Flashing the Hazard Lights: Interrogating Discourses of Disruptive Algorithmic Technologies in LIS Education

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ABSTRACT

The increasing relevance of service algorithms and emerging technologies has landed many professions at a 'disruptive' crossroads. With the popular emergence of ChatGPT, a large language model from OpenAI designed to interact with users through conversations, discourses surrounding its ubiquity, potentiality, and adoption have captivated audiences. We argue that the unpredictable nature and changing capabilities of ChatGPT and other algorithmic technologies are another critical juncture in the advancement of LIS education. When given a library-oriented prompt, ChatGPT manifested biases that we normally interrogate in our ethical and professional conduct in the delivery of library services, further demonstrating the risk of algorithmic technologies in reproducing and amplifying marginalization and replicating harm. Hence, we 'flash the hazard lights', so to speak, and urge a more critical analysis and precautionary consideration of the social, technological, and cultural harms enabled or perpetuated by the uncritical adoption of ChatGPT and other algorithmic technologies.

ALISE RESEARCH TAXONOMY TOPICS

artificial intelligence; information ethics; education; pedagogy; social justice.

AUTHOR KEYWORDS

critical data studies; social justice informatics; critical librarianship; library and information history; chatgpt.

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INTRODUCTION

The increasing relevance of service algorithms and emerging technologies has landed many professions at a 'disruptive' crossroads. With the popular emergence of ChatGPT, a large language model from OpenAI designed to interact with users through conversations, discourses surrounding its ubiquity, potentiality, and adoption have captivated audiences. While artificial intelligence technologies like ChatGPT may feel and appear "disruptive" across corporate and educational sectors, using this rhetoric to describe experiences with new technologies can reinforce the "innovation bias" that encourages their rapid and uncritical adoption (Weeks, 2015). In turn, this has ignited larger critical conversations between the authors of this paper, particularly regarding the potential impacts of AI on Library and Information Science (LIS) education. Through an acknowledgement of the complementary critical perspectives librarians and data scientists possess regarding technology, and by adopting a critical pedagogical praxis, LIS education can leverage its existing strengths to demystify the role of algorithmic culture in our scholarship and practice.

LITERATURE REVIEW

Histories of Emerging Technologies and LIS Education.

Extensive discourses regarding the implementation, use, and adaptation of technology by libraries has yielded longstanding and persistent debates of the role and challenges of technological change in library and information science education (see, e.g.: Van House and Sutton, 1996; Johnson, 1999; McCaslin, 2009; Bosque and Lampert, 2009; Abels et al., 2015; De Paor and Heravi, 2020). Similarly, debates emerging from the shift from library schools to information schools, with particular regard to the increased emphasis on the roles and challenges of digital technologies in the delivery of library services, have drastically reconfigured approaches to information education (see, e.g: Bell and Shank, 2004; Dillon and Norris, 2005; ALA, 2009; Cronin, 2012; Singh and Mehra, 2013; Raju, 2017, 2020).

Digital technologies are historically framed as potential threats to the library and information science profession, often positing that librarians do not respond and redefine their roles in relation to technologies. This reinforces deterministic logics of technologies acting upon librarianship, whereby technological artifacts "assume the attributes of autonomous process, 'mysteriously' generated by society and thrust upon its members" (Heilbroner, 1967, p.345). While libraries continue to remain relevant as ever, library services are constantly adapting in the face of persistent technological change, as Palfrey (2015) reminds us: "we may think we know what all patrons want from libraries, but preferences are changing every year dynamism must be the watchword for libraries in a digital age" (p.41).

The issues encountered here echoes what scholars have illustrated as a shift from librarian to cybrarian (see, e.g.: Marion, 2001; Champelli, 2002; Ansari, 2007; Hicks, 2013), a

portmanteau of ‘cyber’ and ‘librarian’, reflecting the increasing embeddedness of ICTs in library work. Rhetorically, however, the notion of cybrarian closely echoes themes present in Haraway’s conceptualization of cyborgs (1991). Applying Bell’s (2020) distinction of the “body itself as interface” (p.33), this interpretation helps to further problematize the reduction of librarians as a merely technological medium themselves. It is this reduction of the librarian’s agency as nothing more than a machine for library patrons, coupled with unbridled technological change, that has arguably informed the current state of library and information ecosystems today.

