

### Special Section: Norms, Power Relations and Injustices in Digitality Media Practice & Research Reports

## Structuring the Infosphere Online: Web Search Engines as Protagonists of Content Moderation

**Jonathan D. Geiger**

**Abstract:** The World Wide Web (WWW) is an open data space on the Internet. The number of websites accessible on the WWW is so vast that web search engines are essential as structuring and orientation tools for its use. However, content moderation does not occur only within social media; it has also long been practised in the context of web search engines, above all by Google as the dominant provider. This article analyses the process behind the creation of web search engine results pages—from the crawling of the WWW to the presentation of search results to the user—and identifies where automatic-algorithmic and manual content moderation are employed to improve the user experience. It emphasises that this not only creates technical biases but also deliberately influences the results of web searches from a political and corporate perspectives. Web search engines also play a special role due to their gatekeeping function with respect to the WWW, as they represent key nodes in the infosphere.

**Keywords:** digital infrastructure, infosphere, content moderation, search engine, Google, algorithm

#### **Author information:**

Jonathan D. Geiger is a Researcher at the Academy of Sciences and Literature in Mainz, Germany. He studied Information Science and Engineering (B.A.) and Philosophy with a focus on the Philosophy of Science and Technology (M.A.). His doctoral research explores epistemology and media philosophy, examining how questioning processes, search engines, and smartphones shape knowledge in the digital age. Since 2016, he has worked on projects developing digital information infrastructures for the humanities and cultural sciences. He also coordinates the working group Philosophy of Digitality / Philosophical Digitality Research within the German Philosophical Society.

ORCID: 0000-0002-0452-7075

E-Mail: [jonathan.geiger@adwmainz.de](mailto:jonathan.geiger@adwmainz.de)

**To cite this article:** Geiger, Jonathan D. (2025). Structuring the Infosphere Online: Web Search Engines as Protagonists of Content Moderation. *Global Media Journal – German Edition*, 15(2), DOI: 10.60678/gmj-de.v15i2.337

## A Historical Perspective on Web Search Engines

Both the World Wide Web (WWW) and the Internet—the technical foundation of the WWW—are digital information infrastructures and therefore are primarily spaces of possibilities. Due to their decentralised nature and fundamental openness to everyone (with an Internet connection), they surpass the traditional landscape of mass media information infrastructures in terms of content access and publication options, which was characterised in particular by the gatekeeping roles of print media houses, broadcasting companies, and libraries. Today, creating and publishing a website is open to everyone and involves only a few obstacles—publishing content on dedicated platforms such as Facebook, YouTube or Instagram is even easier.

The openness of these spaces also allows for the publication of critical content, which creates numerous areas of tension with regard to technical, legal, political and ethical boundaries—particularly in connection with social media platforms—and raises the question of how this content should be moderated (“content moderation”). Several publications on this topic have appeared in recent years (e.g. Gillespie, 2018; Petricca, 2020; Stewart, 2021; Ferret, 2025; Spencer-Smith & Tomaz, 2025; Pollicino, 2021; Schinello, 2024; Hallinan et al., 2025; Palladino et al., 2025; Van de Kerkhof, 2025).

However, content moderation on digital platforms does not exist only in the realm of social media, but also in the area of informational navigation on the World Wide Web. Although publicly accessible websites on the WWW can be visited ‘easily’ through browsers and Internet protocols, this accessibility is offset by the sheer volume of websites. When the first website appeared on the WWW in 1991, there was no need for search and orientation tools—not even a year later, when only ten websites were online. By 1998, however, there were already over two million websites, and today the number is in the billions (Internet Live Stats, 2025). This transformation has turned a small collection of pages into an unmanageable information space that is practically impossible to use without supporting tools.

To address this situation, several tools were developed: First came web directories, in particular the Yahoo Directory, which went online in 1994. These web directories were large, manually curated lists in which people organised vast numbers of websites into a hierarchical tree structure. However, this concept ultimately failed—the effort required was simply too great (even though Yahoo did not take its web directory offline until 2014). Later, social bookmarking systems emerged—an attempt to distribute the work of curating all websites in a central directory to the users. The second approach was the development of automated, algorithmic search systems—web search engines as we know them today.

Information retrieval systems (e.g., GOLEM) already existed before the WWW, and the first web search engines were developed in 1993 (W3 Catalog). Between 1996 and 1998, Google was launched online as a web search engine (Brin & Page, 1998).

It quickly gained popularity and, within a short time, it took over the role of a gate-keeper to the contents of the WWW. As early as 2000, Introna and Nissenbaum pointed out the dangers of a privately monopolised web search engine in their much-cited essay (2000), as it had become increasingly clear that Google's search results—and thus the use of the WWW—were being influenced by special interests.

