Building the Path for the Last Mile: Developing Critical AI Literacy for Library Workers

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ABSTRACT: This article examines the intersection of artificial intelligence (AI) technology and libraries by looking at the evolving research process through the framework of critical librarianship. Through a review of relevant literature and case studies, we discuss how AI tools are reshaping higher education amid a backdrop of budgetary cuts and an increasingly siloed academy. In this environment, library workers are increasingly anxious to defend their role in the research process and illuminate harms perpetuated by algorithmic tools. By engaging with the concept of the "last mile," an analogy for AI in the research space, we consider the intersections of labor, pedagogy, and professional practice. We argue that librarians enhance and facilitate deeper learning as researchers and students strive to reach milestones in their research journey. Further, we emphasize the importance of being proactive with advocacy in our academic communities by highlighting this unique role. Through exploring these critical perspectives, we advocate that librarians actively challenge algorithmic biases, advocate for users to engage with AI ethically, and increase focus on relational labor in the research process. This article contributes to the ongoing dialogue of AI use in libraries but offers a critical lens and a path forward for actionable insights for librarians and library workers.

Keywords: artificial intelligence, critical librarianship, labor, reference librarianship, research, academic libraries, public services, higher education, academic librarianship

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Introduction

Widespread adoption and implementation of artificial intelligence tools are defining our current reality as library workers and learners. Dozens of large language models, image generators, literature mapping, and assorted algorithmic decision-making research or generation tools have been publicly released, most managing to both withstand and learn from user testing and trials in the court of public opinion. The development, exponential growth, and implementation of algorithmic decision-making models have been tracked in the media, targets of seemingly endless speculation (Haque et al., 2022). Whether they emerge as radically transformative technologies or subprime stock market chum is up for debate, and rather immaterial for library professionals who are busy responding to what they're seeing on campus. Researchers across disciplines believe that these technologies will be a part of their work in the years to come, even if we are not sure exactly how (Van Noorden & Perkel, 2023). The programs, systems, and tools we will be discussing fall under the very large umbrella of algorithmic decision-making systems but have a long list of potentially accurate terms one could use to describe them: artificial intelligence, robotic systems, automated means. We will consistently refer to programs, systems, and tools as artificial intelligence (AI), following the conventions of our professional affiliations (American Library Association, 2019; IFLA, 2020).

Librarians and educators have been scrambling to understand how aspects of this technology work, while adapting their assignments, syllabi, and learning materials to maintain learning outcomes. Information professionals are facing the additional challenge of learning how these tools may impact the research process, accepting that the instructions and recommendations for use will add more conditionality to an already complex process. This adds yet another "it depends" to instruction practices. Further, these tools carry forward very real and enduring issues that have long been present in the research space. How can academic library workers balance maintaining a critical lens so learners do not lose sight of the enduring issues inherent to these technologies, while also accepting that these tools are becoming engrained in educational and research workflows? At this point, the discourse is beyond examining the implementation of AI in libraries through a binary lens. Libraries are in a reactive position where these systems are already in use, with many professional bodies investigating institutional, software, and hardware mechanisms of the technology. Subscription database platforms are rushing to develop their own implementations that will, in due course, be updated with or without the consent of the libraries that serve as their customers.

In this manuscript, we identify what is distinctive about what library workers provide within the course of scholarly research and, in the process, deepen our understanding of relational labor in library work. Conversations around AI products intersect issues of labor, education, and professional practice in libraries and the wider academe. What is human and relational in our work is also what is critical and undervalued; we need to better understand how AI impacts our field if we want to continue to center the values of critical librarianship as we look forward. Applying a critical lens to librarianship or other information fields such as data studies or informatics requires the examination of power structures and systems driven by social, economic, and political contexts that provide infrastructure and enable some lines of inquiry while obscuring others (Drabinski, 2019). Through a critical lens, we discuss how academic librarians must develop AI literacy in order to support students, faculty, instructors and staff in their engagement of these

new tools in the research and writing process. We also articulate some of the underlying anxieties surrounding AI in libraries by drawing parallels between attitudes toward these new tools and other innovations that changed how scholars and librarians approach research.

