

INFORMATION IS NOT NEUTRAL, EVEN IN SCIENCE

EXPLORATIONS OF ALGORITHMIC BIAS AND CONSTRUCTED AUTHORITY IN
HEALTH AND SCIENCE KNOWLEDGE PRODUCTION

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ASSUMPTIONS

Information is “neutral”

Science is “fixed”

Data is “objective”

Allchin, D. (1999). Values in science: An educational perspective. *Science and Education*, 8(1), 1-12. <https://doi.org/10.1023/A:1008600230536>

Peters-Burton, E. E., Dagher, Z. R., & Erduran, S. (2022). Student, Teacher, and Scientist Views of the Scientific Enterprise: An Epistemic Network Re-analysis. *International Journal of Science and Mathematics Education*. <https://doi.org/10.1007/s10763-022-10254-w>

Rykiel E.J, Jr. (2001). Scientific objectivity, value systems, and policymaking [Conference Paper]. *BioScience*, 51(6), 433-436. [https://doi.org/10.1641/0006-3568\(2001\)051\[0433:sovsap\]2.0.co;2](https://doi.org/10.1641/0006-3568(2001)051[0433:sovsap]2.0.co;2)

REALITY

Information creation and structure is inherently biased

Science is everchanging

Data is gathered and interpreted in many ways

Greenfieldboyce, Nell. [Who gets to use NASA's James Webb Space Telescope? Astronomers work to fight bias.](#) January 11, 2022 5:15 AM ET | Morning Edition, Science (5:00)

Stevens KR, Masters KS, Imoukhuede PI, et al. [Fund Black scientists.](#) *Cell*. 2021;184(3):561-565.
doi:10.1016/j.cell.2021.01.011

Taffe, Michael. [Racial Inequities in NIH Grant Funding.](#) March 15, 2022. (43:00). "... the disparity in NIH grant funding for Black scientists... has persisted despite growing efforts to tackle it. Black scientists are interested in health issues that have not been as valued by the NIH, i.e., the funding available for those areas is significantly less, thus funding rates are considerably lower."

SOURCES (ENGLISH, GLOBAL NORTH, OTHER)

VOCABULARY
ALGORITHMS

EVALUATION /
APPRAISAL
(BY WHAT
CRITERIA?)

INTERNALIZED
FRAMEWORKS

WHO GETS FUNDED? PUBLISHED?

RESEARCH QUESTION (PARADIGMS, WESTERN SCIENCE)

OHSU GRADUATION CORE COMPETENCIES

<https://www.ohsu.edu/sites/default/files/2020-12/OHSU-Graduation-Core-Competencies-with-narrative.pdf>

Information Literacy: Recognize the power of information in educating, influencing, and understanding the world, while seeking and amplifying missing perspectives. With this lens, locate, critically evaluate, and effectively use information to participate in decision-making, quality improvement, and broader scholarly discourse.

Community Engagement, Social Justice and Equity: Apply principles of social justice, equity, and/or anti-racism through community-engaged practice, service, or scholarship

- QUESTIONS WE ASK
- GLOBAL NORTH
- ALGORITHMIC BIAS
- LABELLING/ KNOWLEDGE ORG

- Curry, M. J., & Lillis, T. (2018). The dangers of English as lingua franca of journals. Inside Higher Ed. <https://www.insidehighered.com/views/2018/03/13/domination-english-language-journal-publishing-hurting-scholarship-many-countries>
- Lady Science. (2018). The myth of meritocracy in academic publishing. The New Inquiry. <https://thenewinquiry.com/blog/the-myth-of-meritocracy-in-academic-publishing/>
- Ray, V. (2018) The racial exclusions in scholarly citations. Inside Higher Ed. <https://www.insidehighered.com/advice/2018/04/27/racial-exclusions-scholarly-citations-opinion>
- "Cognitive Biases in Literature Searching" and "Systemic Bias in Internet Search Engines" from <https://library.usa.edu/inclusive-intersectional-research>

- Information (academia/disciplines) not neutral; org up to humans (inherent bias)
- Search engines/databases/info sources often miss additional knowledge - current system doesn't easily represent or include some ideas/concepts.
- Algorithms in Google, PubMed, and other search engines we have come to depend on "learn" from our searches and thus are a reflection of human biases. (Noble, 2018).

