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Sarah Appedu, Jasmina Tacheva

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Sarah Appedu and Jasmina Tacheva

Abstract

The release of OpenAI's chatbot ChatGPT in November 2022 launched a reckoning with the potential consequences of this new technology for librarianship. In this discourse, there is a clear desire among librarians to take agency over the predicted destiny of the library and information science field, which has a long history of adapting to new technologies, yet may be seen as reactive when these technologies are introduced. The question of agency has become more urgent as the harmful impacts of algorithms and AI become increasingly visible. This community-centered study focuses on the perceptions and concerns of practitioners and scholars in library and information science regarding AI, technological innovation, and the ways in which they position their own and others' agency when discussing their consequences. We utilize a critical narrative and discourse-based analytic framework to consider how they may reflect both the deterministic discourses perpetuated by "technological elites" and the socially constructivist discourses common in library and information science. We highlight librarian perceptions of AI's impact through the lens of agency to consider how these two seemingly opposing viewpoints may be reconstructed through their discursive constructions of technology and what we can learn from them about the directions of agency among librarians, their communities, and technology.

Keywords

agency, technological determinism, social constructivism, feminist STS, library education, artificial intelligence, agential realism, critical discourse analysis

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Introduction

Scholarly and commercial interests in artificial intelligence have been ongoing for decades. However, the release of OpenAI's chatbot ChatGPT in November 2022, which uses generative AI to produce "instant answers" to users through a humanlike dialogue, launched a mainstream reckoning with the potential benefits and consequences of these new technologies for the field of librarianship and for society at large. Popular headlines and professional conversations questioning the role of librarians and other information professionals and the impact these tools would have on their work dominated. Could ChatGPT and other AI technologies finally render librarians obsolete?

While historical precedent may indicate that the answer to this question is a resounding no, one only needs to join a professional listserv, read the news, or preview the landscape of conferences, journals, and professional development to observe that concern and fascination around AI technologies continue to abound. In this discourse, there is a clear desire to take agency over the predicted destiny of the library and information science (LIS) field, which has a long history of successfully adapting to new technologies yet may also been seen as reactive when these new technologies are introduced into society (Youngman et al. 2023). Meanwhile, technology industry leaders simultaneously perpetuate extreme dystopian and utopian scenarios after the "AI revolution" supposedly changes the course of human history with technology always in the driver's seat and its creators mysteriously unaccounted for (Benjamin 2022). In their forecasts, technology is going to revolutionize every facet of existence for the absolute better or worse. And while these technologically determinist views—which refuse agency to most of humanity, privilege the power of technological artifacts, and allow their creators to evade accountability—have been largely criticized for their oversimplification of historical and social context in their predictions (Suchman 2020), their presence in our mainstream, scholarly, and professional discourse must be problematized.

The question of who or what has agency over the trajectory of technological innovation and its impacts on human society has long been a problem for philosophers and social scientists. As Winner explains, "The sheer multiplicity of technologies in modern society poses serious difficulties for anyone who seeks an overarching grasp of human experience in a technological society" (1993, 362). However, while adjacent fields such as science and technology studies (STS) and critical data studies have made substantial progress in developing more complex models of how agency may be enacted between human users, technological artifacts, and society, library scholarship and practice has yet to apply these conceptualizations of agency to our own attempts to respond to new technologies. While concern for incorporating technologies whose impacts are yet unknown into library practices and services is nothing new, the importance of answering

the question of agency has taken on a sense of urgency in recent years as the harmful impacts of algorithms, machine learning, and artificial intelligence become increasingly visible (Bender et al. 2021; Gebru and Torres 2024; Ricaurte 2022). According to Lloyd, "Little attention [among librarians] has been paid to what constrains or redefines agentic performance" (2019, 1481) or, in our view, to what librarians attribute agency to in discourses around technology. Overlooking the important role of human and technological agency can leave librarians underprepared to resist the persistent accusations of irrelevance that are often levied against them and to actively (and reflexively) participate in shaping the discourses and practices that arise in response to new innovations. To address this crucial gap in both theory and practice, we pose two interrelated research questions:

- How is agency discursively represented among librarians when discussing their experiences with and perspectives on new technologies such as AI?
- To whom or what do librarians discursively attribute agency when considering the trajectory of technological change in libraries?

This exploratory, community-centered study explores these questions by focusing on the perceptions, concerns, and hopes of practitioners and scholars at various stages in their career in the field of library and information science regarding artificial intelligence, technological innovation, and the ways in which they position their own and others' agency when discussing their consequences. For ease of reading and in acknowledgment of every practitioner's lived experience as a library worker, we will refer to the participants individually and collectively as librarians. We focus on the discourses constructed among current library scholars and practitioners and consider the ways they enact and/or resist both the deterministic discourses perpetuated by "technological elites" (Noble and Roberts 2019) and the socially constructivist discourses common in LIS. We do this by qualitatively analyzing a transcript from a recorded public panel in fall 2023 on the topic of innovations in librarianship featuring several library scholars—including those with backgrounds as academic librarians—and public library professionals of various positions, including public services, archives, and library data analytics. We also conducted an in-depth, follow-up interview with an MLIS student who attended the panel and had experience working in academic libraries. This interview allowed us to ask probing questions beyond what was asked in the panel and hear from a library worker who was in library school at the time of ChatGPT's rise in popularity.