In the library, our systems are vulnerable to changes into existing vendor database technologies and their contents without our consent. We are consumers in educational economies with experience navigating conversations with vendors, and we have experience being flexible with big package deals that may not offer exactly what we want but are affordable. Over the past decade, navigating schisms in online publishing is changing how we think about collection development and library catalog search systems. AI tools like chatbots and mediated research databases provide more infrastructure to the online information landscape, creating the precondition for a new "last mile" information need. The term "last mile," alternately used with "first mile," describes the gap between collectivized service and an individualized service need. The term has been used as an analogy for concepts as disparate as humanitarian aid (Balcik et al., 2008) or vaccine hesitancy (Chevallier et al., 2021), but is most commonly used in urban planning and transportation studies to refer to the ability of a transit system to see a user from their point of origin to their destination (Zellner et al., 2016). Our role as librarians is not to wrap our heads and fists around these systems so tightly that we must mediate access. It is to guide users with questions through the first or last mile of their research.

Technology as Confidant + Combatant

Librarians have traditionally played a crucial role in facilitating patrons' access to information within research libraries. This facilitation has shifted and evolved in tandem with technology over the past century, and even more quickly over this last decade. In the early 2000s, librarians adapted to new search aggregators and new types of information sources like Wikipedia and websites. For developers, it was clear that there was a public demand for quick search tools, but there was also general uncertainty around how its service would be funded. Over time, two major funding stream models have emerged: (1) single payer, wherein libraries and research institutions pay for access to search databases, and (2) engagement driven, wherein user time on an application becomes currency. To increase profits for engagement driven search databases, search algorithms have been optimized to meet and anticipate information needs. Robust algorithms have eclipsed the need for search functions on some popular applications used for information seeking, such as TikTok (Adobe Express, 2024). Applications reflecting this third-wave information landscape rely on algorithms to anticipate and align content with user preferences, eliminating the need for users to consciously formulate explicit search strategies, while maximizing advertiser profits (Fister, 2019). In contrast, academic and research libraries continue to teach advanced search techniques for databases that use earlier models of information retrieval like Boolean.

Librarians have spent the past two decades refining teaching practices and strategies for navigating the internet, while shedding light on biases (Buolamwini & Gebru, 2018; Raji, 2020; Richardson et al., 2019; Sweeney, 2013), prejudice (Eubanks, 2018), and harms (Charitsis & Lehtiniemi, 2023) that exist in that space. Safiya Noble's (2018) work on bias and economies of attention in Google search algorithms as advertising agents is just as precinct today as it was six years ago when her book, *Algorithms of Oppression,* was released. All of this is known as swaths of the internet were scrapped for language models, a process which has been detailed extensively

in (Bender et al., 2021; Brown et al., 2020; Lund et al., 2023). Even Chat GPT-3 acknowledges that their training data overrepresents young male views from developed countries (*GPT-3 Model Card*, 2020). Germane to librarians and those supporting information literacy education is the removal of information from its original context and imposed mask of neutrality. This removal changes how users will interpret it and, in turn, how librarians and instructors can approach teaching literacy concepts. In reality, repackaging information regardless of existing harms comes with a slew of issues. However, since this technology is still so new to the library and information science field, many of the articles are still in an exploratory phase with lingering questions about the eventual impact (Frank, 2023; Kingsley, 2023; Teel et al., 2023).

AI Enters the Chat

Functionally speaking, what then does AI mean for academic librarians and how might it be any different from any other algorithmic development over the past decade? Academic librarians deal with research queries at many different levels and there is no "one size fits all" approach to the research consultation. Patrons are often unsure of the level and type of assistance they need with a query. A seemingly complex question may have a simple search resolution, and a quick question may become quite complex. Complex literature searches may include keyword development, search string composition, database searches, retrieval, screening, data extraction, reference management, deduplication, and appraisal – any step of which may now be augmented by AI applications. At this point, there are very few empirical studies that actually compare manual methods to automated augmentation. It has been well established that ChatGPT and other AI chatbots are unreliable when prompted to find the full citations of scholarly articles (Haman & Školník, 2023). However, when these tools are used to develop search strings or identify keywords, the results are vague (Nguyen-Trung et al., 2023). Some AI tools purport to directly address user needs that libraries and librarians have long provided - research services for both large and small questions and literature mapping tools. Manning et al. (2023) presents a study in progress where multiple researchers manually conduct a predetermined search on standard databases, then replicate the search on an AI literature mapping tool. This study, and others like it no doubt on the way, are important steps to help librarians build functional understandings of these tools. However, the opacity of each tool will remain problematic since we may not be able to expect tools to predictably replicate results, nor will we be able to document decisions the program made in terms of including and excluding certain results.