A Library Perspective on Algorithmic Technologies.

While librarians are not necessarily the primary creators of technology, they play an important role in developing critical responses to technologies that LIS education can leverage to raise the critical consciousness of information professionals about the impacts of “new” technologies. Historically, they raised concerns about the ways databases, a now popular and formerly “disruptive” library technology, reinforce oppressive social categories, suppress non-Western knowledge, and must be continuously challenged (Drabinski, 2013; Duarte & Belarde-Lewis, 2015). Recently, librarians have transitioned to critically examining the algorithms that drive information systems, including databases (Reidsma, 2019). Algorithms are a common topic among critical information professionals and scholars because of the questions they raise about agency and power within everyday information exchanges, what Lloyd (2019) terms as “algorithmic culture.”

In our algorithmic culture, librarians are well positioned to mitigate the social consequences of technology. The concept of algorithmic literacy highlights the pivotal role of librarians as educators, and their influence on student interactions with technology and future technological developments (Ridley & Pawlick-Potts, 2021). Indeed, an algorithmic culture necessitates a consideration of algorithmic literacy and critical interrogations of the impact of technologies when educating future librarians, technologists, data scientists, and information professionals. Beyond attention to the consequences of technological adoption, critical information professionals must resist discourses framing technologies as disruptive, and in turn, refuse the unquestioned adoption of such technologies within our professional activities and scholarly pursuits.

Previous scholarship has examined the incorporation of critical topics related to technology within library instruction (Agosto, 2018; Cooke, 2017; Head et al., 2020; O’Hara, 2021, 2022; Tewell, 2016), however, increased attention to educating librarians to feel confident in leading these discussions is necessary. Librarians are well-equipped to problematize and illuminate the consequences of new technologies, as they already do with information. So too, will our emerging information professionals benefit from increased curricular attention to the critical and social arrangements of technological development. Adjacently, Tait & Pierson (2022) remind us that few LIS programs in Australia address issues related to AI in libraries, even though such curricular opportunities exist (also see, e.g.: Singh & Mehra, 2013). A curricular response may help mitigate the emotional and mental toll placed upon librarians and information professionals for constantly responding to new technologies, avoiding what Prabhakaran & Mishr refer to as “techno-stress” (2012). To inspire such curricular responses, we look to critical data studies and social justice informatics (SJI) to consider how developing a

critical library, information, and technology educational program would prepare librarians and information professionals to critically and effectively adapt to constant technological disruption.

The Vital Role of LIS in Social Justice Informatics (SJI).

Critical data studies, a well-established and expanding field, employs critical social theory to investigate how factors like context, relationships, and uncertainty influence data. It refutes data as being a neutral, objective, or independent representation of the world, and asserts that data is inseparable from social and cultural contexts (Kitchin & Lauriault, 2014; Dalton et al., 2016). Despite its inherent transdisciplinarity, critical data studies has developed largely independently from other critical disciplines, particularly critical LIS, to its detriment. However, critical data studies demands cross-disciplinary dialogue, given the multifaceted nature of data and the ability of LIS scholarship and practice to critically interrogate issues related to unequal and inequitable access to data and information that influence knowledge production. Indeed, an expansive critical information studies perspective—bringing together critical data studies, critical LIS, social informatics, and the arts and humanities—is both epistemologically justified and desperately needed to resist the interlocking systems of oppression reinforced by the Big Data industrial complex (see, e.g.: Oliphant, 2017).