- Algorithms of Oppression (Safiya Umoja Noble, Feb 28, 2018, 3:43 min)
- The Truth About Algorithms (Cathy O'Neil, Oct 17, 2018, 2:38 min)
- Farkas, M. Never Neutral: Critical Librarianship and Technology. *American Libraries* (Chicago, Ill). 2017;48(1-2):70.
- Vaidya V. Social Domination and Epistemic Marginalisation: towards Methodology of the Oppressed. *Social epistemology*. 2018;32(4):272-285. doi:10.1080/02691728.2018.1444111

LABELLING AND CATEGORIZATION (PUBMED = MESH)

- BUILT ENVIRONMENT, GUN VIOLENCE
- PERSONS
- PREGNANT WOMEN
- SEXUAL AND GENDER MINORITIES
- MUCH, MUCH MORE!

Drabinski, E. Teaching the Radical Catalog. July 6, 2021 (21:32 minutes)

MESH EXERCISE

- Construct a search using MeSH terms for searchable question
- Observe definitions, dates, changing labels over time.
- What concepts or populations is MeSH having a hard time capturing?
- What other search strategies are needed to represent the ideas?

REFLECTION

Think about possible bias you may bring into the information creation and dissemination process.

SCOPUS/MAPPING & BIAS EXERCISES

- Which journals and researchers have shaped core thoughts in the field?
- What is the "map" of the research areas that have been well and not well researched?
- Do the research questions being asked have embedded assumptions?
- Whose voices are not represented?

ANNOTATED BIB

- 3-5 peer-reviewed journal articles
- 2-3 grey literature resources
- WHY is this source useful to your topic?
- Strengths / limitations
- Possible biases

OUTCOMES

"I find it really interesting how information is categorized and evaluated in the background of the databases. I learned the value of specific terminology and angles to tease out the optimal information."

"From what I have learned in this class, in the future I think I can evaluate a source and its biases a bit better."

"...this course...will enrich my ability to search the literature more thoroughly using a variety of sources while being more aware of the caveats and missed opportunities that come with my choice of terms and platforms. I found in particular the discussions on algorithmic bias to be the most interesting and perhaps the most important."

WHAT WE CAN DO

Make students aware of the problems so they can best utilize the tools with a critical eye when they are consuming/creating information.

BRING IN THE LIBRARIANS!

Designed for your specific class, program, or content area

Examine your realm of research

Teach basics of search strategies and evidence-based practice through this critical framework.

WHAT WE CAN DO

Offer students **opportunities to practice** evaluating possible biases in the searches they do, resources chosen, questions they ask, knowledge they create.

ADDITIONAL REFERENCES

- Why most published research findings are false. *PLOS Medicine*, 2(8), e124. <https://doi.org/10.1371/journal.pmed.0020124>
- Ioannidis, J. P. A. (2014). How to make more published research true. *PLoS Medicine*, 11(10), e1001747. <https://doi.org/10.1371/journal.pmed.1001747>
- Eisner, D. A. (2018). Reproducibility of science: fraud, impact factors and carelessness. *Journal of Molecular and Cellular Cardiology*, 114, 364–368. <https://doi.org/10.1016/j.yjmcc.2017.10.009>
- Wicherts, J. (2017). The weak spots in contemporary science (and how to fix them). *Animals*, 7(12), 90. <https://doi.org/10.3390/ani7120090>
- Gluck, J. C. (2020). How searches fail: cognitive bias in literature searching. *Journal of Hospital Librarianship*, 20(1), 27–37. doi:10.1080/15323269.2020.1702839. <https://www-tandfonline-com.liboff.ohsu.edu/doi/full/10.1080/15323269.2020.1702839>
- A broken system – why literature searching needs a FAIR revolution. <https://blogs.lse.ac.uk/impactofsocialsciences/2020/02/03/a-broken-system-why-literature-searching-needs-a-fair-revolution/>
- García-Puente, M., Pastor-Ramon, E., Agirre, O., Morán, J.-M., & Herrera-Peco, I. (2020). Research note. Open letter to the users of the new PubMed: A critical appraisal. *Profesional de La Información*, 29(3), Article 3. <https://doi.org/10.3145/epi.2020.may.36>
- Science has a racism problem. (2020). *Cell*, 181(7), 1443–1444. doi:10.1016/j.cell.2020.06.009. <https://www-sciencedirect-com.liboff.ohsu.edu/science/article/pii/S0092867420307406?via%3Dihub>
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- Outdoors, B. (2017, December 8). Who Do You Cite? Black Outdoors. <https://blackoutdoors.wordpress.com/2017/12/08/who-do-you-cite/>
- This Library Takes an Indigenous Approach to Categorizing Books. (2019). YES! Magazine. <https://www.yesmagazine.org/social-justice/2019/03/22/decolonize-western-bias-indigenous-library-books>