Some libraries have begun experimenting with AI chatbots which have been trained to emulate the library's user-focused approach and present answers in a seemingly neutral tone (Lai, 2023). The programmed impulse to respond with an authoritative answer has impacted the accuracy of referrals for more complex queries, or troubleshooting proxied URLs (*ibid*). In libraries, the referral process connects users to professional librarian assistance with a query, so the possible gatekeeping of queries based on phrasing or question structure is concerning, especially since this experimentation is on the ground with real users. In a white paper on applying algorithmic justice to libraries, Leung et al. (2019) writes:

> The basic problem with this approach in the world of reference services is that any AI or machine learning system that libraries would design and use would rely on training data as the basis for its machine learning model. Any dataset that librarians would pull together would carry with all of the biases and lack of diversity inherent in our profession

> as it exists today. (p. 5)

They suggest adapting Meredith Broussard's "human in the loop" approach by including librarians in the process of having AI answer questions, or by reviewing the answers given back (Leung et al., 2019, p. 6). This would also allow library professionals to also provide sources with important contextual information that a chatbot may not deem relevant. This expansion of a search is especially important when users are researching potentially harmful or sensitive topics. When considering a fully AI chat service, Hosseini and Holmes (2023) worry about losing the human connection with patrons and students, particularly with respect to evaluating sources. Keeping librarians in the loop allows for some additional checking and critical thinking when responding to more nuanced queries, especially in an online environment.

The idea of an automated reference chatbot is not necessarily new or novel. During the Web 2.0 era, search engines provided a rapid shift in newly accessible answers which supported the development of niche "helpbot" services, such as ChaCha ("ChaCha (Search Engine)," 2024). ChaCha was a flash-in-the-pan of an application that allowed users to text in a simple query and be texted a response back. Back in the early 2000s, a study on ChaCha's effectiveness for research assistance summarized it as "While ChaCha might be an exciting new tool for research, in its current incarnation it cannot serve as a replacement for a librarian except in the most basic of situations. In some ways, one could equate it to Wikipedia: a good jumping off point, but not a researcher's final destination for information" (Tynan, 2011). This rhetoric parallels what so many other librarians have also advocated for when adapting any new technology, whether it is ChaCha, Wikipedia, or AI.

The difference with generative AI is that it shifts away from human moderation. ChaCha was, and Wikipedia is, moderated by humans with very real flaws and biases. Learners are made aware of this early in their research training and approach Wikipedia and other services with a critical lens. Wikipedia editors try to document controversies, and there are pages of reports that gesture toward a community that, however imperfect, strives to hold itself accountable to facts. The projected or presumed neutrality of a computer program that has been built on flawed and biased data presenting as authoritative and neutral source gives librarians new information literacy challenges. The lack of transparency with language models and associated algorithms obfuscates the choices made for the user and adds new challenges for how we teach users about these tools, especially when many AI tools are scraping data from websites like Wikipedia. This means librarians and information literacy instructors are facing a potentially transformative pedagogical shift where the foundations of what has been transmutable in information literacy sources must be regularly reconsidered.

Labor in Libraries

Time + Efficiency + Labor

At the core of our investigation into the evolving landscape of reference and research assistance services lies an examination of the distinctive and indispensable role librarians play within the wider academe as collaborators and supporters in the research and instruction space. While we are not sure what the application of AI tools in the higher education landscape will eventually look like, the goals of their applications aim to reduce time pressures on existing researchers and

optimize budgets. In higher education, what large tech corporations label problems are, for the most part, the result of manufactured budgetary crises and austerity. Contingent faculty now comprise the majority of teaching and research positions at colleges and universities across the United States, allowing administration to exercise more control over staffing levels as enrollment shifts (Berry & Worthen, 2024). Academic and research libraries are also strained by budgetary and staffing cuts, making it harder to provide high quality research services for an ever-shrinking professoriate.