This also meant that content moderation was practised, namely at the level of selecting and presenting websites in response to search queries. A wealth of research on Google's monopoly power was published in the late 2000s—for example, 'Die Google-Ökonomie: wie Google die Wirtschaft verändert' (Kaumanns & Siegenheim, 2007), 'Die Macht der Suchmaschinen' (Machill & Beiler, 2007), 'Die Wiederverzuberung der Welt in der Google-Gesellschaft' (Moebius, 2007), 'Die Google-Gesellschaft. Zehn Prinzipien der neuen Wissensordnung' (Schetsche et al., 2007), 'Die Googleisierung der Medien' (Wegner, 2007), 'Das Google-Imperium' (Reppesgaard, 2008) and many more. Yet Google still continues nowadays to shape global access to websites for billions of people and still engages in forms of content moderation, that, as with social media platforms, should be critically reflected upon in the context of global media ethics.

Web search engines and their dominance—above all Google Search—on the WWW are thus a comparatively recent phenomenon. However, as components and conditions of our infosphere, they have so far been only marginally discussed in philosophy. In their article on 'Search Engines and Ethics' in the Stanford Encyclopedia of Philosophy, Tavani and Zimmer note that "relatively few academic works on the topic of search engines have been written from a philosophical perspective" (Tavani & Zimmer, 2020). This article aims to make a small contribution to this discussion: To what extent can we speak of content moderation in web search engines, particularly in Google, and where does it take place? The article deliberately leaves out search engines on local operating systems and intranets.

## **The World Wide Web and Search Engines as Part of the Infosphere**

If we look at the world we live in only from the perspective of knowledge and information collections and flows, we are presented with a comprehensive, heterogeneous and complex structure. Libraries, archives, academic institutions, experts, mass media, smartphones and much more all seem to be loosely or closely linked. For this, Luciano Floridi adopted the concept of the 'infosphere', providing it with a theoretical foundation:

Infosphere is a neologism coined in the seventies. It is based on 'biosphere', a term referring to that limited region on our planet that supports life. It is also a concept that is quickly evolving. *Minimally*, infosphere denotes the whole informational environment constituted by all informational entities, their properties, interactions, processes, and mutual relations. It is an environment comparable to, but different from, cyberspace, which is only one of its sub-regions, as it were, since the infosphere also includes offline and analogue spaces of

information. *Maximally*, infosphere is a concept that can also be used as synonymous with reality, once we interpret the latter informationally. In this case, the suggestion is that what is real is informational and what is informational is real. (Floridi, 2014, pp. 40–41)

In this (minimal) conception of the infosphere, the WWW occupies a central place. Conceived as a collection of websites, however, the WWW resembles an infinite labyrinth that is almost impossible to navigate without orientation tools. Web catalogues and portals, which sought to establish themselves as central orientation points for the WWW at the turn of the millennium (Van Couvering, 2008), lost this race to the simpler and more efficient web search engines. Google not only set new standards in the algorithmic processing of millions of web pages using the PageRank algorithm and its interface design, but also in the commercialisation of web search with AdWords.

According to Stalder (2018), this algorithmically produced order is a constitutive condition of the digital. The enormous amount of unstructured data cannot be handled without artificially generated orientation. Referring to Google's PageRank as one of the best-known algorithms, he describes the unstructuredness as a necessary condition for algorithms in the infosphere:

Here, “unstructured” means that there is no prescribed order such as (...) a cataloging system that assigns to each book a specific place on a shelf. Rather, the books are spread all over the place and are dynamically arranged, each according to a search, so that the appropriate books for each visitor are always standing ready at the entrance. Yet the metaphor of books being strewn all about is problematic, for “unstructuredness” does not simply mean the absence of any structure but rather the presence of another type of order – a meta-structure, a potential for order – out of which innumerable specific arrangements can be generated on an ad hoc basis. This meta-structure is created by algorithms. (Stalder, 2018, pp. 112–113)

This meta-structure can be encountered in the form of a list of hits on the search engine results page, although the preconditions of these forms are hidden by the users. Therefore, in the digital realm there is no such thing as being “unstructured”, but rather being “structured differently”. We can thus conclude that web search engines algorithmically organise the WWW as part of the infosphere in a manner that renders it practically usable.

## Content Moderation and Google

The term ‘content moderation’ has been circulating for several years in discourses surrounding the regulation of social media platforms. In their special issue of the *Internet Policy Review*, Badouard and Bellon describe content moderation ‘as the multi-dimensional process through which content produced by users is monitored, filtered, ordered, enhanced, monetised or deleted on social media platforms. This process encompasses a great diversity of actors who develop specific practices of content regulation.’ (Badouard & Bellon, 2025) Content moderation is ‘central to what platforms do’ (Gillespie, 2018, p. 13) in order to keep illegal or offensive

content off their platform and thus enhance the user experience. Examples of such problematic content include copyrighted material, hate speech (Michalon, 2025), disinformation (Harris, 2024), illegal content, and spam.

