation and retrieval taken from a set of specialized institutional contexts (e.g. government bureaucracies, libraries, archives, etc.), and designed to facilitate optimal speediness in data storage, retrieval, and processing, on to manifold spheres of life that would once have been perceived as antagonistic to it. 'Filing techniques', as Cornelia Vismann would have it, have been 'turned into discursively analysed *principles* that can be applied to computerized data processing' (2008, 163–164), without any real discrimination in terms of *what* data is processed. Given how much the average individual, on any given day, relies upon search engines for a wide variety of tasks, it would be surprising if this usage *did not* establish norms informing their relationship to knowledge production and retrieval. And as software, these search engines have certain very precise formal parameters and constraints, some born of technical necessity, others reflective of commercial demands and institutionalized modes of organization.

For instance, at the most basic, fundamental level, search engines are computational systems – discrete state machines – that work exclusively with computable information. Anything not stored in a computable format is by definition outside the search engine's reach. Such a constraint is not purely technical in origin: Alan Turing once remarked that

'the idea behind digital computers may be explained by saying that these machines are intended to carry out any operations which could be done by a human computer', who is 'supposed to be following fixed rules; he has no authority to deviate from them in any detail' (1950, 436). In other words, a management technique for regulating workers, confining their activity to mathematical calculations into which they have little insight or ability to intervene and enabling them to perform this activity in a swift fashion by precisely ordering and streamlining the calculations they must perform (typically aided by slide rules or mechanical calculators), would eventually come to be technically operationalized in the electronic computer, which deals with nothing other than computable functions.

Slightly more specifically, search engines can only provide results based on information accessible to them, either contained within particular databases (built on particular data models amenable to such search functions) or, in the case of general-purpose web search engines, reachable by their crawlers (which entails their being locatable within the public internet's address space) and containing content capable of being indexed (a category that began with only file names and web page titles, but gradually broadened to include full text, meta tags, in-links and out-links, images, sound, videos, etc.). Though we have no interest in valorizing the imagined plenitude of some uncomputable excess, it is nevertheless the case that modes of life must exist in which, as Alexander Galloway suggests, 'discrete symbols do not take hold, or at least do not hold sway' (2021, 1) and the knowledge they produce will remain inassimilable to the search engine as long as they resist such encoding.

This does not mean this uncomputable knowledge, in whatever shape it takes (i.e. without making any determination in advance regarding what exactly constitutes knowledge), is free from formal or material constraints. It certainly does not mean that it will not be indexable in the future. But as long as there exists knowledge that search engines cannot reach, the information they deal with cannot be treated as synonymous with knowledge as such. Which is to say, search engines are not necessarily inimical to knowledge (as the most pessimistic accounts intimate, e.g. Carr 2011; Cassin 2018), but operate on the basis of a particular and peculiar form of knowledge. And the ever-present nature of these search engines in our daily activities (not to mention our practices of scholarship, to which we must now turn) means we inevitably rely upon this form of knowledge in manifold aspects of our lives. Search is, as Renée Ridgway puts it, 'not merely an abstract logic but a daily practice' (2020, 417).

Analogous observations could be made about many different software and hardware tools that have become ubiquitous since the personal computer's emergence. Myriad facets of academic labour have long been computerized, a process which is still ongoing in teaching, research, and administration. 'Would a messy work of genius such as Marx's *Capital*,' asks Thomas Hylland Eriksen, 'have been shorter or longer, simpler or more complex if its author had had access to word processing software?' (2001, 2). Eriksen's tentative answer to this thought problem is that said book would have been tidier, less complex, and even lengthier. There is no reason why any of us should reach the same underdetermined conclusions, as if the effects of a program like the word processor are straightforwardly predictable and enumerable. Making such claims always risks invoking the spectre of 'technological determinism' – specifically, in Judy Wajcman's words, the tendency to assume 'that technologies are used in a

uniform way overall and everywhere, revolutionizing work, leisure, education, family relationships, and personal identities' (2015, 21; cf. Peters 2017). But the inability of any of us to state with any certainty how the word processor would have affected a single historical thinker's work, let alone intellectual practice tout court – and this is before we even broach the question of what word processor, at what time, we are speaking – should not prevent us from observing that this software's affordances, in terms of both formal design choices and material constraints (see Kirschenbaum 2016), are vastly different from those of the steel nib pen, iron gall ink, and rag- or wood-based paper.