Turning to technological solutions to solve staffing demands seems like a natural decision for many administrators. Suggestions for integrating AI into research and instructional workflows in the name of efficiency are part of a larger trend in services that accelerated after the onset of the COVID-19 pandemic. Klein (2020) outlines the aggressive pivot municipalities and organizations have made investing in big tech solutions to problems in education, healthcare, and infrastructure. Conferences on computer supported work are already presenting new AI tools that could support students learning research skills in large enrollment classes, taking some of the instructional burden off faculty and graduate assistants (Palea et al., 2024). Education is at a crossroads, where these tools are becoming more deeply entrenched in our educational systems to facilitate economies of scale, efforts very much rooted in return-on-investment framing. This neoliberal framing has clear indications and effects on the type of labor that academic and research libraries value.

In connection to labor, librarians, public services, and academic libraries have demonstrated that they favor investing in technological tools and roles that support them over more relational positions like liaisons or reference—devaluing roles that require higher levels of affective labor (Sloniowski, 2016). Broussard (2018, p. 27) warns against the bias in line of thought, and uses the term “technochauvinism” to label this belief that technology holds the solutions to our problems, that computational decisions are superior, and by extension the programmers and computer scientists who create these technologies are better than other people. Overreliance on technology will have myriad effects on research, which may further the entrenchment of existing biases and achievement gaps; as those who have access to these digital tools will be able to more easily thrive, while others who lack access will be hindered and others do not.

In supporting research, an extensive amount of labor invisible to end users is required to maintain a system that promotes transparency and gives scholars choice, context, and insights. Libraries can expose the framework of their operations by way of catalog records and, in some cases, archived documentation of composed collections at various points in time. Academic and research libraries can identify when a particular resource was acquired, cataloged, made available to patrons, and how frequently it has circulated. Resources are traceable, modifiable, and removable at granular levels. In contrast, AI programs and Large Language Models (LLM) lack such transparency, intentionally obfuscating the framework of their training corpus. The intentional obfuscation creates algorithmic black boxes which allow for the operationalization and systemization of proxies for users’ identities. These identity proxies, such as zip codes or categories such as "urban" or "rural," operate under the guise of neutrality, making it difficult to challenge or contest the program’s rationale as biased (Benjamin, 2019, pp. 35–37).

Academic and research libraries often find themselves aligning goals and missions to those of the

wider institution they are inextricable from supporting. In the United States, the burden of tuition costs is on the student, often in the form of loans, as they become consumers with choices to make about their future. Many students will select a university or program that will place them in the most competitive professional position to assume or maintain specific class positions, or legitimize their debt burden (Beilin, 2016). Institutions of higher education market themselves to student consumers to compete for student enrollment. Libraries feel pressured to narrowly define their contributions to training members of the workforce, translating critical education to a language the wider academy is conditioned to understand (Drabinski, 2017). Information literacy teaching practices are compromised by limited time, even though critical thinking and information literacy is a skillset that is learned over an extended amount of time (Nicholson, 2016).

With reference services, it is obvious that a chatbot could easily answer more questions per unit of time than a librarian. Studies within library and information science are already asking whether existing tools can accomplish the job of reference as well as a librarian can (Hosseini & Holmes, 2023; Lai, 2023), and what role AI can have in supporting students. Students have reported that a chatbot's inability to react with normal human emotions gave interactions a transactional feel, unlike the connections made in student-teacher interactions (Chen et al., 2023). The conflicts we see with this are relational, and we know students are interested in belonging to a community. Support from peers and others on campus, including librarians, can play a significant role in these students' sense of belonging (Crawford et al., 2024). Providing reference services is a skill that librarians develop subject expertise in and can allow librarians to meet learners where they are and respond in individualized ways that make the learner feel supported. They can respond to queries in process, and help learners articulate their research aims. This praxis is honed by years of practice and learning, but it is hard to quantitatively measure. This relational labor is also largely invisible, but differentiates what librarians provide in the reference process over any technological tool. However, this could work both ways since the perceived privacy and confidentiality of a chatbot may be welcomed by some students who are reluctant to interact with a stranger or who have had negative experiences in the library.