We utilize a critical narrative and discourse-based analytic framework where scholars engage critically with the ways in which language recreates the material circumstances of the world through individual experiences to make the underlying values and power structures within those discourses

visible (Lazar 2007; Souto-Manning 2014). This analytic approach creates opportunities for social transformation by highlighting the power of the storyteller to shape the discourses that shape them. By raising our critical consciousness around ways librarians both enact and resist technologically determinist discourses around AI and other "disruptive technologies," we can confidently answer the question of whether librarians will be "obsolete" with a definitive "We're not going anywhere" that transcends binaries of agency, recenters the agency of librarians and their communities to shape technological change, and prepares them to navigate the seemingly growing agency of AI-powered technologies and their creators. We conclude by reflecting on Barad's (2006) concept of "agential realism" as a potential avenue for accounting for the complex relationship between librarians, technology, and their communities that can both empower librarians and hold them and their stakeholders accountable for their role in shaping technological futures.

It is important to note that for our purposes, AI itself is not the villain of this story but, rather, just one iteration of a larger project of exploitation for the benefit an elite few, or what Tacheva and Ramasubramanian (2023) refer to as *AI Empire*. We focus on AI because it is a timely and important topic, but we also believe that to truly embrace a critical stance toward new technologies, we must move past fixating on specific technological artifacts and look deeply at the roots of these artifacts in oppressive knowledge-making, policy-creating, and economic systems.

Theoretical Framework: The Technological Determinism/Social Constructivism Binary of Agency

Agency is often described as human-centric in the social sciences. S. Fuchs notes that "agency requires consciousness, free will, and reflexivity. Persons can relate to themselves, to the external world, and to other persons. Since they have consciousness, they are aware of who they are, of the reality of physical objects and things, and of their relationships with other persons" (2001, 26). In this view, having consciousness and free will allows human actors to make decisions based on their capacity for rational thought. However, that agency is constrained by the various structures that limit or enable actors to act on their decisions (Emirbayer and Mische 1998). In contrast to this human-centric view, scholars in STS have developed several models of agency that account for the possibility that agency is enacted by technological systems as well. These models of agency generally fall into two opposing paradigms: *technological determinism*, which positions technology as having more agency than humans over the trajectory of human history, and *social constructivism*, which views humans as the primary agents over this trajectory (Dafoe 2015).

In what follows, we will review these two seemingly binarily opposed conceptualizations of human and technological agency. These concepts

serve as the theoretical framework for our empirical investigation into how these conceptualizations may be enacted by librarians through their discursive constructions.

Technological Determinism: Technology as Agentic, Humans as Responsive

Technological determinism posits that technology is the primary driving force of human history, economic development, and social progress. In Kline's account, there are two main tenets of technological determinism: that there is "an internal, technical logic [that] determines the design of technological artifacts and systems" and that "the development of technological artifacts and systems determines broad social changes" (2001, 15495). More simply, Hughes defines technological determinism as "the belief that technical forces determine social and cultural changes" (1994, 141). In other words, technology has agency over humans and the capacity to change their circumstances without their control.

Technological determinism began to fall out of fashion in the 1980s due to the adoption of constructivist theories among sociologists of science, who argued that technological development should be seen as a human-controlled activity where human actors and institutions have agency over its creation and use (Dafoe 2015; Ropohl 1983). Determinists' overprivileging of the agency of technology has been associated with the "black box" metaphor, which is used by technicians to make the workings of technology invisible (Winner 1993). While there may be positive aspects to ceding some agency to technology, such as accepting the results from an online search rather than piecing together one's own index, doing so uncritically has "the potential for [our] information landscapes to narrow and deemphasise the socially nuanced and embodied ways of knowing, thus transforming, reframing, and reconfiguring the nature of our agency" (Lloyd 2019, 1476). Consequently, if librarians intend to help patrons feel empowered to act as agents to navigate and resist the social consequences of technology, paying critical attention to the power they may unknowingly cede to technological artifacts is crucial.

This is especially true considering the growing popularity of technologically determinist discourses around artificial intelligence, where technological elites position AI as an inevitable outcome of human progress while pushing the public toward adopting and adapting to their products in the name of staying relevant (Andersen 2023). For example, the concept of "existential risk" coined by Nick Bostrom (2002) reflects a belief that technological progress is out of the control of individual human actors and yet must be supported at all costs, including apocalypse. In an apparently opposite perspective, technological solutionists and optimists try to persuade the public that technology will serve as a remedy to all major

personal and social problems as a means of justifying their unrestrained development (Fuchs 2022). As the library field continues to grapple with new AI technologies, understanding the important and problematic impact of technologically determinist discourses on our conceptualizations of technology is imperative for consciously taking agency over their impact on the LIS field.