Therefore, the emerging scholar-activist work on SJI can be viewed as an attempt to reclaim this plurivocality of critical work in the context of data, information, and technology. By emphasizing the interconnectedness of various forms of injustice, information, and technologies in the context of corresponding struggles for equity and justice, SJI provides a broad critical lens capable of examining the interlocking aspects of oppressive practices and structures surrounding complex sociotechnical systems and algorithmic technologies, such as ChatGPT. An SJI approach enables us to go beyond the standard critical data studies critique of corporate greed and profit maximization, which risks attributing the industry's problems to "a few bad apples," and instead focus on the problem's deeper roots - systemic racism, carceral capitalism, (neo)colonialism, and heteropatriarchy (Mohamed et al., 2020; Davis et al., 2022).

More specifically, a SJI approach that recognizes and centers the critical work of LIS practitioners, educators, and researchers can break through the barrier of lack of transparency and plausible deniability intentionally and systematically built by Big Tech, and trace the meandering "full-stack supply chain" of AI that includes not only data, but also the exploitation of physical, emotional, and intellectual labor, as well as the environment, especially in non-Western majority world countries (Mohamed et al., 2020; Crawford, 2021; Tacheva and Ramasubramanian, 2023). An LIS-driven SJI framework can strategically scrutinize the origin and curation of data for complex sociotechnical AI models, and in turn, illuminate how the benefits and harms produced by these systems' inputs, outputs, and everything in between are unequally distributed and threaten the most vulnerable among us (see, e.g.: Lamdan, 2022).

CHATGPT: A SOCIAL JUSTICE INFORMATICS INTERROGATION

Given Western societies' recent fascination with large language models with an easy-to-use user interface, an attempt to integrate critical LIS with a transnational queer-feminist

framework of data, information, and technology within SJI can shed light on the gross injustices at the heart of ostensibly "democratized" and "user-friendly" systems like ChatGPT. Despite the fascinating ease with which they "generate" content, such systems are incapable of producing anything new, instead parroting back to us our own stolen data and information (Bender et al., 2021). Furthermore, their feigned fluency and consistency are largely due to stolen labor, evidenced by reports of criminally underpaid workers in Kenya who were hired to filter graphic contents from ChatGPT (Perrigo, 2023). The processes surrounding the creation, maintenance, updating, and deployment of ChatGPT are thus just another example in a long line of environmental and human rights violations from the AI industry which is based on "fauxtomation" and "ghost work," or the intentional misrepresentation of algorithmic systems such as ChatGPT as fully automated when they rely heavily on human labor, particularly from majority-world countries (Taylor, 2018; Gray and Suri, 2019). The only "revolutionary" aspect of AI is how adept the industry has become at stealing our own creativity and selling it back to us as an algorithmic miracle, and LIS practitioners, educators, and scholars are at the forefront of reminding us of this increasingly important distinction.

To briefly demonstrate ChatGPT's potentiality for harm in the context of library-oriented work, we asked for recommendations relating to 'children's books about adventure' (*see Figure 1*), in which ChatGPT returned 10 recommended titles best classified as young adult novels—all released before the mid 20th century—of which 9 were authored by white men and 1 by a white woman. When prompted to name 'children's books' by women authors (*see Figure 2*), the list failed to return even 10 examples. The contents of recommended books notwithstanding, the privileging and subsequent erasure of racial and gendered identities—paired with texts that are neither modern nor children-oriented—reflects an encoded supremacy that manifested biases that we normally interrogate in our ethical and professional conduct when delivering library services, and demonstrates the risk of ChatGPT in reproducing and amplifying marginalization through faulty and misrepresentative recommendations. The implementation and use of this output, without critical attention to the biases reproduced, risks further replications of harm.