Contributing to Vocational Awe / Relationality / At the Reference Desk

There is a significant body of work in library and information science literature focused on the practice of providing consultative reference in the academy. Literature tracks the shifts in reference training from practitioner expertise and authority to relational, user-centered consultations with complex emotional, nuanced, and intellectual interplay. The full scope of this tracking and analysis risks becoming an exercise in navel-gazing and reinforces pressures on librarians to treat their jobs as a vocation demanding self-sacrifice for the sake of the wider academic community (Ettarh, 2018). Termed "vocational awe," this moniker has become a call for librarians to critique their practices of seeing their profession as their entire livelihood and to create better boundaries around work and personal life. More contemporary literature folds in the importance of relational approaches and the connection to both critical librarianship and trauma-informed librarianship where the librarian intentionally and deliberately navigates queries with respect to positionality, sensitivity, and framing reference within a political act (Accardi, 2017; Adler et al., 2018). Eamon Tewell (2019) underscores the importance of the relational nature of reference work, emphasizing that the physical reference desk transcends its role as a place for answers. It can also be a community hub where empathy and compassion are present (Brook et al., 2015). Adopting a

feminist standpoint, Higgins (2017) posits that "care seems to hold possibilities as a means toward equitable, inclusive, anti-neoliberal futures" (p. 73). Reference work can be a political act and, with a critical approach, it can be a liberatory process for those working towards social justice and equity.

This perspective emphasizes the transformative potential of compassionate reference practices in shaping a more inclusive future but is directly antithetical to algorithmically mediated reference possibilities. In an environment where traumatic current events impact and shape everyday life, librarians are expected to encounter and manage challenging topics with real world consequences. Helping users build transcultural competence as information landscapes become increasingly complicated requires fluency in multiple websites and databases, pedagogical skill and, crucially, time (Hicks, 2015). Assisting a student who is trying to find the most current information on a global conflict zone might require a librarian to encourage the student to consult very current postings that are unlikely to have been incorporated into a chatbot as well as older but not yet historical information sources for contextual background.

The Double-edged Sword

The relationships that are created and built between library workers and patrons are important. They can create community and instill feelings of belonging and welcomeness. In order to be sustainable, some argue these relationships should allow for vulnerability as each participant acknowledges their positionality, challenges, and excitement – providing transparency to the research process (Denke, 2020). Dialogue is essential during a reference interview. It allows the librarian and user to acknowledge positionality and gain a better understanding of the information needs. Librarians bring intention and care into the relationships they build, and they have been encouraged by many to nurture this aspect of the reference consultation. In reference interactions, librarians can walk a fine line between providing compassionate reference practices and yielding entirely to managing a patron's emotional needs over their informational needs (Emmelhainz et al., 2017). Studies of women of color (WOC) librarians have shown that they feel pressured to provide extra emotional labor—in particular for students of color--because the LIS field is so underrepresented (Chou & Pho, 2017). WOC are motivated and encouraged to do this because the academy has underserved these marginalized students, There is, nonetheless, a high probability that librarians may burnout, especially if the additional emotional labor they put into fostering these relationships goes unacknowledged by library leadership. Additionally, there is a lot of harm and bias that BIPOC librarians and students experience when working in library public services (Chou & Pho, 2017).

During the pandemic, many BIPOC discussed how remote work and digital communication reduced the occurrence of microaggressions and enabled them to feel less taxed by working in biased environments (Masunaga, 2023). Librarians are not saviors, and their place in the academy means that they can and do contribute to the marginalization of BIPOC and underrepresented students. The transactional nature of AI interfaces may have the ability to mitigate some harms for BIPOC and other marginalized communities as an intermediary for users to ask sensitive questions to an entity that does not display emotions or judgment. It may be easier for a group to receive help from an automated system than talking to someone who has a very different positionality from them, and a more anonymous AI tool may allow for more vulnerability on the part of the user. To be useful in this case, the AI will need to be intentionally trained to serve the

needs of minoritized groups (Eicher et al., 2018). Currently, there are still significant issues of bias within AI tools, and they have not been designed with BIPOC users in mind (Benjamin, 2019; Small, 2023).