Social Constructivism: Humans (and Institutions, Social Systems) as Agentic, Technology as Responsive

Social constructivism (for simplicity, we are including social constructionism in this definition) represents an alternative approach to conceptualizing the relationship between humans and technology that centers the agency of people and social organizations to shape society. In this approach, the design of technologies does not determine their use in society; instead, humans interpret the purpose of technological artifacts through their interactions with them (Pinch and Bijker 1984). This analytic approach results in a "multidirectional" model of development that can take multiple varying paths, in contrast with the linear, deterministic models used previously. In this view, humans act as agents to create new technologies that are shaped by the social context in which they are created and the people who use them.

While social constructivism may be useful for centering the role of human agency in creating and using new technologies, it must be used intentionally and critically to avoid replicating determinist accounts of society that exacerbate existing inequalities (Trouillot 2015). Further, social constructivist views of technology do not always capture the complexity of technological development and its interactions with human users and organizations, where technological artifacts do (or at least appear to) have agency over both users and their material reality despite not being fully autonomous themselves (yet?). As the autonomous systems sectors in industry and academia continue to expand (Yazdanpanah et al. 2023), it is becoming increasingly important for librarians to acknowledge the role of human actors and institutions in manufacturing the dystopian and utopian futures whose creation the leaders in these sectors attribute to technology, as well as the emerging AI technologies over which creators may have less control (Cavalcante Siebert et al. 2023). As several critical scholars have shown, these discourses strategically erase the accountability of those who directly benefit from the development and implementation of harmful new technologies (Ali 2019; Gebru and Torres 2024; Tacheva and Ramasubramanian 2023). Yet the empirical research we have located has not interrogated how librarians' discourses around new technologies may either reinforce or challenge these cultural shifts through their positioning of agency within these complex interactions.

Applying the Technological Determinism/Social Constructivism Binary (and Its Critiques) to Librarian Discourses

Even if it is inaccurate, technological determinism can appear to explain the everyday experience of technology that may not itself be literally autonomous but is designed to appear that way (Wyatt 2008), as in the case of ChatGPT and its predecessors—including graphical user interfaces that were designed to make early computers more "user friendly" and conveniently hide their technical inner workings (Taylor 2018). This may be why technological determinism "continues to fascinate" (Wyatt 2008, 165), despite its critiques. Additionally, while social constructivism has been largely adopted among librarians and library scholars (Wilkinson 2015), some scholars have already begun to identify technologically deterministic tendencies in librarian discourses (Birdsall 1997; Erdelez et al. 2011).

This study builds upon this small but growing line of inquiry by highlighting librarian perceptions of AI's impact through the lens of agency to consider how these two seemingly opposing viewpoints may be reconstructed through their discursive constructions of technology. As technological determinism and social constructivism both have the potential to cause harm when used uncritically, becoming aware of their presence and implications for agency can allow librarians to intentionally engage their own agency in the face of technological change.

Research Methodology

This exploratory qualitative research study draws on critical narrative and discourse-based approaches to examine the discourse constructed among a group of librarians in a panel discussion and follow-up interview. In this approach, researchers iterate between closely reading the data and considering their overall theoretical framework in order to reveal patterns, attitudes, and beliefs that may implicitly or explicitly shape participants' discursive constructions of their lived experiences.

Data Sample

For the first part of this study, we analyzed a recorded presentation (which Sarah attended live) on library research and practice hosted by an American Library Association–accredited library and information science program at a large R1 university. This research was considered noninvasive and did not require Institutional Review Board approval, and we obtained permission from the session organizer to analyze the recording. The panel took place in fall 2023 and was hosted in a hybrid format, with some presenters and attendees participating in person and others attending on Zoom. The panel included eight current library researchers and practitioners from both academic and public libraries who were selected for their range of professional and research experiences, including as iSchool faculty. All

participants worked in urban academic or public institutions. The public librarians had different roles, including public services, archives, and data management. The academic librarian in the group worked as a subject liaison to the library and information studies department of their institution, and the two current iSchool professors formerly worked in academic libraries in various capacities. There was also racial diversity among the panelists, likely more than is reflected in the library community at-large, which remains around 80 percent white (Hulbert and Kendrick 2023). The panel was organized around several key themes, including trending research methods and topics, shifts the participants had observed in library practices, and their hopes for the future of LIS research. We focus on topics related to discourse around AI technology and the library's role in its use and implementation, as well as the participants' desires and concerns for the future of AI in libraries. This panel had the benefit of including many different perspectives on the topic of technology in the field of LIS within the same venue.

The second part of this study includes a follow-up interview with an MLIS student attendee on the questions raised around technology by the panel as well as additional questions about how their educational and professional experience was or was not preparing them to work in a world where AI is a part of their practice. Incorporating the student voice in our discursive construction allows us to hear one example of how AI is being considered within LIS education. We recruited this master's student to conduct an in-depth interview about how they viewed new technologies such as ChatGPT and their impact on their work, allowing us to pilot our interview questions and ask probing questions beyond what was able to be discussed at the panel. This student was selected for their attendance at the panel and prior experience working in libraries before attending library school, and the interview was conducted within two weeks of the panel. We recognize that a single interview cannot provide a generalizable account of the LIS student perspective. That said, our close reading of their experiences paired with the panel allows for a deep interrogation of their discursive conceptualizations of agency that is in line with a critical discourse and narrative inquiry methodology.