Content moderation is also a manifestation space for the diverging interests of platform operators, users (Shadmy, 2023), advertisers (Hill, 2025), governments, civil society organisations (Michalon, 2025), and others. The legal and ethical frameworks governing these processes are, on the one hand, the result of negotiations among these stakeholders and, on the other hand, binding for the specific implementation practices adopted by platform operators.

These implementation practices comprise both technical measures—particularly algorithmic decision-making processes and, more recently, the increasing use of AI applications—and manual interventions. The latter involve the labour of individuals who evaluate reported or potentially critical content and block, delete or approve it in accordance with the guidelines. Many of these people live and work in low-wage countries, particularly in the Philippines, and experience enormous psychological stress resulting from the nature of their work (see Ahmad, 2023; Roberts, 2019; Barnes, 2022; as well as the impressive documentary film ‘The Cleaners’ by Block and Riesewieck, 2018). In practice, content moderation typically entails an opaque combination of technical-algorithmic means and human-manual labour (see, for example, Gorwa et al., 2020; Roberts, 2019; Tobi, 2024; Rieder & Skop, 2021).

However, as mentioned earlier, content moderation does not occur exclusively on social media platforms; it also takes place within web search engines. In this context, documents—such as websites or individual posts—are not deleted from the web itself, but are instead removed from the search index or the results lists. Regarding content moderation, Google writes: “People use Search for billions of queries every day, and one of the reasons they continue to come to Google is they know that they can often find relevant, reliable information that they can trust. To help us do this, we rely on three key elements that inform our approach to information quality:” namely ‘high-quality automated ranking’ (i.e., algorithmic processes, as Stalder describes them), ‘helpful search feature’ (for example, direct access to government data) and ‘content policies’ (Google, 2023, p. 5). These content policies are implemented partly through algorithmic—often AI-based—processes and partly through human labour, carried out by so-called ‘Search Quality Raters’ at Google. The latter appear to be practically indispensable: Google’s attempt to transfer large parts of YouTube’s content moderation to AI systems in 2020 proved unsuccessful, and human moderators were reinstated shortly thereafter when numerous problems arose (Kraus, 2020).

According to Google (as of 2023), more than 16,000 people work as Search Quality Raters for Google (Google, 2023, pp. 15–16). Their tasks include, on the one hand, assessing the quality of web pages (for example, determining the purpose of a page and whether its content may be harmful) and, on the other hand, evaluating the

extent to which a page satisfies the user's search intent—termed '*Needs Met*'—by asking questions such as: What is the searcher's intention? These evaluations are based on a 180-page PDF guideline document (Google, 2025a), and the rating is based on multi-level scales. The *Search Quality Raters* apply the 'EEAT' formula as the central quality criterion, encompassing the following elements:

- **Experience:** the first-hand experience of the creator;
- **Expertise:** the subject knowledge of the creator;
- **Authoritativeness:** the authority of the creator, the main content itself, and the website; and
- **Trust:** the extent to which the page is accurate, honest, safe, and reliable (Google, 2023, p. 25).

It can therefore be stated that Google's search results are the result of numerous algorithmic and human processing steps. Since search engines—above all Google—do not function as platforms for user-generated content in the same sense as Facebook or YouTube, but rather structure the central access to the WWW as an informational space within the infosphere, it is useful at this point to take a closer look at the synthesis processes through which search results are produced. In particular, four phases can be distinguished in the generation of search engine result lists: the capture of websites on the WWW ('crawling'), the creation of the index, the linking of search queries with the index, and the presentation of search results on the 'search engine results page' (SERP).

## Phases of the Creation of Search Results

### ***The Collection of Web Pages on the WWW***

As mentioned at the beginning, the Internet and the World Wide Web are not the same thing. The Internet is the basic technological infrastructure, whereas the WWW is a data space, constituted through shared Internet protocol families. This means that anyone with an Internet connection and the appropriate browser can participate in the WWW and publish content online, i.e., make it accessible to others. These are primarily documents (especially web pages) that are structured in a certain way, namely according to the Hyper Text Markup Language (HTML). All these documents have an address through which they can be requested and, in addition to their content (which can also be multimedia or dynamically generated), include metadata to describe the document. A web page can contain hyperlinks to other pages—either subpages or external pages (Lewandowski, 2021).