To date, creating AI to serve the needs of minoritized groups is something that has been wildly unsuccessful. In an effort to train language models to avoid problematic stereotypes and hate speech, datasets have erased dialogues of communities that mention or reappropriate potentially harmful language, such as the queer community (Bender, 2023). Software will only train on data it has access to and has been trained to serve the needs of a dominant group. Morales and Williams (2021) name the concept of "epistemic supremacy" and connect these issues of accessing knowledge paths which uphold fascism and tyranny. AI's epistemologies also reproduce and center whiteness in its attempts to have a "view from nowhere" presenting AI as a neutral voice (Katz, 2020). Bender (2023) notes that even the size of a language model's corpus does not guarantee diversity of voices. AI is still not designed to be a utopian emotional support network that can truly understand and add context, as imagined by humans (Broussard, 2018, p. 39). AI has been designed to read code, help create code, generate all kinds of information, but it is not designed to code switch. The issues that libraries have historically always strived to address like access to information and lessening the digital divide have the possibility to become even more pronounced as more educational institutions and industries adopt algorithmic tools.

Over thirty years ago, *Critical Approaches to Information Technology in Librarianship: Foundations and Applications* cautioned the field against embracing new technologies without considering their full and long-term impact (Buschman, 1993). According to the authors, technology had undemocratic values expressed by way of cost burdens, and databases do more to guard capitalist information commodities than promote informational freedoms. However, as one reviewer concluded, "the debate over technology in libraries will proceed with or without the participation of librarians" (Kalfatovic, 1995, p. 200) – and so it has. For critiques on the technology most important to our work, we look to critical technology scholars such as Safiya Noble, Ruja Benjamin, Emily Bender, Meredith Broussard, Joy Buolamwini, Timnit Gebru, Latanya Sweeney, and Virginia Eubanks. As library professionals, we know profit-driven tech companies do not share the same values as librarians and educators; however, where exactly their products and services deviate from our professional standards - even our aspirational standards - is still being determined. We should embrace the work done by technologists, apply their work so we can better serve our communities, and make sure we are asking the right questions about how we adapt these technologies. This feels even more important for BIPOC students, faculty, instructors and staff whom the academy has consistently fallen short on serving.

In Practice

The landscape of higher education is in turmoil. Neoliberal university management has increased pressures to produce and publish research while instructors maintain larger course loads. Budget cuts and austerity are also impacting staffing levels in universities and their associated libraries. This makes AI an appealing prospect - a helper to remove us from a mess of our own making. Academic librarians who have seen technological shifts are anxious about how these algorithmic tools will impact their jobs in the future. This feeling of anxiety and fear of replacement is not completely unfounded and should be acknowledged. Librarians are crucial to the conversations that universities are having to determine policy, use cases, and pedagogical engagement with AI.

We have seen that libraries are also often left out of important conversations due to lack of visibility on campuses and lack of proactive engagement with these technological shifts.

Academic librarians must continue to ask questions about the functionality and implications of these tools to educate users about limitations and ethical use. For librarians, this means supporting "fair, swift, economical and effective access to information" that acknowledges the impossibility of neutrality (IFLA, 2012). An emerging thread in this discourse revolves around asking the humans who use AI tools to be transparent in how they have been trained (European Commission, 2024). The dialogue around academic integrity and ethical use is a place academic librarians have a key role – in policy settings and teaching. We are partners with teaching centers on campus as institutions develop guidelines and best practices. Building or teaching AI literacy is a group project that involves faculty, librarians, instructional designers, instructors, staff, and students. All of us have an investment in this and leaving groups out of the conversation is shortsighted and creates unnecessary silos.

Crucially, to be proactive partners, we need to be familiar enough with these technologies to understand how they work to identify problems such as how algorithmic biases may manifest in systematic ways. The act of research is a learning experience. The Association of Research Libraries has broad recommendations for academic librarians suggesting that librarians re-commit themselves to educating users about digital literacies (ARL, 2024). We need to approach teaching these literacies using a critical lens so that researchers can be intentional about how they engage with these tools and recognize what influences their outputs. Building critical AI literacy can also be included within LIS graduate education to introduce LIS students to the ways in which these technologies will impact their future careers. Part of teaching AI literacy must involve creating awareness around bias in datasets, gaps in the ability of marginalized people to access tools, and how harm is obscured in black box algorithms. Learners will continue to seek research assistance in ways that are most accessible to them, and this will include the use of chatbots and other AI tools. For academic librarians, the new pedagogical challenge will be the removal of information from its original context. Such removal changes how users will interpret it and, in turn, how librarians and instructors can approach teaching literacy concepts. In this case, the last mile is ensuring that learners understand biases, prejudice, and harms that have been obfuscated by contextual digestion.