Figure 1

Response from ChatGPT regarding Children's Books About Adventure

(Screenshot taken by first author's ChatGPT conversation on 2/8/2023 at 9:34 PM)

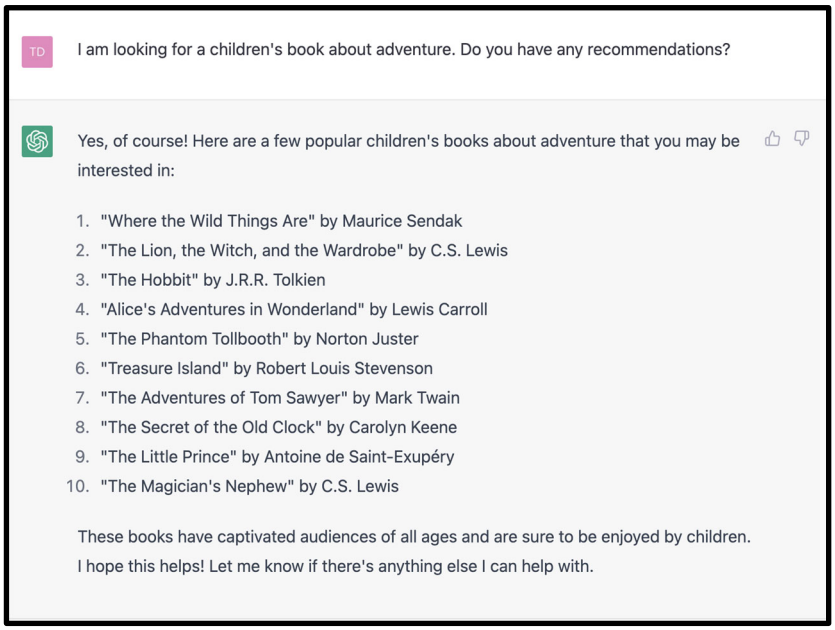
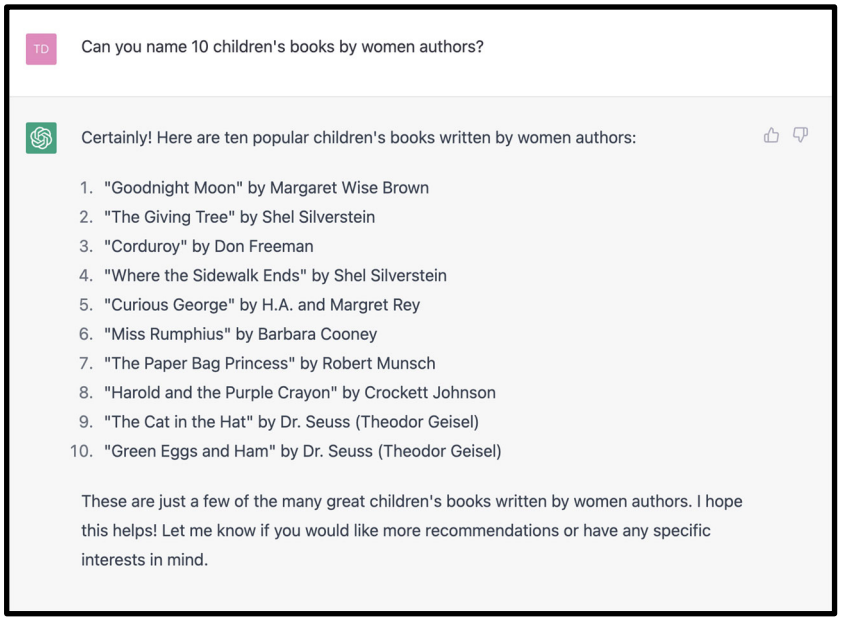


Figure 2

Response from ChatGPT regarding Children's Books by Women Authors

(Screenshot taken by first author's ChatGPT conversation on 2/8/2023 at 9:36 PM)



This output from ChatGPT appears amongst the many well-documented harms inflicted by algorithmic technologies (see, e.g.: Eubanks, 2018, Noble, 2018; Benjamin, 2019), and is uniquely situated to inflict harm upon those who interact with it. The exclusion of information or

prioritization of specific knowledge, as demonstrated here, may enable epistemic injustice, thus leading to epistemicide, with the misuse of outputs in curriculum and teaching further amplifying curricular injustice (Patin et al., 2021a) and the creation of false or misleading outputs inflicting documentary injustice (Youngman et al., 2022). Given the changing nature and capabilities of ChatGPT, there's no telling the scope or magnitude of harm that may be inflicted. Therefore, we 'flash the hazard lights', so to speak, and urge a more critical analysis and precautionary consideration of the social, technological, and cultural harms enabled or perpetuated by the uncritical adoption of these technologies.