Data Analysis

Our goal is to identify how agency is positioned within librarians' conversations around new technologies. Critically, we see our efforts to move toward justice-oriented approaches to technological adoption and creation within the LIS field as bounded by the discursive threads that are woven underneath our interactions, assumptions, and practices, of which we must become critically conscious in order to change or leverage them intentionally. We utilize a critical narrative and discourse-based methodology, which allows us to qualitatively interrogate the ways in which language

and stories shape the material world to make their underlying value and power structures visible and facilitate social transformation (Lazar 2007; Souto-Manning 2014). These goals are consistent with our own, making the combination of critical narrative and discourse analysis an appropriate methodological approach for revealing the ways agency is conceptualized in conversations among librarians about AI and technological change. This interpretive approach does not aim to achieve generalizability or replicability and instead values the subjective and contextual nature of storytelling to create thick descriptions about local understandings of phenomena with wide-reaching implications. We also draw inspiration from Haraway (1992) and Barad's (2006) diffractive methodology where data, theory, and experience are iteratively read through one another in recognition of our inability to separate our analytic gaze from our local context and personal experience.

We took an abductive approach to analyzing our data, where we began with a grounded, data-driven approach to developing themes from the data that served as our initial analytic framework. These themes reflected the practical nature of what the librarians discussed, including community perceptions of library work, the services currently or expected to be impacted by AI, and areas of librarianship they perceived as being impossible to replace with AI. We then reviewed the data through the lens of our emerging theoretical framework of agency to further synthesize our initial observations and build our preliminary theoretical model, which was revised through an additional round of analysis. The panel and interview transcripts were approached as various parts of a larger, overarching story or narrative constructed among this group of librarians in their shared discussions and in the follow-up interview. While each librarian was considered for their individual contribution to the discourse, they were not compared but, rather, seen as distinct yet actively entangled agents constructing the discursive phenomenon interrogated in this research. As we learned how these librarians saw technology impacting their work, we began to identify the actors or agents discussed among the librarians and the direction of agency they implied or explicitly stated. We decided not to conduct systematic qualitative coding, which we view as unnecessary under a narrative and discourse-based paradigm, and instead generated broad ideas that could be used to guide our understanding of agency as seen through our librarians' discursive constructions of their experiences with and attitudes toward AI and other technologies. Our goal is not to generate broad, universalizing statements about librarians generally but to reveal the complex dynamics underpinning the attitudes, practices, and hopes of one group of librarians that can inform future library research and start to promote more empowering discourses around AI and libraries. Our interpretations are necessarily informed by our own unique positionalities as a current iSchool doctoral student and former library worker

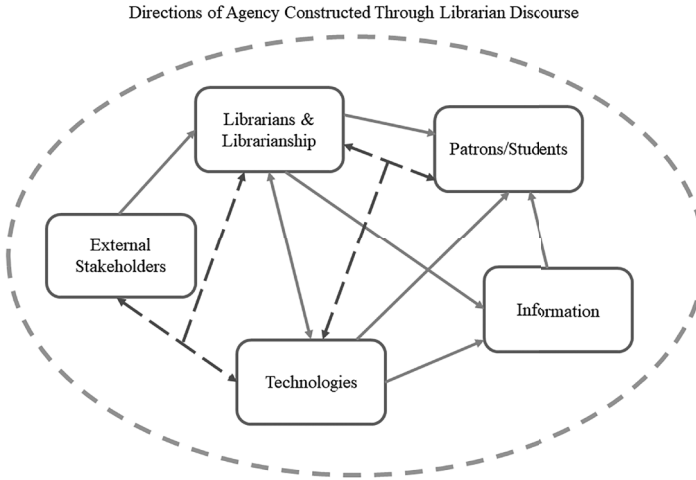

Figure 1. Directions of agency constructed through librarian discourse. The figure illustrates the relationships between various actors/agents (depicted by boxes) that emerge from librarians' discourses of agency. Solid lines indicate the direction of agency between actors. Dashed lines illustrate combined agentic influences resulting from the interactions among different groups of actors. The dashed boundary represents the broader social and economic conditions impacting the agency of these actors.

(Sarah) and current iSchool faculty member conducting critical research on AI and its impact on various communities (Jasmina). In the following section, we summarize our results and emerging theoretical model of agency.

Results

Our results are organized in the same manner as our theoretical framework to build toward our emerging understanding of discourses of agency among librarians as nuanced, dynamic, and multidirectional. Because we took a grounded approach to building our theoretical model, only the agents and directions mentioned or implied by our librarians are included. There may be several other actors and directions of agency present in librarian discourse, and building on this initial model will be an area of further research.