To speak in such a way is not to speculate on the effects these media might cause, but to endeavour to catalogue, however hesitantly, just some of the myriad localized formal parameters operating in the production and circulation of knowledge. Within the context of contemporary academia, there are innumerable other such parameters we could examine: from state funding arrangements, institutional priorities and expectations, impact evaluation processes, disciplinary mechanisms, social and cultural norms, funding bodies' requirements, and industry partners' demands, down to the design and capacity of teaching spaces, the accessibility of buildings, scholars' workloads, employment contracts, and so on. Many of these are the products of the procedures and diktats, issuing from a plethora of public and private organizations, that organize academic life; others are, to quote Sara Ahmed, 'a result of histories that congeal as habits or shared routines' and can have palpably material effects, involved in 'the narrowing or restriction of what bodies do' (2017, 109–110). Our focus in this article is the search engine, not because it possesses some especial, epochal determinative status, but precisely because it offers a perfect example of how our very conceptions of 'knowledge' can be said to be wrapped up in the media we use and vice versa, in a recursive set of relations that elude any straightforward causation.

Ordering knowledge

It would be no exaggeration to say that much academic research, especially in the theoretical humanities, starts with a search engine query. The exact kind might vary: a web search engine, a citation index, a digital assistant, a library catalogue, an archival database, a software repository, a PDF reader, a social media platform, a desktop search tool, perhaps even a mapping service directing one to a café with speedy Wi-Fi, comfortable seating, and decent coffee. In practice, search engines help scholars (like everyone else) orient themselves in relation to computational systems defined by an almost unimaginable surfeit of information. They also shape contemporary research cultures by informing the paths that research takes and speeding up the research process. We would hazard that search engines are the dominant tool of scholarly research today, surpassed only by the aforementioned word processors. Particular fields of study may have other prerequisite hardware and software, but almost no other tool traverses disciplinary boundaries in quite the same way.

In spite of this plethora of search engines available to us, the incontrovertible paragon of the *search paradigm* is Google. Media studies research on Google tends to focus on its monopolistic position as a major technology company (Vaidhyanathan 2011), which has allowed it to establish a formidable position as a giant platform conglomerate (Srnicek 2017), a major player in the attention economy (Pasquinelli 2009), a prime broker of

internet advertising space (Hwang 2020), and as a central facilitator of contemporary modes of data-driven surveillance (Zuboff 2019), algorithmically driven classification and discrimination (Noble 2018), and linguistic commodification (Thornton 2018). Google's monopoly has invested it with what Richard Rogers describes as 'algorithmic authority, or the belief in the epistemological value of search engine results' (2013, 119): its success, which can be largely put down to its amassed computing power, the size of its index, the capacity of its crawlers to continually trawl the web, and its sophisticated implementation of machine learning, arguably combined with ongoing anticompetitive conduct and reputation laundering (see Phan et al. 2022), allows it to entrench this monopoly, in large part by maintaining, in the face of an ever-expanding surfeit of indexable information, its already-noted speediness and efficiency. This in turn has not only reinforced the perception that Google is the only game in town (its only real competitor outside China and Russia being Microsoft Bing), but has turned search into a habitual activity, almost as unthinking and repeated as checking one's watch.