A search engine starts with a list of web pages, which in turn usually contain many hyperlinks to other pages. Programmes ('crawlers', 'robots', 'spiders', 'bots') then visit each of these pages and create representations of them, including metadata, relevant content and other information, such as how up-to-date the page is or how popular it is (based on the number of hits and/or the PageRank). The PageRank

algorithm is a special feature of Google as a search engine. It is modelled on Eugene Garfield's scientific citation index from the 1950s and 60s (Brin & Page, 1998; Mayer, 2009) and directly correlates the relevance of a document with the number of references or links to it. These representation units are then downloaded and stored by the search engine operator. They form the basis of the index. Web crawling must be carried out continuously in order to have the most up-to-date data possible in the index and thus make it available to users.

Web crawlers therefore only search the WWW, not subnets with other protocols such as the so-called darknet. No page can be found if no hyperlink refers to it. Websites are only searched to a certain depth, and only websites that are generally accessible—areas with paid content are categorised as the ‘deep web’ and are not searched, nor are password-protected areas, and so on. In addition, the instructions on a website must allow crawling by web crawlers. For this purpose, the ‘robots.txt’ file in the root directory of websites is used; it precisely regulates crawling and provides further metadata about the site. Despite the sheer volume, web search engines therefore only access a small proportion of the pages available on the WWW. It should be noted, however, that there is no complete list of all websites on the WWW, and it is therefore not possible to determine how large the proportion actually is that has been accessed by a search engine (Lewandowski, 2021, pp. 42–44).

It should also be noted that search engines not only acquire third-party content through web crawling as part of ‘content acquisition’, but also through feeds and their own data inventories—in the case of Google, for example, through acquired platforms such as YouTube and projects such as Google Books (Lewandowski, 2021, pp. 36–38). Overall, these processes are taking place in line with Stalder’s concept of the ‘the digital condition’ (2018).

### ***The Creation of the Index***

The page representations resulting from web crawling are then processed and integrated into the index (Lewandowski, 2021, pp. 40–44). The content of these page representations is analysed, and an initial check is carried out to determine whether the represented website is a duplicate or the original (‘canonical’) page; all pages containing copied content are grouped into clusters. The content of the representations is then broken down and analysed for its content. Central topics and terms are determined using mathematical methods and weighted according to their relevance to the page. The frequency of words, as well as their formatting and positioning in the text, are key factors here, although the exact calculation method remains a company secret. When categorising the representations in the index, they are placed in relation to other representations and their respective relevance in relation to particular topics and words.

A number of factors come into play when assessing a page’s relevance. Technical factors include characteristics of the page itself, such as the completeness of its

metadata, the amount of embedded multimedia content such as images and videos, along with their descriptions; the language and character encoding; the length of texts; and much more. The practices of 'Search Engine Optimisation' (SEO) do not improve search engines themselves, but rather the content of websites so that they can be read and processed as effectively as possible by web crawlers and indexers within legal boundaries. This technical suitability of websites results in preferential treatment and disadvantages, so-called biases, being implemented into the determined relevance, which can be associated with the language and geography of the websites (Diaz, 2008; Graham & Dittus, 2022).

These technical factors are also influenced beyond the legal framework of SEO by website operators, for example through the frequent and targeted linking of pages in the context of so-called 'Google bombing', or through spam pages. There are also non-technical factors, in particular in the case of Google, such as the manual work of the Search Quality Raters, who assess pages for their quality and potential harmfulness (Google, 2023, pp. 19–21).

Overall, it can be said that a search query does not search the WWW, but rather the index, which is made up of representations of crawled websites enriched with additional data, including manually created quality assessments by human content moderators.

### ***The Linking of Search Queries with the Index***

More precisely, search queries are passed on to the 'query handler'. This programme enriches the specific search queries, which are usually very short and therefore require interpretation, with additional contextual information. This contextual information includes, in particular, data relating to the user and the search data of other users. Google, for example, states: 'Relevance is determined by hundreds of factors, such as the user's location, language and device (computer or smartphone). For example, a user in Paris searching for 'bicycle repair shop' will get different results than a user in Hong Kong (Google, 2025b). The user's location can be determined via their IP address, and further information about the device used, the browser, and other information can be derived from the search query itself. In addition, data from the user's own previous searches ('search history') are used, which can be accessed via locally stored cookies. At this point, questions arise concerning the necessity of the data collected and its subsequent use, which enables large-scale, indiscriminate monitoring (Zimmer, 2008; Stalder & Mayer, 2009).

Another source is the data of other users who have made similar search queries in the past (and the results pages they subsequently visited), as well as data generated by manual content moderation of the Search Quality Raters. This includes the 'Needs Met' assessment, an evaluation by human reviewers of the relevance of a specific search result that the algorithm has identified as pertinent to the query. This complex dataset, of which the actual search query is only the smallest part, is then

compared with the index using information retrieval methods. The result is a list of the representations found and the numerical values of their algorithmically determined relevance. In addition, the results are filtered again before they are returned to the user's browser.