Our developing discursive model can be seen in figure 1. The figure illustrates the relationships between various actors/agents that emerge from librarians' discourses of agency, including the direction of agency between actors, the combined agentic influences resulting from the interactions among different groups of actors, and the broader social and economic conditions impacting the agency of these actors. In what follows, we will review these dynamics by looking at the three main themes (i.e., directions

of agency among actors) we identified (1) socially constructed directions (including external stakeholders and libraries), (2) technologically driven directions, and (3) tool-based conceptions that demonstrate how these interactions are more complex than the simple binary presented previously in this paper can reveal.

Theme 1: Socially Constructed Views of Agency

Librarians overwhelmingly understand the important role of human actors in shaping technological innovation and critically questioning the use and capabilities of new technologies. In our sample, the two primary groups of human agents articulated are external stakeholders and librarians as individuals and a collective field.

Librarians also recognize that the process of adapting to new innovations depends not just on the technology itself but on the social and economic conditions in which librarians find themselves at the time of its release. Recent factors in our librarians' experiences include the COVID-19 pandemic, the culture wars over library books that threaten librarian safety, and the increased need for social work services in the library. Whereas AI may be an increasing concern in academic and industry settings, public librarians especially are battling several other existential threats to their work that overshadow the supposed threat of AI. While not necessarily centered on individual human actors, these sentiments implicitly recognize the important role of human institutions and systems in shaping technological innovation and its impact on the library field.

External stakeholders as agentic over librarians

External influences, including individual and collective stakeholders, play an important role in shaping librarians' conceptions of agency in the process of technological change and the adoption of AI. The librarians in this group recognize that how their work is perceived by others has consequences for the trajectory of AI technologies' impact on the field. This includes recognition that there exist people who are "anti-library," in the interviewee's words, and are willing to replace librarians with AI chatbots if given the opportunity. One of the panelists reflects, "And I feel like, with AI, um, and with the perception of I guess the field, or everyone outside of the field thinking, well, libraries are going to be extinct." Further, the interviewee shares comments from their grandmother that suggest that there exists a perception that libraries themselves are machines that do not require human intervention. In remembering a conversation with her, they recall, "And she was like, I know it sounds like, ridiculous, but I never thought about who's the guy buying the books." While we cannot say whether this view is common or an anomaly of this person's grandmother, it should be concerning considering Ranganathan's fifth law of

librarianship, which states, "A library is a growing organism" (1931, 392). If patrons cannot conceptualize a human being purchasing the books that they see on the shelf, how might that threaten the perception of librarians' agency and community role in the wake of AI?

External stakeholders are especially emboldened through the release of new technologies such as ChatGPT, and their agency over librarians may be exacerbated by their adoption of discourses and attitudes that represent technology as a threat to their existence. The panelists and interviewee recognize that many of these threats are informed by popular beliefs that AI could serve as a potential replacement for librarians. The interviewee sees this as a misunderstanding of the complex work librarians do and the difficulty of replacing their roles with an AI. However, these critical moments in history still invite renewed criticism of librarians and may further invisiblize their already underappreciated skills and expertise. This may be why another panelist comments that she would like librarians to better anticipate the major trends that impact their work so that they may be better prepared to handle them while addressing several other simultaneous disruptions. While she does not list technological crises as one of these trends, it is easy to see how new AI tools may be yet another phenomenon in which librarians will be remembered as "reactive." The external stakeholders in these discourses may be the ones perpetuating these beliefs, yet the power of new technologies to incite these criticisms is clear (though where these beliefs come from is not revealed in this data).

Librarians as agentic over technology and their community

Librarian agency is clearly present in these librarians' reflections about their own responses to technologies and how they conceive of technologies' potential to disrupt their work. While there is some acknowledgment of the ways in which librarians may have limited their own agency by not getting to the "forefront" of changes in technology, they also implicitly engage their agency over both their community's perceptions and the technological threat itself to combat accusations of irrelevance by pointing out their skills and expertise that could not be easily replaced by an AI. For example, the interviewee repeatedly argues that it would be difficult to fully replace the reference librarian with an AI chatbot. A major deficit of AI chat tools is their inability (due to their design and the nature of predictive algorithms) to conduct the reference interview, an integral practice in library reference services that requires the librarian to dialogue with the patron, model curiosity, and get to the heart of their information need—which may not be clear to either the librarian or the patron at the start of the interaction (Ross 2003). The interviewee reiterates this in their own words, saying that "even sometimes like, what people think they need sources on may not actually be what they need sources on, which you of

course don't say to them. But like, would you tell me what you're working on?" In contrast, an AI chatbot would simply take users' questions at face value.

Additionally, they point out that librarians provide information literacy instruction through reference interactions by explaining the process for locating the information needed to address the question (Elmborg 2002). An AI chatbot merely returns an output with no indication of how that answer was created or where the information was found. Furthermore, a librarian who focuses on archival materials notes that her work with primary sources would be impossible to replicate through an AI since physical contact with the collections is often what drives people her way. Librarians also engage several affective skills to successfully support their patrons, from handling their feelings of frustration as they work through the complexities of research to celebrating their successes (VanScoy 2012). Librarians may not yet be taught much about AI within their training (Tait and Pierson 2022), but they are well versed in fostering community and possess the "human touch," which allows them to connect to patrons on a personal level, which the interviewee argues is difficult to replicate with an AI program that struggles to appear natural. Being forthright about the skills they are bringing to the table is imperative for librarians to successfully overcome discourses of obsolesce perpetuated by external stakeholders, which we recognize may not come easily considering the Reference and User Services Association (RUSA) guidelines' gendered expectations about how librarians should interact with patrons (Emmelhainz et al. 2017).

