



Scholars Should Report Documented Due Diligence of Literature Searches in Their Research Problem Domain^{*}

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Commentary

Research with experience and expertise in a problem domain requires familiarity, awareness, and knowledge of the historical record of published literature in that problem domain. In science, engineering, and medicine, the reproducibility, validity, reliability, and integrity of that knowledge cannot be separated from its provenance (C. Taswell 2010). For much of the last century, scholarship with excellence, both for research communications in academia and intellectual property filings (copyrights, trademarks, and patents) in industry, has required documenting due diligence of prior art and literature searches in the relevant research problem domain. However, since the turn of the current century, many authors active in research publishing have experienced the pressure of the publish-or-perish environment to move fast and make exciting claims of novelty (Edwards et al. 2017). This pressure to game the bibliometrics for quantity at the expense of quality in science creates an incentive to shirk the time-consuming work of authentic scholarship in favor of unethical hacks involving misconduct such as fabrication, plagiarism, and ghosting. Reestablishing standards for truth, honesty, authenticity, and integrity requires countervailing incentives (Edwards et al. 2017).

The most basic due diligence for any scholar is searching the literature within the relevant problem domain. Finding useful knowledge in prior work then comes with the ethical obligation to cite and discuss that prior work, to clearly distinguish what already existed and what new knowledge one is contributing. The pressure to appear more novel leads some to neglect searching at all and instead write a dismissive literature review, saying, "To the best of our knowledge, no studies have investigated..." (Phelps 2012). Some may even take this a step further, disregarding the existence of prior work they know exists, in which case the same words constitute a ghosting literature review (A. Craig and C. Taswell 2025). Either way, it introduces a falsehood that dissuades readers from seeking valuable earlier work.

Since 2014, the Brain Health Alliance Virtual Institute (BHAVI) has passed on traditions of scholarly integrity through mentoring (S. K. Taswell, A. G. Craig, et al. 2019). However, it is not enough for young people to learn scholarship in school and mentoring programs and then abandon it when they realize powerful institutions only value the superficial appearance of progress. Peer review once kept most misinformation, dis-information, anti-information, and caco-information

from entering the scholarly record, but a lack of transparency and accountability combined with pressure to work quickly and favor the well-connected can compromise its efficacy (S. K. Taswell, Triggles, et al. 2020). Peer review needs to evolve to meet the challenges of the Internet Age by replacing anonymity and secrecy with attribution and accountability to the public. We have previously called for this in the form of reproducible peer review, in which a reviewer documents the sources of information and the lines of reasoning well enough that a new reviewer can find the same information and follow the same logic to arrive at the same assessment (A. Craig, Lee, et al. 2022). We further called for the publication of peer reviews, creating an incentive for reviewers to write quality reviews that their peers will recognize and cite and a disincentive to write dishonest reviews that will come under public scrutiny (A. Craig, Lee, et al. 2022).

Prior to that, we introduced a specific form of accountability through reproducibility, the Fair Attribution to Indexed Reports (FAIR) Metrics (A. Craig, Ambati, et al. 2019). We have demonstrated use of FAIR Metrics that quantify how often an article appropriately cites sources, misrepresents the content of sources, accurately presents claims as novel, or plagiarizes from prior work (A. Craig, Athreya, et al. 2023). We later extended this concept to FAIR Metrics of how adequately reviewers document the sources of information references in their peer reviews (A. Craig and C. Taswell 2024).

However, we need reviewers to evaluate the FAIR Metrics using more than just their current knowledge. To recognize plagiarized knowledge, reviewers need to have seen that knowledge in an earlier source. To have a significant chance of finding the original source of the information, they need to search for it. Even if they do recognize the plagiarism and call attention to it, the authors may claim that the prior work did not appear in their own search. To give reviewers a fighting chance of catching plagiarism, we need reproducible literature searches. That is, we must require that authors record their literature searches in enough detail that the reviewer can follow the same steps and compare the resources they found to those the author claims to have found. While authors and reviewers may find some differences in search results due to changes in the search tool or in the underlying index of resources, the overall state of knowledge in a problem domain should change little between submission of an article and assignment of that article to a reviewer. When some new development has occurred in that interval, the reviewer can give the authors a chance to update their work.

Recording the literature search strategy has long been a defining feature of systematic literature reviews (Harari et al. 2020). The Preferred

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Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement provides a guideline for finding, evaluating, selecting, and synthesizing primary research (Page et al. 2021). However, this PRISMA guideline does not specify exactly what details of the literature search and results the authors should record. As we develop our own guidelines, we will consider PRISMA as a reference point but will need to develop sets of standards appropriate to different kinds of publications, including literature reviews, primary research articles, and commentaries. Starting this year, BHA's Brainiacs Journal of Brain Imaging And Computing Sciences (Brainiacs) will transition toward requiring inclusion of a literature search report with each article submission. We will need to analyze different search engines, library databases, and other search resources to determine what details authors will need to document. We will also need to test different approaches to documenting and replicating searches to find suitable standards of due diligence for different problem domains. We will also need to develop criteria for when the search results are the same, similar, related, or different (Athreya et al. 2020).

Ultimately, we plan to record and publish both authors' and reviewers' search records using the Nexus-PORTAL-DOORS-Scribe (NPDS) Cyberinfrastructure. One of the original goals of the PORTAL-DOORS Project (PDP) has always been to track the provenance of knowledge in formats that are readable to both humans and automated agents (C. Taswell 2007). To facilitate recording literature searches and results in a format usable by semantic reasoning engines, we will extend the FAIR Metrics module of the PDP-DREAM Ontology. This module already features classes and properties useful for recording the comparison of claims between the scientific report or peer review under analysis and those in prior work (A. Craig and C. Taswell 2023).

Requiring authors to report explicit assertions about where, when, and for what they searched and expecting reviewers to know the available literature published in the research problem domain, or otherwise reproducing the searches reported by the authors will create transparency and accountability. Publishing these searches will expose those who shirk their due diligence to public scrutiny and will make visible and citable the often hidden but essential work that sets apart those authors who are true scholars. Modeling this practice in the Brainiacs Journal may be only a small step toward shifting the incentives to once again favor scrupulous accumulation and reporting of knowledge. Nevertheless, it establishes an example that other organizations can emulate. Together, we can turn the tide and restore the public's trust in scholars across science, engineering, medicine, law, education, and other fields where humans work to solve the problems afflicting life on planet earth.

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