BRIDGING THE GAP

Librarians Aren't Going Anywhere!.

Through our initial observations of ChatGPT, we're confident in stating that librarians aren't going anywhere. Despite varied perspectives of how ChatGPT will impact professional landscapes (see, e.g.: Herman, 2022; Shiri, 2023), its popular emergence is not an endpoint. Furthermore, while it may appear enticing to imagine the extent to which algorithmic technologies will impact the work of library and information professionals, such an idealistic lens of interpreting ChatGPT renders library and information professionals disposable, and in turn, warrants concern. Rather, this is yet another critical juncture in the history of technological change in the library and information profession. Reframing the newness of these 'disruptive technologies' as another recurring challenge allows us to pay homage to the longstanding critical and culturally cognizant library workforce historically at the forefront of technological advancement. Indeed, recognizing and mitigating the potentiality, prevalence, and replication of harms enabled through algorithmic technologies, like ChatGPT, requires technological literacy and cultural competence that librarians and information professionals have practiced for ages. Altogether, our analysis emphasizes, and indeed necessitates, an awareness of the rhetoric by which these 'disruptive technologies' make their way into the LIS education, and critically addresses them through our pedagogical praxis.

Toward A Critical Pedagogical Praxis.

While scholars and practitioners from across the information sciences work together to develop critical responses to technologies and algorithmic culture, LIS educators have a collective responsibility to interrogate the politics of adoption of 'disruptive technologies'. For such a critique is crucial for all areas of information science; if librarians are going to have a role in others' algorithmic literacy education, then information science education must provide them opportunities to gain this literacy along with other critical information scientists. Making the historical and social nature of technological development present in LIS education might help fill the gaps in developing students' ability to enact resilience and critical engagement in the face of continuous technological change by problematizing the "newness" of technologies like ChatGPT and those that follow. This may be achieved by embracing critical pedagogical practices within courses on this topic, which scholars have already recommended for raising students' critical consciousness around the impacts of technology (Kincheloe, 2008; Means, 2015; Patin et al., 2021b). Critical pedagogy recognizes that educational institutions are embedded in power

relations, but are nonetheless imbued with the potential to promote various forms of critical literacy and democratic agency" (Means, 2015, p.25). This allows for all future information professionals, regardless of the role they assume, to see themselves as agents in the process of technological change, allowing for more fruitful collaboration and comprehensive critical engagement.

WHAT'S AT STAKE?

Our concerns expressed here pre-date the release of GPT-4 from OpenAI, in addition to problems or advancements emerging after March 2023. However, we hope that a snapshot of this current cultural moment will prompt further critical dialogue and consideration of algorithmic technologies and their popular adoption or resistance. In doing so, a LIS-driven SJI lens is imperative when engaging with their potential impact, uses, and adoption. Our arrival at this next critical juncture in LIS will set the stage for future considerations of the role of digital technologies in our professional and educational praxis. In the pursuit of knowledge justice, LIS educators must be willing to responsibly shift our competencies, promote critical dialogue in the face of rapid technological changes, and commit to ethical, sustainable, and equitable professional practice, in preparation for bridging whatever gap comes next.

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REFERENCES

Abels, E. G., Howarth, L. C., & Smith, L. C. (2015). Envisioning our Information Future and How to Educate for It: A Community Conversation. *Proceedings of the Association for Information Science & Technology, 52*(1), 1–3. https://doi.org/10.1002/pra2.2015.14505201004

Agosto, D. E. (Ed.). (2018). *Information literacy and libraries in the age of fake news*. Libraries Unlimited.