As 'a crucial point of entry into the web', Rogers goes on to argue, search engines are 'epistemological machines' that actively shape the returns they generate in response to a query – and they do so because in order to generate these returns, they must first 'crawl, index, cache, and ultimately order' the internet's content (2013, 31). The crucial point here is not just that such search engines – and Google in particular, by virtue of its monopoly position – are technically restricted to indexing certain forms of content, but that their ubiquity results in knowledge production, across pretty much all fields and spheres (including, but not limited to 'content creation' in the narrow sense in which this phrase is now used) being 'optimized' in order to both conform to these restrictions (ensuring they are legible to these search engines' crawlers) and second-guess their algorithms (hoping to achieve a high ranking in their results). In other words, search has become so normalized as a means of information retrieval it increasingly provides the basic framework within which knowledge production occurs, and yet for precisely the same reason we tend to take this framework for granted. 'The speed of Google's search engine so enthralls us,' observes Wajcman, 'that we seldom reflect on the fact that it favors some content over others' (2015, 179). The perception of efficient, frictionless access furnishes scant opportunities for critical reflection on the workings of this apparatus, ensuring that search remains a mundane, customary, and almost invisible component of our everyday existence (see Haider and Sundin 2019). The extent to which our scholarly activity is moulded by the results that search engines feed us – and by normative expectations of efficiency that they may well instil in us – remains occluded.

Of course, a bureaucratic ethos – involving, in Ian Hunter's words, 'self–abnegation, strict adherence to procedure, and dedication to professional expertise' (1992, 488) – has long been an essential part of academic work, even if it is often treated (especially in the theoretical humanities) as a foreign, external, even actively hostile imposition, obstructing their research's true flourishing: standardized rules–based grading, ranking, and moderation, external examination, peer review, specialization, disciplinarity, and delimited areas of expertise, clearly–defined hierarchies built on formal qualifications, and established norms regarding intellectual rigour and honesty all constitute standard elements of an academic's professional conduct.

And rationalizing information retrieval as a means of speeding up the research process is likewise hardly new within this setting. Markus Krajewski, for instance, compares the

scholar's determinately and idiosyncratically sequenced 'box of paper slips' to the schematized form of the librarian's card catalogue, which aims to inventory all available books in a logically consistent and broadly accessible fashion, observing that the latter 'serves as a collective search engine', for 'its data input comes from numerous sources, but it always works in accordance with strictly regulated instructions, so that it can be queried by anyone' (2011, 50). But whilst libraries involve myriad processes of selection, filtering, and ordering (not least, the question of which books librarians choose to include), and the established book form is defined by a number of formal and material constraints, such catalogues tended to rely upon a restricted set of metadata (e.g. author, title, year, language, publisher, place of publication, decimal number classification, etc.) and thus, even though they worked to impose systematic order upon the books they indexed, they had little impact upon the latter's content, which the reader still needed to scrutinize for themselves.

In contrast to this, web search engines have, since the mid 1990s, indexed various facets of web pages' content (e.g. text, images, embedded videos, links, etc.) in order to assign each of these pages a determinate value, determining their relative importance. In particular, Google's early success came on the back of their PageRank algorithm, which used hyperlink analysis to quantify the relations between web-hosted pages and documents, with the ostensible aim of furnishing users with the most 'accurate' results. But this automated evaluation now increasingly takes the form of 'personalization', which capitalizes on users' preferences and behaviours to recursively shape the content and ranking of information returned by a particular query, effectively making 'relations between people,' as Celia Lury and Sophie Day observe, 'available for computational calculation' (2019, 20). The development of such algorithmic procedures, which of course parallel trends in targeted advertising and curated feeds, is crucial for these platforms' ongoing commercial viability. Search engines, notes Bernhard Rieder, '*must* rank in order to be useful' (2020, 11). The sense of speediness that makes them so habitually useful would be immediately jeopardized if they did not return the results users desire (indeed, many would argue that this decline in utility has already occurred, thanks to a combination of advertisement-polluted results, machine-generated content, and search engine optimization tactics). Again, 'efficiency' arrives by means of a rationalization of information.