During this filtering process, settings relating to the protection of minors are taken into account (e.g. "family filters"), as well as country-specific regulations regarding blocked and illegal content. At this point, agreements that Google has made with governments, especially autocratic states, become relevant (see, for example, Jiang & Dinga, 2014). However, such filtering is not limited to those cases. For instance, web content denying the Holocaust is banned in Germany and is therefore filtered out there. However, as statements of this nature are considered legal in some other countries, they remain in the index but are hidden for corresponding search queries. Finally, restrictions applied at the national level also include content that falls under the 'right to be forgotten', for example, content about people whose further dissemination has been stopped by a court (Lewandowski, 2021, p. 41), such as personality-infringing images of public figures that are still findable online, or articles containing allegations that were later disproved in court.

### ***The Presentation of Search Results on the 'Search Engine Results Page'***

The data determined by the query handler is transferred to the user's browser and displayed there—embedded within a design that also takes into account the device type, screen resolution, and other factors (Lewandowski, 2021, pp. 157–160). The search engine results page (SERP) on Google, for example, contains not only the hit list ('web search result blocks'), but also 'special content results blocks'—these include excerpts from Wikipedia, FAQs, snippets from Google Maps, headlines from news portals, and more. In addition, paid links, so-called Google Ads (formerly 'Ad-words'), are displayed at the top and labelled as 'sponsored'. In this way, companies and organisations can make their websites and offers visible to users who enter relevant queries, in return for fees.

The actual search results ('organic results') are displayed in a list of blocks. Each block begins with the page's URL and an icon, followed by the title of the content, which also functions as a hyperlink to the corresponding website. Below this, further information and brief descriptions of the target website are shown. The results are displayed automatically. Nevertheless, it should be noted that their arrangement as a list entails certain special features. For example, the list only reflects the ordinal ranking of the hits returned by the indexer, not the relative distances between them. For example, the distance between hits three and four may not correspond to the difference between hits six and seven. Furthermore, the list of results is not displayed on a single continuous page but is divided into several pages of results. Numerous studies have shown that very few users view results beyond the second or third page. This is why the placement of Google Ads at the top of the results page is especially significant.

## Discussion

Along the individual phases of processing queries on web search engines, it becomes clear how many factors of a technical, economic, political, and human nature are involved in shaping the concrete search engine results pages (SERPs) as syntheses. Most of these processes are realised technically and algorithmically in Stalder's sense, which inevitably entails biases and influences. Only in the area of assessing the quality of websites and the relevance of websites for specific search queries does manual processing by human content moderation come into play, based on the policies of the search engine operators. The structuring of these processes, whether by algorithms, policies, or human actors, has an impact on search results—both positive and negative.

Many of these mechanisms were set up to exclude spam or unethical content such as child pornography from the SERPs, for intuitively understandable reasons. This is why Goldman (2008), for example, defends this approach and considers the resulting biases to be necessary side effects. According to him, these should gradually be mitigated as the personalisation of search results improves and web search engines come ever closer to their goal: providing every user with the right links to the right websites for every enquiry, including a correct interpretation of the actual informational need, which is not usually directly derivable from the search query itself.

On the other hand, search biases do not occur solely in connection with the filtering of child pornography and violent content, but also due to political and commercial influences. A wealth of publications demonstrates both the centralisation effects on search engine websites across the WWW (the 'Matthew effect' or 'rich-get-richer' phenomenon) as well as biases with regard to non-Western cultures or discriminated minorities (see, for example, Leyrer, 2018; Segev, 2010; Van Couvering, 2010; Metahaven, 2009; Tavani & Zimmer, 2020). Visibility can also be increased, particularly on the first SERP, through financial means, for instance via Google Ads or extensive SEO practices.

These biases are problematic for web search engines also—understood as part of the infosphere according to Floridi—on another level: they influence access to information obtained via the WWW and thus affect users' epistemic self-determination. This relationship has been explored in a range of publications and discussed in relation to various theories and concepts, such as witnessing, the filter bubble, and epistemic virtue (see, for example, de Villiers-Botha, 2022; Gunn & Lynch, 2018; Gunn & Lynch, 2021; Heersmink, 2018; Munton, 2022; Simpson, 2012; Strzolka, 2008; Van Dijck, 2010).

By deciding what is included on the SERP and what is not, an exercise of power takes place, that can be well described using Michel Foucault's concept of the *dispositif* as suggested by Röhle (2007, 2009), or also through the idea of creating order through classifications and the practice of classifying, following Bowker and Star's

interpretation of Foucault (Bowker & Star, 2008). Human content moderators must also be understood as integrated within these conceptions of power that apply to web search engines.

