

Conclusions and Further Research

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17.1 Introduction

Until recently, most scholarly research on Web search engines have been technical studies originating from computer science and related disciplines. The preceding chapters reveal, however, the growing interest – and importance – of studying Web search from a variety of disciplinary approaches. Significant progress has been made to understand Web searching from within social, cultural, and philosophical perspectives, to utilize political, legal, and economic theories, and to place Web searching within information behavioral frameworks.

This final chapter provides a summary of the insights and conclusions presented in *Web Search: Multidisciplinary Perspectives*, illuminating both interconnections and disagreements among its contributors. We also propose new directions for future research to ensure continued progress in the multidisciplinary understanding of Web search.

17.2 Web Search Engine Bias

In the opening chapter of this book, Alex Diaz brings many of the social and cultural critiques commonly applied to traditional media systems to bear on Web search engines, arguing that decisions over content, advertising policies, and consolidation in the industry as a whole undermine the oft-touted promise of search engines to improve deliberative discourse in contemporary society. Diaz is most concerned with incentives for dominant search engines such as Google to “hypercommercialize content and to *bias* results in a self-interested manner” (emphasis added). For Diaz, and the community of scholars he draws from, instances of such bias – whether by mainstream media companies or Web search engines – represent a threat to democracy and the free and open access to information it demands.

Van Couvering’s contribution appears to provide evidence of the kind of industry consolidation Diaz fears. With a few large firms forming an oligopoly within the search engine industry, it seems increasing likely that economic interests might

take precedent over any desire to create more “egalitarian” search engines to serve the public good. In Chap. 8, however, Eric Goldman suggests that the marketplace will provide sufficient mechanisms to ensure that search engines support the values society deems important – including, presumably, the democratic ideals envisioned by Diaz. Further, Goldman argues that bias in search engines is both necessary and desirable to help relieve users of unnecessary clutter in their results. As the market pushes search engines to improve, Goldman argues, “the most problematic aspects of search engine bias [will] largely disappear.”

Given this range of perspectives and concerns regarding search engine bias, the need for additional research seems obvious. Studies must be undertaken to identify not only possible instances of bias in search engines, but also to measure its effects on both a user and societal level. Only when armed with such additional data can we begin to address the normative dimensions of the bias itself.

17.3 Search Engines as Gatekeepers

Diaz and Van Couvering clearly are concerned about how the current state of the Web search engine industry might work against the maintenance of the liberal ideals of freedom from bias and access to knowledge. Their concern is that – given economic incentives – Web search engines might suppress some particular content in favor of other pieces of information. These reflect concerns of Web search engines as information gatekeepers. Hess’s contribution approaches a similar concern, but from a different direction. Rather than focusing on market consolidation and other economic forces that might create a bias in Web search engine results, Hess considers the formal structure of Web search engines themselves, and concludes that by relying on search engines, the rhizomatic nature of the Internet is reduced to simple and convenient “tracts” – to the detriment of knowledge formation. While for different reasons, Hess shares concerns with Diaz and Van Couvering that Web search engines might become powerful gatekeepers of information, threatening the political and liberal promises many held for the Internet. Similarly, Hinman outlines some of the ethical problems that arise when search engines become “intellectual gatekeepers” which not only act as gatekeepers to information, but increasingly play a “central role in the constitution of knowledge itself.” And Fry, Virkar and Schroeder provide necessary empirical evidence of the powerful gatekeeping roles Web search engines can take.

One of Hinman’s central criticisms of Web search engines is their opacity: the public cannot know precisely how they work and must simply trust the search companies to not exhibit bias or act as gatekeepers to the detriment of knowledge acquisition. Future research, then, must focus on reducing this opacity and bring clarity to how Web search engines work, identifying whether any gatekeeping functions exist. While we are aware of some gatekeeping functions of search engines, such as Google’s complicity with China’s desire to censor certain search results,

the extent to which gatekeeping might occur in versions of Web search engines that exist in more open societies must be explored in more detail.

17.4 Values and Ethics of Search

Concerns over bias and gatekeeping point to the ways in which Web search engines have particular value and ethical implications for society. One key value in liberal democratic societies is equal access of all citizens to information and opportunities for, as the U.S. Declaration of Independence puts it, “life, liberty, and the pursuit of happiness.” Martey’s contribution reveals, however, the ways in which Web searching might compromise the pursuit of these values. When relying on Internet search tools to find employment, women typically confront gendered notions of both the Internet itself as well as the jobs themselves. As a result, Martey suggests women are disadvantaged and disincented from using Web search tools in order to advance their employment situations.