Librarians further describe enacting their agency through their interactions with patrons and in some way reflect a sense of dependency between their patrons and themselves. Helping patrons exert agency over information is already a common practice within social constructivist views of information literacy (Addison and Meyers 2013), and applying this approach to new technology is emerging as one way that librarians can demonstrate the important role of human agency over technology within the information-seeking process. For example, these librarians view themselves as having an important role in educating their communities about evaluating misinformation and disinformation, providing fact-checking services, identifying bias within the outputs of AI tools, and creating public outreach campaigns around AI. A panelist who works as a public librarian provides a useful perspective on how she views her role in her community:

> We know that they have questions about like, the information that I'm consuming, like, is this factual, where is it coming from? How can I use things like ChatGPT, you know, to write papers? Or how am I creating a résumé using AI tools? So I think it's really how we're looking at it is, How do we help our community to understand what these tools are and the impacts for them?

These perspectives reflect that librarians exert agency over both new technologies and their communities by helping highlight the limits of AI technology and demystify its inner workings.

While these librarians demonstrate several skills and attributes they can leverage to highlight their important role in their communities, especially after new technologies such as AI are introduced, they have some concern that librarians may be limiting their own agency to meaningfully respond. One panelist states, "I typically think that our field is always reactive. LIS is reactive. We're never at the forefront. We never get ahead of things where I think that this is our domain, where we should be." And yet, there is also an understanding that librarians have continued to exist even after multiple "existential threats" to the field, implicitly recognizing their agency to shape how new technologies impact their work. The interviewee points to the history of new technologies in libraries as evidence that AI likely will not replace librarians. They say to "look at the history. … We had the exact same thing happen when Google came out, and now like, librarians and Google work side by side, like Google is a tool for librarians to use." Similarly, a panelist remembers, "When I started library school we didn't have Google. And then once Google came about, we were like, oh, we're not going to need libraries anymore, right? I see the same trend with ChatGPT, with more AI." These sentiments imply that additional education around the history of technological change in libraries and the strategies librarians employed to respond to those changes may be helpful in supporting librarian agency in the face of future changes and resisting the ahistorical, deterministic perspectives often perpetuated by the technology industry (Pasquinelli 2023). Further, while learning about the history of innovation in libraries may be useful, librarians must also be willing to critically engage with new technologies to enhance their confidence in their ability to respond while avoiding past mistakes. The interviewee demonstrates this by acknowledging that their concerns over ChatGPT and its perceived level of agency diminished over time as they learned what it is and is not capable of through both education and practice.

Theme 2: Technologically Driven Views of Agency—Technology as Agentic over Librarians and Information

These librarians reflect more than just socially constructivist views of agency and in many ways acknowledge the power of technology itself to change their circumstances. The release of ChatGPT is a commonly cited example of a technological artifact with profound social and professional consequences. While it may not be considered the most likely tool to replace librarians, ChatGPT clearly had a role in inciting discourse among librarians and the public about the presence, or in some people's view, the "arrival," of AI. In the interviewee's words, "ChatGPT *was released* and everything changed. That's like one of those real, I feel like, a day that

like everything changed from that point on and like, just public conversations, public perspective of it" (emphasis added). Notably, the "release" of ChatGPT is articulated passively, and the creators of these technologies and their deliberate decisions to release them to the public (Chen 2024) often are not mentioned in reflections about how these tools came to be. A panelist makes a similar discursive move, saying, "I'm noticing that it's starting to *seep its way* into the library tools that are being promoted to me in my role" (emphasis added). Rather than the librarian positioning their increased exposure to AI as a result of strategic business decisions, the AI tools appear to them to be independently appearing within platforms that vendors are already promoting. That said, the interviewee also shares that they think it is "crazy" that "we have ChatGPT for like a few months and we're like, it is the AI revolution," indicating that they do not completely buy into the idea that absolutely everything changed when it was introduced.

That said, there is a sense of inevitably toward AI and its expected impact among these librarians. The interviewee states, "I do think like, AI tools are like something that I'm going to have to like use, have to interact with, and I'm not like, opposed to that, but I also like, am somewhat hesitant sometimes." This could be a pragmatic assertion about the realities of this new technology becoming dispersed throughout the public. However, it may also indicate a feeling of powerlessness over the trajectory of their work. One practitioner on the panel says, "We could benefit from the other perspectives in terms of analyzing some of the long-term trends so that we can avoid some of the repeated issues that might happen." Librarians may feel a greater sense of agency over this impact if they work in partnership with scholars studying these trends (and vice versa, if scholars prioritize equitable and collaborative research projects with librarian partners), which many recognize is currently lacking due to gaps between library research and practice.