ALA (2009, January 27). *Core Competencies of Librarianship*. American Library Association https://www.ala.org/educationcareers/sites/ala.org.educationcareers/files/content/careers/corecomp/corecompetences/finalcorecompstat09.pdf

Ansari, M. N. (2007). Librarian as cybrarian. *Pakistan Library and Information Science Journal*, *38*(2), 24-31. https://www.researchgate.net/profile/Munira-Ansari/publication/324747733_Librarian_as_Cybrarian/links/5ae04fc1a6fdcc2935906b88/Librarian-as-Cybrarian.pdf

Bell, S. A. (2020). The informatics of domination and the necessity for feminist vigilance toward digital technology. In P. Sotirin, V.L. Bergvall, and D.L. Shoos (Eds.), *Feminist*

Vigilance (pp.23-42). Palgrave Macmillan, Cham.. https://doi.org/10.1007/978-3-030-59793-1_2

Bell, S. J., & Shank, J. (2004). The blended librarian: A blueprint for redefining the teaching and learning role of academic librarians. *College & Research Libraries News, 65*(7), 372–375. https://doi.org/10.5860/crln.65.7.7297

Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021). On the Dangers of Stochastic Parrots: Can Language Models Be Too Big? 🦜. In *Proceedings of the 2021 ACM conference on fairness, accountability, and transparency*, pp. 610-623. https://dl.acm.org/doi/pdf/10.1145/3442188.3445922

Benjamin, R. (2019). *Race after technology: Abolitionist tools for the new jim code*. Polity Press.

Bosque, D. D., & Lampert, C. (2009). A Chance of Storms: New Librarians Navigating Technology Tempests. *Technical Services Quarterly, 26*(4), 261–286. https://doi.org/10.1080/07317130802678878

Champelli, L. (2002). *The Youth Cybrarian's Guide to Developing Instructional, Curriculum-Related, Summer Reading, and Recreational Programs.* Neal-Schuman Publishers: New York.

Cooke, N. A. (2017). Posttruth, Truthiness, and Alternative Facts: Information Behavior and Critical Information Consumption for a New Age. *The Library Quarterly*, *87*(3), 211-221. https://doi.org/10.1086/692298

Crawford, K. (2021). *The atlas of AI: Power, politics, and the planetary costs of artificial intelligence*. Yale University Press.

Cronin, B. (2012). The waxing and waning of a field: reflections on information studies education. *Information Research: An International Electronic Journal*, *17*(3), n3. https://eric.ed.gov/?id=EJ984787

Dalton, C. M., Taylor, L., & Thatcher, J. (2016). Critical data studies: A dialog on data and space. *Big Data & Society, 3*(1), 1-9. https://journals.sagepub.com/doi/pdf/10.1177/2053951716648346

Davis, A. Y., Dent, G., Meiners, E. R., & Richie, B. E. (2022). *Abolition. Feminism. Now* (Vol. 2). Haymarket Books.

De Paor, S., & Heravi, B. (2020). Information literacy and fake news: How the field of librarianship can help combat the epidemic of fake news. *The Journal of Academic Librarianship, 46*(5), 102-218. https://doi.org/10.1016/j.acalib.2020.102218

Dillon, A., & Norris, A. (2005). Crying wolf: An examination and reconsideration of the perception of crisis in LIS education. *Journal of Education for Library and Information Science*, 46(4), 280-298. https://doi.org/10.2307/40323908

Drabinski, E. (2013). Queering the Catalog: Queer Theory and the Politics of Correction. *Library Quarterly*, *83*(2), 94–111. https://doi.org/10.1086/669547

Duarte, M. E., & Belarde-Lewis, M. (2015). Imagining: Creating Spaces for Indigenous Ontologies. *Cataloging & Classification Quarterly*, *53*(5–6), 677–702. https://doi.org/10.1080/01639374.2015.1018396

Eubanks, V. (2018). *Automating inequality: How high-tech tools profile, police, and punish the poor*. St. Martin's Press.

Gray, M. L., & Suri, S. (2019). *Ghost work: How to stop Silicon Valley from building a new global underclass*. Eamon Dolan Books.