Zimmer also explores the value and ethical dimensions of Web searching, focusing on the privacy and surveillance aspect of the drive for the “perfect search engine.” He reveals the ways in which users are compelled to provide details of their personal and intellectual activities in order to enjoy the (perceived) benefits of Web searching. Considering Hinman’s brief mention of government’s ability to trace a person’s search histories, the ethical implications of the widespread collection of one’s search activities are significant.

These studies of the value and ethical dimensions of Web searching merely scratch the surface of this vital area of research. Additional work needs to take place to not only understand conceptually what values are at play with Web searching, but also how user’s search activities actually impact values and ethics in the real world.

17.5 Design of Web Search Engines

Zimmer’s discussion of the privacy and surveillance threats of the perfect search engine concludes with a call for the “value-conscious design ” of Web search engines to try to mitigate their value and ethical consequences. Yet understanding the full implications of various designs of search engines remains elusive. An important first step towards gaining an appreciation of possible design variables is to study how users themselves view the technical design of the search tools they rely on. Hendry and Efthimiadis move us closer to this goal with their detailed study of users’ perceptions and conceptual models of search engines. Combined with Lewandowski and Schmidt-Maenz’s suggestions for improved quality measurements of Web search engines, we can begin to take steps towards improved design of these vital online information tools.

Continued work, then, must be performed to hone our ability to not only understand the technical design variables and possibilities of search engines, but also our ability measure the performance and affects of various design solutions.

17.6 Legal Constraints and Obligations

Redesigning Web search engines to mitigate against some of the concerns noted above is not the only solution. Legal and regulatory frameworks could also be constructed to ensure Web search engines do not contain bias, for example, or to protect women from being disadvantaged from their use. If we consider the complex picture Dutta and Brodie paint regarding users search activities for health information – clearly a subject matter of broad public interest – one could envision the creation of laws or regulations to ensure Web search engines provide accurate and unbiased access to health information. Similarly, Zimmer’s concerns with privacy and surveillance of search engine records could be partially absolved if laws were passed limiting search engine’s abilities to collect user data. Goldman, however, argues against any attempt to regulate the search industry, and instead insists that the marketplace will ensure users needs are adequately fulfilled and rights are properly respected. Determining which approach is best requires further study and debate.

Legal constraints and obligations can take a different form in the realm of Web searching. Fitzgerald and his colleagues present a very useful summary of the copyright issues that quickly arise with the rise of Web search engines, especially in light of the desire to scan and index contents of thousands of printed books (as discussed in Hinman’s chapter). The impact Web searching will have on the dominant copyright paradigm in contemporary society will, undoubtedly, gain further attention.

17.7 Cognition and Information Behavior

Knight and Spink highlight the need to understand Web search from an information behavior perspective. Further research is needed to model and situate Web search within the everyday information behavior of individuals. Dutta and Brodie highlights the need for research to develop an integrative model of online health information behavior to help people understanding the health outcomes associated with new communication technologies.

17.8 Integration Across Various Perspectives

One of the key directions identified by chapter authors for Web research is the integration of various approaches to develop an integrated Web search framework. An integrated perspective for Web search seeks to create a more holistic understanding

of Web search that takes into account the various contexts in which human-Web system interaction takes place. This book highlights the need for a more integrated understanding of Web search from the perspective of various scientific disciplines. No integrative framework presently exists. However, an integrated approach has the potential to yield a more holistic theoretical and cognitive understanding that will assist our understanding of the Web search phenomena.

17.9 Final Thoughts

This book provides an overview of new directions in Web search research from a broad social science, philosophical, and information science perspective. The field of Web search is vast, international, interdisciplinary, and dynamic with great potential to impact the everyday lives of people worldwide as they increasingly need to interact with Web search infrastructures. This book is not an historical or exhaustive overview of all the research areas that are important for the future of Web search studies. Web search, as a research issue, crosses from the quite technical areas of computer science to the cognitive sciences, and as we have highlighted in this book, to the social and information sciences. We hope that our book will stimulate further interdisciplinary dialogue to facilitate the development of Web search research.