Technology's primary manifestation of agency within this discourse is over the information that is generated, particularly through the ways in which its inner workings are "black boxed" and its output is dependent on unknown and biased training data. The interviewee points out that one of the problems with evaluating information from platforms such as Google and ChatGPT is that "we don't fully understand how Google's algorithm works." They also point out that while you can ask ChatGPT a variety of questions, it may not give you the right answer and often generates false information, or what have been coined AI "hallucinations" (though this name is somewhat problematic; see Østergaard and Nielbo 2023). Further, several of the librarians are aware of issues of racial and gender bias in AI training data and the impact this has on their outputs (Buolamwini and Gebru 2018; Noble 2018). In this way, technology is seen as having the agency to shape information, which requires users to then enact their own

agency to evaluate that information, reiterating their socially constructivist views of information but hinting at a lack of critical questioning over the technology itself, including its origins and creators. Users' agency relies on their ability to use the tools effectively and evaluate the information they produce, but often their agency over the technology itself is relegated to understanding its capabilities and outputs. While these sentiments do not necessarily reflect pure technological determinism, they do represent an implicit recognition of the power of technology to shape the material world.

Theme 3: Technology as Collaborative Tool

Several of the librarians articulated a belief that AI as a tool can serve as a collaborator in their work rather than a competitor, indicating a sense of shared and negotiated agency not easily explained by either pure technological determinism or social constructivism. The interviewee accepts that tools such as ChatGPT are trained to do certain simple or procedural tasks well, for example, creating a résumé or writing a thank-you note. However, they do not have confidence in AI's ability to complete more complex tasks, such as those that are higher on the READ (Reference Effort Assessment Data) Scale (a metric scale going from 1 to 5 signifying the simplest to the most complex reference questions; see Karr Gerlich, n.d.) or those they see as requiring the aforementioned "human touch." They argue,

> If you're thinking about like, the READ scale, like definitely a lot of one and two questions could be solved by a chatbot. Like, where's the bathroom? Could you give me the call number for this book? Like, something that could just scan the catalog. I think the problem is when you get to more complex research questions, like, I need sources on X thing.

This pragmatic view leads to their positioning of ChatGPT not as a threat but as a partner in the collaboration between the librarian and patron that allows for a more dynamic understanding of agency where both technology and human users influence one another.

The librarians' desires for and concerns about AI also reflect a pragmatic view rooted in the day-to-day tasks of a librarian, where warding off the technology industry's supposed AI apocalypse or ushering in its utopia is not a top priority. The interviewee is both skeptical that AI will replace their job within their lifetime—a discourse they describe as "wishful thinking"—and open to the idea of using it as a tool within their work. They state, "I mean, I think the idea of something that could automatically answer simple questions, especially through like, natural language processing, is super appealing. Like, again, just like, can you find me a call number? Where is the bathroom? Can you give me directions to get to this building?" One of the public librarians on the panel is interested in using an AI assistant, though for different reasons. She shares, "You might have been mentioning before how libraries are not often the top of the

list of priority. And having an AI to kind of fit in, where you might not get an assistant when you need one or might not have a particular role filled, um, I've been definitely exploring that." This desire reflects the realities of public library work, where staff are often overburdened to meet the needs of their community while simultaneously constantly expected to prove their value (Douglas 2020). Instead of being seen as a threat, AI tools can become an intervention in this environment.

However, more sustainable solutions would include reliable financial and community support for libraries that would allow them to hire enough human staff to meet their patrons' needs, without outsourcing this crucial work to a tool that may not be up to the task. These librarians already recognize this reality and make suggestions for how to make progress toward these goals but may choose to adopt AI tools nonetheless to meet their immediate needs. While the tool view of technology may be useful for understanding its potential uses and limitations in this context, it may further invisiblize the larger systemic forces influencing the circumstances in which librarians must resort to adopting AI "tools" despite their known harms and limitations (Orlikowski and Iacono 2001). Each librarian who is open to using AI as a tool expresses some concern and/or indicates that their desire is motivated by a lack of available staff—while AI may be a collaborator, the partnership may not always be an enthusiastic one. That said, there is little discussion among these librarians about the intentions of those who design and create these technologies or how that shapes their impact on librarianship. In a few cases, the librarians point out how technological innovation is shaped by human creators, in terms of both the biases they incorporate into them and the ways that innovation is impacted by economic decisions. While they do not always explicitly acknowledge such human factors in these discussions, there is an implicit awareness that some invisible hand of innovation is not creating artifacts that should be leveraged in helping librarians situate their own agency within these systems. Moving past the tool view in our discursive constructions of technology may better allow for a nuanced understanding of agency as dynamic and negotiated among various actors, both human and technological, and help librarians advocate for the solutions they feel are best for their communities.

Discussion: Problematizing the Human/Technology Agency Binary

Through our critical exploration of their narrative experiences, the panelists and interviewee show us that agency does not occur as a simple binary between humans and technology. Instead, it is negotiated through librarians' historical knowledge of technological adoption in the field, their awareness of the limitations of new technologies and their capacity as librarians to supersede these limitations, and their training on the

harms of new technologies. Additional factors that we found to influence the exchange of agency between librarians and technology include the community they serve, the social and political perceptions of libraries in their community and society more broadly, and the practical needs of library work. We conclude that binary understandings of agency between humans and technology are not adequate for describing librarians' discursive accounts of how agency is enacted in their work, where it is implicitly ascribed to the actions of human actors within and outside of their institutions as well as the seemingly "invisible" forces of technological innovation. Instead, as the testimonies of librarians in our sample indicate, a more complex understanding of the interplay between human and technological agency is needed.