Haraway, D. (1991) A Cyborg Manifesto: Science, Technology and Socialist-Feminism in the 1980s. In Nicholson, L. (ed.), *Feminism/Post-Modernism* (pp. 190-233). Routledge: New York.

Head, A. J., Fister, B., & MacMillan, M. (2020). Information Literacy in the Age of Algorithms: Student Experiences with News and Information, and the Need for Change. In *Project Information Literacy*. Project Information Literacy. https://eric.ed.gov/?id=ED605109

Heilbroner, R. L. (1967). Do machines make history?. *Technology and culture*, *8*(3), 335-345. https://doi.org/10.2307/3101719

Herman, D. (2022, December 9). *The End of High School English*. The Atlantic. Retrieved March 17, 2023, from https://www.theatlantic.com/technology/archive/2022/12/openai-chatgpt-writing-high-school-english-essay/672412/

Hicks, D. (Ed.). (2013). *Technology and Professional Identity of Librarians: The Making of the Cybrarian: The Making of the Cybrarian*. IGI Global.

Johnson, I. M. (1999). Librarians and the informed user: Reorienting library and information science education for the "information society". *Librarian Career Development*, *7*(4), 29-42. https://doi.org/10.1108/09680819910276941

Kincheloe, J. L. (2008). *Critical Pedagogy Primer*. Peter Lang.

Kitchin, R., & Lauriault, T. (2014). Towards critical data studies: Charting and unpacking data assemblages and their work. *Social Science Research Network: Tomorrow's Research Today*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2474112

Lamdan, S. (2022). *Data Cartels: The Companies that Control and Monopolize Our Informatio*n. Stanford University Press.

Lloyd, A. (2019). Chasing Frankenstein's monster: Information literacy in the black box society. *Journal of Documentation*, *75*(6), 1475–1485. https://doi.org/10.1108/JD-02-2019-0035

Mohamed, S., Png, M.-T., & Isaac, W. (2020). Decolonial AI: Decolonial Theory as Sociotechnical Foresight in Artificial Intelligence. *Philosophy & Technology, 33*(4), 659–684. https://doi.org/10.1007/s13347-020-00405-8

Marion, L. (2001). Digital librarian, cybrarian, or librarian with specialized skills: who will staff digital libraries?. *ACRL Tenth National Conference*, pp. 143-149. https://www.ala.org/ala/acrl/acrlevents/marion.pdf

Means, A. (2015). On Accelerationism—Decolonizing Technoscience through Critical Pedagogy. *Journal for Activist Science and Technology Education, 6*(1), 1-8. https://jps.library.utoronto.ca/index.php/jaste/article/view/22502

McCaslin, D. (2009). Access Services Education in Library and Information Science Programs. *Journal of Access Services, 6*(4), 485–496. https://doi.org/10.1080/15367960903149409

Noble, S. U. (2018). *Algorithms of Oppression: How Search Engines Reinforce Racism*. NYU Press.

O'Hara, I. (2021). Feedback Loops: Algorithmic Authority, Emergent Biases, and Implications for Information Literacy. *Pennsylvania Libraries: Research & Practice*, *9*(1), 8–15. https://doi.org/10.5195/palrap.2021.231

O'Hara, I. (2022). Automated Epistemology: Bots, Computational Propaganda & Information Literacy Instruction. *Journal of Academic Librarianship*, *48*(4), 102540. https://doi.org/10.1016/j.acalib.2022.102540

Oliphant, T. (2017). A case for critical data studies in Library and Information Studies. *Journal of Critical Library and Information Studies, 1*(1), 1-24. https://doi.org/10.24242/jclis.v1i1.22

Palfrey, J. (2015). *BiblioTech: Why libraries matter more than ever in the age of Google*. Basic Books.