In ranking results, however, search engines necessarily subject it to a form of 'evaluation', meaning they 'actively intervene in the spaces they seek to represent' (Rieder 2020, 11). They appear to provide us with a window peering on to the world – what Louis Amoore describes as 'an aperture – an opening that is simultaneously a narrowing', reflecting the need not just 'to see, to collect, or to survey a vast data landscape', but 'to perceive and distill something for action' (2020, 16) – but as a result of the necessarily circumscribed view furnished, have a tangible and easily perceptible influence on the world they survey. The mere fact that search engine optimization is considered a commercial imperative (for what point is there to having a website if no one can find it?) is evidence enough of this intervention. It is not to say that these search engines prescribe some kind of determinate practice (in fact, the cargo cult of said optimization is based primarily on guesswork), but they instil the understanding that, in order to be legible within online space, one must conform to their requirements (even if these are not stated in advance, in order to protect trade secrets and prevent or obscure manipulation, or are simply

impossible to apprehend, generated algorithmically from staggeringly large data sets; see Burrell 2016). The search results page, so outwardly anodyne, becomes a perfect example of the ways in which an interface can, in Lisa Nakamura's words, compel 'particular sorts of identifications, investments, ideological seductions, and conscious as well as unconscious exercises of power' (2008, 17). Put simply, search engines have a crypto-normative function, even as they tout their objective neutrality: they judge content … and they judge us.

Google's algorithmic techniques, as Rieder goes on to illustrate, operationalize both mathematical formulas for sorting and ranking *and* 'quite fundamental ideas about authority, importance, relevance, and so forth' (2020, 295). Even the results of the most innocuous search query instantiate normative judgements about how knowledge *ought* to be valued. The important thing is not what these judgments are, not the criteria according to which they are made, but the mere fact that they occur, that they shape the information we access, and encourage us to shape our own knowledge production in conformity with them. At the very least, our habitual usage of search engines is likely to reinforce the sense that anything important, anything we should *know*, is (or should be) accessible through them. The paradigm of *search* and its perceived efficiency is built on the presupposition that knowledge should always be there, existing, in the database, waiting to be accessed, capable of being instantaneously retrieved with the right query. As Dominic Pettman puts it:

> today, the very status of something as having value is determined by its digital appearance, and all things that are not in the database wink into irrelevance or even nonexistence. This is the ontology of Google and other local search engines' (2016, 111–112).

This crypto-normative function is particularly relevant to scholars, whose work explicitly centres on the production and exchange of knowledge. And given that this knowledge is overwhelmingly discovered and accessed via search engines both general-purpose and specialized (Google has of course entered into the latter market with Google Scholar, though there are many other citation indexes leaning upon their own search tools), it does not seem unreasonable to say that scholars do not just employ search engines in the course of their research, but actively (albeit often unwittingly) produce content designed *for* search engines.

Optimizing our research

A perfect example is a basic feature utilized when employing search engines for research purposes: the keyword. Many of us are no doubt familiar with a (by now standard) instruction included in so many publishers' submission guidelines: in order to optimize the visibility of our research for search engine queries, we are encouraged to ensure our essays, articles, chapters, books, and presentations make liberal use of appropriate keywords in their titles. Often, even after a journal article, book chapter, or monograph proposal has been accepted, we will be instructed to alter the title to exactly these ends. Although the spread of search engine optimization techniques into academic publishing is admittedly rather trivial in the grand scheme of things (if nothing else, merely confirming once again that the academy is not insulated from broader trends), it offers a convenient means of exploring the influence search

exerts over scholarly practices. Search engines have exponentially increased not only the sheer amount of information that researchers are able to sort and parse, but the speed at which this can occur.