## Conclusion

The processes of content moderation in web search engines are embedded within these power structures and perpetuate them, both in their technical-algorithmic and human-manual processes. A complete delegation of content moderation in web search engines to algorithms would eliminate the ethical questions concerning the working conditions of Google's Search Quality Raters, who are rendered invisible and are sometimes exposed to extremely distressing content. However, such delegation does not appear feasible, as current algorithms are not yet capable of reliably identifying critical (and, conversely, uncritical) content with sufficient accuracy. Moreover, the ethical questions surrounding bias would not disappear as a result. A return to manually created web catalogues also seems extremely unrealistic these days.

Nevertheless, the ethical reflection on the role of Search Quality Raters in web search engines such as Google is comparable to that concerning content moderation on social media platforms such as YouTube or Instagram. Regardless of who or what carries out these processes, it seems undisputed that content glorifying violence, infringing copyright, or involving child pornography and similarly critical content must be removed from the list of search results—or, preferably, from the index altogether. Ethical considerations are central to web search engines and, in particular, to manual content moderation processes. They focus on commercial and political influences, as well as on normative value systems of search engine operators (for example, regarding sexual morality) in relation to the structuring of the infosphere and thus to users' access to information and informational spaces.

This article was not intended to provide an in-depth discussion of these ethical considerations, such as those undertaken by Tavani and Zimmer (2020) or by Leyrer (2025), but rather to emphasise that the current discourse on content moderation in social media should not overlook the fact that web search engines such as Google have also been carrying out automated and manual content moderation for many years. These practices raise questions that are, in part, comparable to those found in social media contexts, and in part, more strongly situated within the domain of information ethics.

Content moderation will remain a pressing issue in the near future—not only because large web search engines such as Google are integrating AI applications that significantly exceed the performance of traditional algorithms and could therefore restructure the relationship between algorithmic and manual content moderation, but also because, as long as Google's monopoly position as gatekeeper to the WWW

persists, users will remain dependent on compensatory techniques to address biased search result lists.—In particular, information literacy (Klingenbergs, 2016) and infrastructure literacy (Gray et al., 2018) are essential in enabling users to recognise and critically assess such biases and influences.

## References

Ahmad, S. (2023). *Ground control: Organizing content moderation for social media platforms*. <https://doi.org/10.17169/REFUBIUM-40700>

Badouard, R., & Bellon, A. (2025). Introduction to the special issue on content moderation on digital platforms. *Internet Policy Review*, 14(1). <https://doi.org/10.14763/2025.1.2005>

Barnes, M. R. (2022). Online extremism, AI, and (human) content moderation. *Feminist Philosophy Quarterly*, 8(3/4). <https://doi.org/10.5206/fpq/2022.3/4.14295>

Block, H., & Riesewieck, M. (Directors). (2018). *The cleaners* [Film].

Bowker, G. C., & Star, S. L. (2008). *Sorting things out: Classification and its consequences*. MIT Press.

Brin, S., & Page, L. (1998). The anatomy of a large-scale hypertextual web search engine. *Computer Networks and ISDN Systems*, 30, 107-117.

de Villiers-Botha, T. (2022). Re-assessing Google as epistemic tool in the age of personalisation. In *Proceedings of SACAIR 2022: The 3rd Southern African Conference for Artificial Intelligence Research* (pp. 323-339). [https://2025.sacair.org.za/wp-content/uploads/2023/01/SACAIR\\_ConferenceProceedings-v7.pdf](https://2025.sacair.org.za/wp-content/uploads/2023/01/SACAIR_ConferenceProceedings-v7.pdf)

Diaz, A. (2008). Through the Google goggles: Sociopolitical bias in search engine design. In A. Spink & M. Zimmer (Eds.), *Web search. Multidisciplinary perspectives* (pp. 11-34). Springer.

Ferret, N. (2025). The realm of digital content regulation as a social space: Sociogenesis of moderation norms and policies on Twitch platform. *Internet Policy Review*, 14(1). <https://doi.org/10.14763/2025.1.2004>

Floridi, L. (2014). *The fourth revolution: How the infosphere is reshaping human reality*. Oxford University Press.

Gillespie, T. (2018). *Custodians of the internet: Platforms, content moderation, and the hidden decisions that shape social media*. Yale University Press.

Goldman, E. (2008). Search engine bias and the demise of search engine utopianism. In A. Spink & M. Zimmer (Eds.), *Web search. Multidisciplinary perspectives* (pp. 121-133). Springer.

Google. (2023). *Search quality rater guidelines: An overview*. <https://services.google.com/fh/files/misc/hsw-sqrg.pdf>

Google. (2025a). *Search quality evaluator guidelines*. <https://static.googleusercontent.com/media/guidelines.raterhub.com/de//searchqualityevaluatorguidelines.pdf>

Google. (2025b). *How Google search works*. Google for Developers. <https://developers.google.com/search/docs/fundamentals/how-search-works>

Gorwa, R., Binns, R., & Katzenbach, C. (2020). Algorithmic content moderation: Technical and political challenges in the automation of platform governance. *Big Data & Society*, 7(1), 1-15. <https://doi.org/10.1177/2053951719897945>

Graham, M., & Dittus, M. (2022). *Geographies of digital exclusion: Data and inequality*. Pluto Press.

