



Information Retrieval Literacy in the Age of Generative AI: Bias, Query Formulation, and Prompt Engineering

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1. Introduction

Information retrieval literacy evolves with the systems, interfaces, and embedded assumptions users encounter. For over three decades, web search engines served as the principal gateway to online information, cultivating habits, heuristics, and misconceptions across all user types. Information retrieval literacy forms a continuum from keyword-based query strategies developed for web search engines to the prompt engineering skills needed for large language models (LLMs). Failures across this continuum stem from users who were never taught how to search or critically evaluate results, compounded by systems embedded with biases largely invisible to those without relevant literacy.

2. The Search Literacy Problem

Early web search engines trained users to think in keywords, while advanced search strategies remained the domain of information professionals. General users developed trust in simplicity and an implicit assumption that the first results were optimal. Jakob Nielsen's concept of Google Gullibility describes users' tendency to select top results regardless of relevance (Nielsen, 2008). Critically, Google Gullibility is not a historical artifact. It persists across interface generations and is now observable in users' uncritical acceptance of AI-generated responses, shaped by interface design and an educational system that never taught users, including educators and information professionals, how to search or critically evaluate results (Thurow, 2015; Notess, 2006). This pattern reflects both decades of interface design choices and systemic gaps in information sciences education (Belkin, 1980; Bates, 1989; Schultheiss & Lewandowski, 2021). The input interface has evolved from the prescriptive search box to the large AI input element inviting contextual input, yet users carry habits formed by earlier interfaces (White, 2016; Forrester, 2025). Hallucination, a documented LLM failure mode in which systems generate factually incorrect responses (Ji et al., 2023), is difficult for users without relevant literacy to detect or verify.

3. Programmed Bias as a Literacy Barrier

Both web search engines and generative AI reflect creators' assumptions and constraints (Breuer et al., 2025). Bias patterns in generative systems shape information retrieval quality and remain largely opaque to users lacking relevant literacy. The Politeness Bias describes systems that adopt warm, collaborative tones that dilute analytical precision. The Conflict Avoidance Bias, closely related to sycophancy in LLMs (Sharma et al., 2023), describes systems programmed to avoid confrontation. The Helpfulness Heuristic describes systems that provide unsolicited next steps that redirect users away

SEASON 2026, September 15–17, 2026, Hamburg, Germany

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DOI: <https://doi.org/10.48441/4427.3801>



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from their actual query. Each can be countered through deliberate prompt engineering, but only by users with sufficient literacy to recognize it.

4. A Literacy Framework for the Full Continuum

Users across all populations have been conditioned by decades of interface design to trust technology answers rather than question them (Marchionini, 1995). A practical literacy framework spans the query-to-prompt continuum, encompassing four competencies: (1) critical evaluation of web and AI outputs; (2) recognition of Google Gullibility and its AI-era equivalents; (3) understanding of programmed AI bias and its effect on output quality; and (4) prompt engineering strategies that mitigate known biases. The failure to teach users how to search, critically evaluate results, and engineer prompts represents a systemic literacy problem that calls for a literacy solution, one grounded in over two decades of multi-method longitudinal research (Fidel, 2008; Granikov et al., 2020).

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