For Raymond Williams, the keyword provided a point of entry into 'certain ways of seeing culture and society,' because the keyword was bound 'to certain activities and their interpretations' and because it played an 'indicative' role, pointing to 'certain forms of thought' (2015, xxvii). Williams, for whom culture consists in the play between shared and individual meanings, sees the keyword as a means of analysing the complexity and variety of these meanings, and in doing so, exploring both how the terms 'culture' and 'society' have come to be understood and how these understandings are themselves cultural and social expressions. Under search's influence, keywords have taken on a different function altogether. Whereas Williams' keywords are components of a broader network of signification – that is, a language – the search engine locates knowledge in a wholly different kind of network: an address space in which such knowledge is rendered locatable and legible to machines and, therefore, amenable to the search query itself.

Instead of rewarding subtle and sustained probing at meaning with a sense of how culture and society are understood, 'when the search engine becomes the primary basis for scholarly research,' argues Matthew Fuller, 'the keyword becomes a crucial pivot for the articulation of fields' (2017, 59). Which is to say, the question of what we as scholars choose to read or not read is more and more influenced by textual practices of tagging and metadata, which are designed to make our published research legible to search engines, but which also draw disciplinary boundaries. For Fuller, one effect of search on our 'speeded-up research cultures' is that it has become 'possible for communities working in related domains to entirely bypass each other's work' due to 'overdutiful following of links' (2017, 59). Faced with a glut of publications, keywords become an easy means of making the literature search a manageable task. But in doing so, they do not merely catalogue bounded disciplines and scholarly communities, but actually help entrench these boundaries.

In like manner, we might also remark upon – or, perhaps, admit – how often we, as academics, make use of keyword searches to navigate digitized copies of the literature we have to peruse in the course of our research. No longer having to rely upon the limited resources of their university libraries, interlibrary loan services, bookshops, and whatever archives to which they are able to gain access, scholars are now blessed and cursed by a situation where, as N. Katherine Hayles writes, 'not only electronic literature but virtually all historical periods and genres are affected as print works are increasingly re-produced as electronic documents' (2002, 19). The proliferation of e-book versions of scholarly monographs and journal articles, alongside or as a substitute for their traditional print counterparts, combined with extensive digitization efforts (e.g. Google Books, Project Gutenberg, JSTOR, or Cairn.info), open repositories, and increasingly accurate optical character recognition, has transformed a vast array of academic outputs produced over centuries into an equally vast data set, susceptible of being tagged, indexed, and searched at will. The PDF may well be, as Lisa Gitelman suggests, 'an unloved documentary form' (2014, 132), but it (along with other similar formats) is certainly well suited to a speeded up research culture where keyword searches partially supplant in-depth

reading and copying and pasting supplement detailed note-taking – a process which generative artificial intelligence tools threaten to exacerbate further.

How much scholarly literature has been overlooked in recent years because it is not available in e-book or PDF format? 'To be digitally uncontactable' today, writes Robert Hassan (2019, 49), 'is to be practically invisible', and the same arguably goes for any document that is digitally unlocatable. Of course, the increased presence of such resources, along with search engines indexing them, does not stop scholars from consulting hardcopy books or ordering journals – the former in particular are far from obsolete. But there are a number of formal features belonging to digitally accessible documents – not least, their amenability to the search paradigm – that is likely to make them preferable. Not just because one can search within them (or use a desktop search tool like Apple Spotlight or Windows Search to quickly wade through one's entire collection), but because they are searchable within citation indexes, and are thus much more likely to show up in search results. Even though a search engine like Google Scholar still sometimes displays sources that have not been digitized (assuming they're cited in documents that *do* exist in a digital, indexable form), sources whose full text has been indexed and is accessible are likely to be consulted more and thus accrue more citations. And whilst we have no real insight into how such search engines determine their rankings, it is clearly evident that highly cited articles are favoured by their algorithms, increasing their prominence, projecting a sense of implied authority upon them and making it more likely that they will be read (and cited) in the future. The weight search engines ascribe to citations in their ranking systems in turn shapes how scholars themselves are evaluated, ranked, and rewarded: the academy has incorporated the search paradigm's normative regime into its very reward structures.