Gray, J., Gerlitz, C., & Bounegru, L. (2018). Data infrastructure literacy. *Big Data & Society*, 5(2). <https://doi.org/10.1177/2053951718786316>

Gunn, H., & Lynch, M. P. (2018). Googling. In D. Coady & J. Chase (Eds.), *Routledge handbook of applied epistemology* (pp. 41-53). Routledge.

Gunn, H., & Lynch, M. P. (2021). The internet and epistemic agency. In J. Lackey (Ed.), *Applied epistemology* (pp. 389-409). Oxford University Press.

Hallinan, B., Reynolds, C., Kuperberg, Y., & Rothenstein, O. (2025). Aspirational platform governance: How creators legitimise content moderation through accusations of bias. *Internet Policy Review*, 14(1). <https://doi.org/10.14763/2025.1.1829>

Harris, K. R. (2024). *Misinformation, content moderation, and epistemology: Protecting knowledge*. Routledge.

Heersmink, R. (2018). A virtue epistemology of the internet: Search engines, intellectual virtues and education. *Social Epistemology*, 32(1), 1-12. <https://doi.org/10.1080/02691728.2017.1383530>

Hill, S. (2025). Stop hate for profit: Evaluating the mobilisation of advertisers and the advertising industry to regulate content moderation on digital platforms. *Internet Policy Review*, 14(1). <https://doi.org/10.14763/2025.1.1825>

Internet Live Stats. (2025, May 30). Total number of websites. <https://www.internetlivestats.com/total-number-of-websites/#trend>

Introna, L., & Nissenbaum, H. (2000). Shaping the web: Why the politics of search engines matters. *The Information Society*, 16, 169-185.

Jiang, M., & Dinga, V. (2014). Search control in China. In R. König & M. Rasch (Eds.), *Society of the query. Reflections on web search* (pp. 139-148). Institute of Network Cultures. [https://networkcultures.org/query/wp-content/uploads/sites/4/2014/06/10.Min\\_Jiang.pdf](https://networkcultures.org/query/wp-content/uploads/sites/4/2014/06/10.Min_Jiang.pdf)

Kaumanns, R., & Siegenheim, V. (2007). *Die Google-Ökonomie: Wie Google die Wirtschaft verändert*. Books on Demand.

Klingenberg, A. (2016). *Referenzrahmen Informationskompetenz*. Deutscher Bibliotheksverband. [https://www.bibliotheksverband.de/sites/default/files/2020-12/Referenzrahmen\\_Informationskompetenz.pdf](https://www.bibliotheksverband.de/sites/default/files/2020-12/Referenzrahmen_Informationskompetenz.pdf)

Kraus, R. (2020, September 20). YouTube puts human content moderators back to work. *Mashable*. <https://mashable.com/article/youtube-human-content-moderation>

Lewandowski, D. (2021). *Suchmaschinen verstehen* (3rd ed.). Springer.

Leyrer, K. (2018). *Selektion und Bias in traditionellen und Internet-Informationsintermediären. Forschungsstand*. <https://open.fau.de/items/504e2dbd-ab12-4969-8497-b5aec7ba0464>

Leyrer, K. (2025). *Selektion in Informationsintermediären: Ethische Perspektiven auf Suchmaschinen und Bibliotheken*. transcript.

Machill, M., & Beiler, M. (Eds.). (2007). *Die Macht der Suchmaschinen / The power of search engines*. von Halem.

Mayer, K. (2009). Zur Soziometrik der Suchmaschinen. Ein historischer Überblick der Methodik. In K. Becker & F. Stalder (Eds.), *Deep Search: Politik des Suchens jenseits von Google* (pp. 64-81). Studien-Verlag.

Metahaven. (2009). Peripherie Kräfte. Zur Relevanz von Marginalität in Netzwerken. In K. Becker & F. Stalder (Eds.), *Deep Search. Politik des Suchens jenseits von Google* (pp. 207-220). Studien-Verlag

Michalon, B. (2025). The role of civil society organisations in co-regulating online hate speech in the EU: A bounded empowerment. *Internet Policy Review*, 14(1). <https://doi.org/10.14763/2025.1.1826>

Moebius, S. (2007). *Die Wiederverzauberung der Welt in der Google-Gesellschaft*. transcript. <https://doi.org/10.25969/MEDIAREP/11907>

Munton, J. (2022). Answering machines: How to (epistemically) evaluate a search engine. *Inquiry*, 1-29. <https://doi.org/10.1080/0020174X.2022.2140707>

Palladino, N., Redeker, D., & Celeste, E. (2025). Civil society's role in constitutionalising global content governance. *Internet Policy Review*, 14(1). <https://doi.org/10.14763/2025.1.1830>

Petricca, P. (2020). Commercial content moderation: An opaque maze for freedom of expression and customers' opinions. *Rivista Internazionale Di Filosofia e Psicologia*, 11(3), 307-326. <https://doi.org/10.4453/rifp.2020.0021>

Pollicino, O. (2021). Shedding light on the darkness of content moderation. *Verfassungsblog: On Matters Constitutional*. <https://doi.org/10.17176/20210205-235959-0>

Reppesgaard, L. (2008). *Das Google-Imperium*. Murmann.