Patin, B., Sebastian, M., Yeon, J., Bertolini, D., & Grimm, A. (2021a). Interrupting epistemicide: A practical framework for naming, identifying, and ending epistemic injustice in the information professions. *Journal of the Association for Information Science and Technology*, *72*(10), 1306-1318. https://doi-org.libezproxy2.syr.edu/10.1002/asi.24479

Patin, B., Sebastian, M., Yeon, J., Bertolini, D., & Grimm, A. (2021b). The Mis-Education of the Librarian: Addressing curricular injustice in the LIS classroom through social justice pedagogy. In B. Mehra (Ed.), *Social justice design and implementation in library and information science* (pp.175-189). Routledge. https://doi.org/10.4324/9781003129219-16

Perrigo, B. (2023, January 18). OpenAI used Kenyan workers on less than $2 per hour: Exclusive. *Time*. Retrieved March 10, 2023, from https://time.com/6247678/openai-chatgpt-kenya-workers/

Prabhakaran, A., & Mishr, H. K. (2012). Technological Change in Libraries: The Evolution of Techno Stress. *Researchers World*, *3*(1), 131–135. https://www.proquest.com/scholarly-journals/technological-change-libraries-evolution-techno/docview/1009889425/se-2

Raju, J. (2017). Information professional or IT professional?: the knowledge and skills required by academic librarians in the digital library environment. *portal: Libraries and the Academy*, *17*(4), 739-757. https://muse.jhu.edu/article/672182

Raju, J. (2020). Future LIS education and evolving global competency requirements for the digital information environment: An epistemological overview. *Journal of Education for Library and Information Science*, *61*(3), 342-356. https://doi.org/10.3138/jelis.61.3.2019-0088

Reidsma, M. (2019). *Masked by Trust: Bias in Library Discovery*. Litwin Books.

Ridley, M., & Pawlick-Potts, D. (2021). Algorithmic Literacy and the Role for Libraries. *Information Technology & Libraries*, *40*(2), 1–15. https://doi.org/10.6017/ital.v40i2.12963

Shiri, A. (2023, February 6). *ChatGPT and academic integrity.* Information Matters, 3(2). https://informationmatters.org/2023/02/chatgpt-and-academic-integrity/

Singh, V., & Mehra, B. (2013). Strengths and weaknesses of the Information Technology curriculum in Library and Information Science graduate programs. *Journal of Librarianship and Information Science*, *45*(3), 219–231. https://doi.org/10.1177/096100061244820

Tacheva, Z. & Ramasubramanian, S. (2023). Challenging AI Empire: Toward a Decolonial and Queer Framework of Data Resurgence. Advance. Preprint. https://doi.org/10.31124/advance.22012724.v1

Taylor, A. (2018, Aug. 1). The Automation Charade. *Logic Magazine*. Retrieved March 10, 2023, from https://logicmag.io/failure/the-automation-charade/

Tait, E., & Pierson, C. M. (2022). Artificial Intelligence and Robots in Libraries: Opportunities in LIS Curriculum for Preparing the Librarians of Tomorrow. *Journal of the Australian Library and Information Association, 71*(3), 256–274. https://doi.org/10.1080/24750158.2022.2081111

Tewell, E. (2016). Toward the Resistant Reading of Information: Google, Resistant Spectatorship, and Critical Information Literacy. *Portal: Libraries & the Academy*, *16*(2), 289–310. https://doi.org/10.1353/pla.2016.0017

Van House, N., & Sutton, S. A. (1996). The panda syndrome: an ecology of LIS education. *Journal of Education for Library and Information Science*, 37(2), 131-147. https://doi.org/10.2307/40324268

Weeks, M. R. (2015). Is disruption theory wearing new clothes or just naked? Analyzing recent critiques of disruptive innovation theory. *Innovation*, *17*(4), 417-428. https://doi.org/10.1080/14479338.2015.1061896

Youngman, T., Modrow, S., Smith, M., & Patin, B. (2022). Epistemicide on the record: Theorizing commemorative injustice and reimagining interdisciplinary discourses in cultural information studies. *Proceedings of the Association for Information Science and Technology*, *59*(1), 358-367. https://doi-org.libezproxy2.syr.edu/10.1002/pra2.759