Within the larger critical librarianship movement, there have been calls from librarian scholars to apply other forms of resistance through transformative librarianship, which seeks to examine how information fosters self-awareness and how we in turn use that self-awareness to better serve our communities. This approach can be particularly impactful for library workers who identify as minoritized in their academic communities. Indigenous librarianship has been examined by Littletree, Andrews, and Loyer (2023), who write that Indigenous information literacy "is the ability to use information to create or gain knowledge, while practicing the Indigenous concepts of relationality, reciprocity, and respect" (p. 5). Both transformative librarianship and Indigenous librarianship require an intentionality that is rather antithetical to the technocratic austerity that many academic libraries are faced with. Reaching a greater number of learners with fewer staff and resources leaves the margins unexamined in service of the greatest return on investment. Critical librarians will need to prioritize the time to be inclusive of other ways of being, relating, and knowing to resist the overarching pressure to save time and resources.

As libraries wrestle with these big shifts, they must consider what is worth investing in and resourcing, especially in light of the defunding of higher education. There has always been tension between what is more important to save or cut. Shana Higgins (2020) advocates that "We need to also center relational abilities, effective labor, and maintenance work in academic libraries in universities. These fundamental, cultivated abilities in skills are feminized, and those undervalued and universities in favor of innovation, technological solutions, and what is perceived as individual endeavor" (p. 271). In environments where scarcity and austerity loom large, this quote prompts critical reflection on the significance of how libraries invest their resources. The tension between sweeping library futures into AI and technology, and the affective relational labor of librarians begs the question: is investing resources and funding solely in specific technologies the comprehensive solution to the major problems academic and research libraries are facing or are people the most valuable resource?

The Last Mile

What we see with AI in the information space is not novel. AI is, in effect, a new type of aggregator, scraping and shaving aspects of the internet information space and presenting it in a new format. Technology companies saw a potential innovation space and responded, and librarians are reacting and then immediately checking themselves for doing so. Like innovations of the past, some queries can be resolved faster while new queries emerge, and exclusions and digital divides remain. The perennial anxiety that the librarian will be made obsolete remains a specter, but time and again librarians demonstrate that their value-add is not just their technological literacy. It is their relationality, their ability to ask the right questions, to consider information's context, and to advocate for equitable access. That is not to say there is no cause for concern. In reference librarianship, "the last mile" is now how we can use relational skills to interpret and answer queries with intentionality, positionality, sensitivity, and currency. It is how we gauge user comfort and attempt to explain the inner workings of these technological black boxes. Basically, this "thing" can take you most of the way, but you do have to walk a bit of the journey on your own. You have to be critical. You must assess bias and listen intently for minoritized voices.

There is a quiet crisis in higher education as more and more librarian lines are eliminated, and workloads are consolidated. In 2020, Naomi Klein wrote "we face real and hard choices between investing in humans and investing in technology. Because the brutal truth is that, as it stands, we are very unlikely to do both." Even if librarians institute a "human in the loop" fix for AI-augmented reference, how long until that mediation becomes unsustainable? When universities are run like a business, and research at scale is the priority, how will librarians respond? A technology company's primary interests are profits for their shareholders, not the greater good. A lack of collective ownership and management means access to these AI tools is not a given, and it is plausible that we will see the emergence of more digital divides as software companies charge users for premium access. The instability of these tech platforms keeps critics off-balance; the landscape changes constantly, and it is impossible to stay up to date on each and every platform's capabilities, strengths, and limitations. We can use our experience with change in the information space to acknowledge that we do not have to be experts in every single one of these programs to understand how to talk about them and raise concerns. Our role requires us to be, at the very least, aware, to ask questions, and to be conscientious as we use and teach these tools. We must

advocate for slowing down to ask critical questions and we must focus on supporting the research process at all stages—including the last mile.

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