Rieder, B., & Skop, Y. (2021). The fabrics of machine moderation: Studying the technical, normative, and organizational structure of Perspective API. *Big Data & Society*, 8(2). <https://doi.org/10.1177/20539517211046181>

Roberts, S. T. (2019). *Behind the screen: Content moderation in the shadows of social media*. Yale University Press.

Röhle, T. (2007). Machtkonzepte in der Suchmaschinenforschung. In M. Machill & M. Beiler (Eds.), *Die Macht der Suchmaschinen / The Power of Search Engines* (pp. 127-142). von Halem.

Röhle, T. (2009). Die Demontage der Gatekeeper. Relationale Perspektiven zur Macht der Suchmaschinen. In K. Becker & F. Stalder (Eds.), *Deep Search. Politik des Suchens jenseits von Google* (pp. 133-149). Studien-Verlag.

Schetsche, M. (2007). *Die ergoogelte Wirklichkeit: Verschwörungstheorien und das Internet*. transcript. <https://doi.org/10.25969/MEDIAREP/11870>

Schinello, S. (2024). New (digital) media in creative society: Ethical issues of content moderation. *Filosofija. Sociologija*, 35(1). <https://doi.org/10.6001/fil-soc.2024.35.1.9>

Segev, E. (2010). *Google and the digital divide: The bias of online knowledge*. Chandos.

Shadmy, T. (2023). Power to the users. *The Law & Ethics of Human Rights*, 17(2), 167-204. <https://doi.org/10.1515/lehr-2023-2010>

Simpson, T. (2012). Evaluating Google as an epistemic tool. *Metaphilosophy*, 43(4), 426-445.

Spencer-Smith, C., & Tomaz, T. (2025). Labour pains: Content moderation challenges in Mastodon growth. *Internet Policy Review*, 14(1). <https://doi.org/10.14763/2025.1.1831>

Stalder, F. (2018). *The digital condition*. Polity Press.

Stalder, F., & Mayer, C. (2009). Der zweite Index. Suchmaschinen, Personalisierung und Überwachung. In K. Becker & F. Stalder (Eds.), *Deep Search. Politik des Suchens jenseits von Google* (pp. 112-131). Studien-Verlag.

Stewart, E. (2021). Detecting fake news: Two problems for content moderation. *Philosophy & Technology*, 34(4), 923-940. <https://doi.org/10.1007/s13347-021-00442-x>

Strzolka, R. (2008). *Das Internet als Weltbibliothek: Suchmaschinen und ihre Bedeutung für den Wissenserwerb*. Simon.

Tavani, H., & Zimmer, M. (2020). Search engines and ethics. In *The Stanford encyclopedia of philosophy* (Fall 2020 ed.). <https://plato.stanford.edu/entries/ethics-search/>

Tobi, A. (2024). Towards an epistemic compass for online content moderation. *Philosophy & Technology*, 37(3). <https://doi.org/10.1007/s13347-024-00791-3>

Van Couvering, E. (2008). The history of the internet search engine: Navigational media and the traffic commodity. In A. Spink & M. Zimmer (Eds.), *Web search. Multidisciplinary perspectives* (pp. 177-206). Springer.

Van Couvering, E. (2010). *Search engine bias: The structuration of traffic on the World-Wide Web* (Unpublished doctoral dissertation). London School of Economics and Political Science. <https://etheses.lse.ac.uk/41/>

Van De Kerkhof, J. (2025). Article 22 Digital Services Act: Building trust with trusted flaggers. *Internet Policy Review*, 14(1). <https://doi.org/10.14763/2025.1.1828>

Van Dijck, J. (2010). Search engines and the production of academic knowledge. *International Journal of Cultural Studies*, 13(6), 574-592. <https://doi.org/10.1177/1367877910376582>

Wegner, J. (2007). *Die Googleisierung der Medien*. transcript. <https://doi.org/10.25969/MEDIAREP/11888>

Zimmer, M. (2008). The gaze of the perfect search engine: Google as an infrastructure of dataveillance. In A. Spink & M. Zimmer (Eds.), *Web search. Multidisciplinary perspectives* (pp. 77-99). Springer.