The rankings produced by citation indexes like Google Scholar do not necessarily determine what scholars read, but they provide one of the central mechanisms by which the surfeit of academic publications is narrowed down and made accessible to end users: when time is at a premium, we are likely to gravitate toward first-page results (either assuming that these must be the most accurate, relevant results, or simply in the name of expediency). The well-crafted query might indeed return what we think we are looking for. In doing so, though, it not only models a particular conception of knowledge; it models *efficiency* and *convenience* as key constituents of research practice. It also provides incentives with respect to what and where scholars publish: to publish in a journal, say, that only comes in hardcopy, or with a scholarly press that does not offer full-text indexing on Google Books, is to imperil the potential reach of one's research from the outset. It can also have profound and distinctly aleatory effects on academic careers, given the increased emphasis many employers and funding bodies place on citation metrics (in some measure supplanting equally arbitrary judgements regarding journal 'prestige', for instance). It is notable that Google's *PageRank* algorithm was partly inspired by Eugene Garfield's pioneering mathematical techniques for enumerating and evaluating academic citations. From its origin, therefore, Google's network science has been entwined with a history of metrics-driven 'audit cultures' (Strathern 2000), its ranking algorithm rooted in the disciplinary techniques that have become standard within academic institutions and have, in many countries, been formalized in state-initiated research impact evaluation exercises.

All this is part of a broader shift in the use and value of information. Google, like so many other online services (from social media networks to price comparison sites and real estate portals), effectively operates as a rentier platform, positioning itself as an intermediary between users and the information they wish to access, a milieu within which a great deal of our web usage takes place. Such platforms, explains Brett Christophers:

> intermediate trade (broadly defined) that often could and does take place without the benefit of their intermediation, but which one or more parties to that trade believe is sufficiently facilitated by such platform intermediation that they are willing to pay the intermediary for the service (2020, 181).

Of course, in the case of Google, like most of the aforesaid services, one rarely pays for this intermediation directly (aside from, perhaps, extra storage on Google Drive, or the service fee developers pay to host their apps on Google Play); rather, as all media scholars are surely aware, we pay principally through our attention and our data. As Christophers goes on to argue:

> [Google] has achieved this by serving as an exemplary attention platform, connecting users to companies wanting to win our attention, and relentlessly selling our attention to them […] The simple reason that Google can earn so much from advertising is that so many of us spend so much time on the site, which means it is easier (but accordingly more expensive) for advertisers to attract mass consumer attention on that platform than almost anywhere else (2020, 188–189).

The more entrenched Google's monopoly position (i.e. the more it intermediates our everyday activities) the more attention it can gain from us and the more data it can extract.

A strong incentive exists for Google, and other platforms of its ilk, to make as many of these activities digitally registrable and accessible – brought within what Mark Andrejevic calls the 'digital enclosure' (2007) – and thus able to be indexed. Hence Google's expansion into various facets of human existence that are not, on the face of it, web-oriented: from the oft-useful Street View, through which, remarks Scott McQuire, 'the city has become searchable and the process of searching contributes further flows of data to the proprietary platform operator' (2016, 89), to the so far ill-fated Google Glass which augurs, writes Sarah Kember, 'another environment of mass transparency, another language and poetics of seeing and being seen that is based less on reflection, refraction and magnification and more on data visualization, facial identification, mobile location, gamification and life-logging' (2016, 37), rendering countless daily interactions digitizable. Google is always there, it is always present, a constant overhanging intermediation. Our scholarship is not exempt from these exigencies, either, but exists within the attention economy of which Google and other search engines form a crucial component.

As Yves Citton notes, it is impossible to make sense of the importance within the academy now placed on 'impact', one of many 'rhetorical weapons pulled out of the administrative bag when it comes to slashing budgets, increasing teaching loads, freezing hires, or closing whole departments', without considering the transformations wrought by the attention economy, which is fundamentally 'a matter of 'catching people's eyes and ears, of short-circuiting argumentative chains, and of triggering a desired reaction in members of the audience' (2013, 74). Scholars are exhorted to 'optimize' their research

outputs and their personal brands in order to maximize the attention received, given they are constantly in competition with countless other outputs and resources – whilst at the same time they are also urged to comply with numerous other institutional pressures intended to 'optimize' the very same outputs, often with just as much guesswork, for internal and external evaluation exercises. 'In a profession where metrics such as citation counts and journal impact factors are often used as stand–ins for quality,' observes Alice Marwick, 'other metrics, such as the ability to attract attention, can be a considerable advantage' (2020, 609; see also Mau 2019).

Obviously, it is not just Google and its competitors that profit from this. When we 'optimize' our research to conform with the imperatives of search, rendering the results of our intellectual labour discoverable via keyword queries, we produce value for the publishing conglomerates that control access to these products (and realize outsized revenues). We also subject our academic production to an alternate regime of *use* value, in which our research can be used, per Jathan Sadowski (2020), to optimize systems used to access academic knowledge, consolidate control over this knowledge, and grow the value of publishers' holdings. This latter point is particularly crucial: the labour of not only producing and publishing research, but, indeed, simply *searching* produces data that can be 'assetized' (Birch and Muniesa 2020; Langley 2020) to secure ongoing income streams, in the form of advertising revenue or subscriptions, for search engine providers and publishers alike. In internalizing the norms of efficiency and optimization upon which the injunction to be contemporary is founded, scholars are unwittingly interpellated as streamlined knowledge workers and petty asset managers alike.

Conclusion

The search engine, argues Cubitt, is built on 'an efficiency model', presenting 'the world as a landscape and itself as a vehicle capable of instantaneous travel to precise positions' (2002, 10). Beyond impelling the production and conversion of computable information, we might say, the search paradigm involves a certain figuration of knowledge, dependent upon and yet exceeding its mere technical exigencies: as discrete, exact, and able to be located within an ordered address space. Scholarly research is not immune to this. Insofar as we are compelled to generate outputs in a recognizable form, able to be uploaded to repositories, included in performance reviews, and listed on CVs, the knowledge we produce in this manner is inevitably reduced to the status of computable information – one more indexable data set amongst so many others, all accessible via the same search engines. This is the price of efficiency. Academic research becomes just another kind of 'content creation', subject to the rationality and efficiency – but also the capriciousness and impenetrability – of the search engine. After all, the institution of scholarly publishing is also caught in its own, bespoke attention economy. When we streamline our research to make it more discoverable via techniques such as keyword searching, we are optimizing the products of our academic labour in order to help rentier publishers continue to realize outsized returns on subscriptions to the journals in which we publish.

Michelle Bastian propounds that our scholarship 'needs to be guided by an understanding of time as normative and political, as supportive of certain ways of living over others', being especially critical of linear accounts of time that 'actively hide the

multiple processes, expectations, responsibilities, and histories' that women and minorities must negotiate in order to be recognized as philosophers (2013, 227–228). Exemplary of this normative aspect to scholarly temporalities is the so-called 'publish or perish' mentality, which treats the rapid and repeated production of published outputs as an end in itself, and accordingly favours those unburdened by, say, caring responsibilities or precarious work contracts. This mentality involves more than just the expectation that we get work done quickly, carrying an array of prerequisites and presuppositions with it regarding the form of work produced, rendering it legible within institutional rubrics. In the same way, we have tried to emphasize in this article that 'efficiency' within technological paradigms, such as that of search, involves more than just interfacial response times and the speed of data retrieval, but also ever-sharpened techniques for discovering, classifying, and hierarchizing (as well as excluding, by accident or design) information.

Both instances reflect, in seemingly quite different contexts, a bureaucratic-rationalist need for 'constant, firm, intensive, and calculable administration' (Weber 2019, 351) that has at least partly emerged from the academy itself – particularly from managerial or state-decreed efforts to quantify academics' productivity ('outputs') and influence ('impact'): for example, just as Google's PageRank was partly inspired by the algorithms used in academic citation indexes, which worked to submit research to quantitative evaluation, academic outputs are now partly shaped both by the need to be visible in Google's search results and by what else is visible and accessible through Google and other such search engines. We are not at all suggesting that this bureaucratic-rationalist ethos has been unidirectionally imposed upon scholars, as if it were inherently foreign to academic life: as Hunter observes, although the humanities academy has often been positioned in opposition to this ethos, it has itself long functioned as 'a gatekeeper in the bureaucratic system of social selection', having had to 'accommodate its formerly esoteric intellectual and ethical disciplines to the routines and objectives of a bureau-based and state-centred system of social training and selection' (1992, 487). The affordances of the search paradigm have had an undeniable impact upon the shape of twenty-first century knowledge production, but this impact both reflects and is enabled by pre-existing trends within the academy and other sites of such production.

Indeed, the writing of this article has been exempt from neither these trends nor the peculiar tempos of scholarly knowledge production that have developed inside the academy. As this present article passed through stages of journal submission, peer review, revision, and, finally, acceptance, the search paradigm that we have described came under sudden threat from generative artificial intelligence systems. Commentators in both the popular press and within the academy have speculated that ChatGPT – which is currently integrated into the Bing search engine, and is in the process of being integrated into several other software tools scholars regularly use (such as the Microsoft 365 suite of applications, which seems to have a monopoly over universities' enterprise software provision, at least in the United Kingdom) – may well jeopardize the ascendancy of 'search' as a paradigmatic technique of knowledge production. When one can use a natural language prompt to generate full-text answers from a chatbot, what need has one to craft a search query in order to kick-start a research project?

Yet the implications of the search paradigm are not simply or directly that *search determines knowledge*; rather, as we have tried to illustrate, search is indicative of the normative influence media technologies' design exerts on knowledge production. Framed in

this way, we would speculatively and tentatively suggest that any impact such generative systems *might* have on scholarly knowledge production ought to be understood through the normative exigency to produce knowledge more efficiently, whilst foreclosing the opportunity to critically reflect on how media technologies facilitate such knowledge production. If the 'prompt' were to replace the 'search' as the point from which (academic) research were to start, these norms would necessarily mutate – but they would not necessarily be replaced.

Academic work, like any form of work, always operates within determinate confines, from disciplinary boundaries (going back to the mediaeval universities' delineation of faculties), to methodological rigour (which likewise can be perceived in the dialectical disputation of the mediaeval schoolmen), and standardized modes of publication (monographs, articles, conference papers, etc.). Rather than seeing the identification of formal constraints as a starting point for cultivating our own subjective autonomy, we wish to instead foreground the panoply of tools, techniques, and material situations that shape our research; understanding, in other words, how scholarly practices invariably arise within contingent contexts and operate within determinate limits, rather than valorizing the humanities' supposedly singular capacity for eluding such limits. This entails considering what media theorization is and what it can do, focusing on the intricate, entwined, recursive relationship between media scholarship and media themselves, not in order to cement a more stable epistemological foundation, but rather to position (and accordingly, decentre) the act of theorization within a mediated world, revealing it as just one of countless everyday instances in which individuals grapple with their own technical and institutional circumstances.

Such an approach has implications for the ways in which we historicize the very act of theorizing media and its gradual recognition within institutions of secondary, further, and higher education over the course of the twentieth century, offering pointers for an intellectual history of media theory that can more thoroughly account for this discipline's own mediated and mediative contexts. It also has implications for our present media-theoretical discourse, highlighting that theorization is not confined to the academy but is in fact part and parcel of the daily interactions and negotiations with media that shape *all* of our lives, whether or not we are academics, and reminding us that everyone, by dint of these interactions and negotiations, possesses certain media literacies that inform their work and guide their conduct. Lastly, it gestures toward the continued importance of a humanities-oriented approach to media studies, which does not merely seek to gather and analyse data, but which considers the competencies, capacities, and modes of ethical or intellectual conduct that are derived from a life lived amongst media.

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