Moving forward, we draw inspiration from Haraway's "A Manifesto for Cyborgs" (2002), which encourages critical, feminist approaches to conceptualizing the relationship between humans and technology that allow oppressed groups to reclaim agency in the process of technological and social change by pointing to their co-constitutive nature. We argue that, as with the problematic binaries of man/woman and human/technology, maintaining a binary stance toward technologically determined and socially constructed accounts of agency positions these two in an unequal hierarchy struggling for dominance. Doing so is problematic when both positions are limited in their ability to articulate the relationship between humans and technology and the arrangements that impact their interactions. The binary also cannot account for the development of technologies that appear to act as agents on humans and society, such as those powered by AI. Lloyd warns that "in an online space, algorithms exert agency in relation to information seeking and retrieval" (2019, 1481). If this is true, then the social constructivist view that agency lies solely in human actors is no longer true, if it ever was. As these librarians demonstrate, both humans and technologies act as agents to negotiate meaning and shape the material world.

One way to embrace a more explicitly nuanced understanding of agency within librarianship that better allows librarians to situate and enact their own agency within complex technological changes is to reframe technological determinism and social constructivism as a spectrum instead of a binary. In his attempt to reclaim the terms, Dafoe positions technological determinism and social constructivism as either ends of a spectrum that invites consideration of "to what extent, in what ways, and under what scope conditions … particular kinds of technology [are] more autonomous and powerful in shaping society" (2015, 1050). This perspective is already being utilized in other areas of critical data studies and feminist STS (i.e., de la Cruz Paragas and Lin 2016; Matthews 2021), yet our review of the literature shows that few empirical studies are looking at librarians through this nuanced lens of agency. However, the reflections shared by

the panelists and interviewee show that a more complex understanding of agency is needed for the LIS field to engage in reflexive adoption of new technologies and resist the discourses stemming from technological elites that aim to enforce their own conceptions of agency, which, as other critical scholars have shown, reinforce social systems that benefit only an elite few at the expense of the majority.

Some LIS scholars have adopted more nuanced views of agency to conceptualize the complex interactions between sociotechnical systems, social change, and information-related professional and scholarly practice. Hauser (2023) proposes that information systems designers be seen as having "inscriptive agency" over the truth conditions that are materialized through their technological systems. In this view, technology itself has agency, but only because human beings with power dispense those technologies into social institutions with power. Importantly, not all humans have the same level of power depending on their location within these social systems, revealing the nuanced way agency can be enacted and restrained within sociotechnical information systems. He brings up the example of the body-scanning technology used by the Transportation Security Administration (TSA) as one mechanism of social control that has material consequences for our ability to proceed through the airport. However, while Hauser recognizes the need to address such injustices within the LIS field, he does not acknowledge how such systems are designed with inherent binaries that constrict certain people's agency more than others. Costanza-Chock's (2020) work on design justice, where the intersectional experiences of gender identity, race, and others, must be considered to ensure that such binaries are interrogated for their role in enforcing such systems of control. Lundahl proposes that LIS researchers and practitioners examine "the process by which algorithms wield social power" (2022, 1443). They can do so by recognizing that algorithmic technologies are not merely tools but, in fact, are used in various decision-making processes that shape social reality. Users are also seen as having agency within these systems, and the impact of algorithms is understood to be less unidirectional than in the understandings typical in the library field.

While this framing offers important avenues for overcoming the problems of the determinism-constructivism binary, it is by no means perfect and should not be considered the only way forward. Doing so risks recasting it as another form of deterministic thinking, which does not account for the multiply diverse possible futures implied by our co-constitution with environments, social relations, and technologies. Instead, we offer this conceptualization as a starting point derived from the librarian community to help librarians make sense of the complex entanglements of humans, technology, innovation, and agency. Following epistemologist Kristie Dotson's (2014) three-stage framework of epistemic and social

change, we argue that a binary understanding of technological determinism and social constructivism constitutes a *first-order change*, which merely offers a vocabulary to present uncritical understandings of technology in Big Tech and popular media, thus tacitly reinforcing them. In contrast, recasting these categories as a spectrum constitutes a *second-order change*, which calls into question and consciously modifies the binary as status quo. However, this is not the end of the process, as second-order changes "function well for a significant portion of the social population, for example, more epistemically powerful portions, and poorly for others" (Dotson 2014, 127). Therefore, librarians ought to continuously strive for the most demanding of the three stages of change—a *third-order change*—which concerns "recognizing and, possibly, enabling the ability to alter operative, instituted social imaginaries, in which organizational schemata are situated" (Dotson 2014, 119).

What this looks like as library and information professionals continue grappling with the present realities of AI is subject to constant change and will serve as an area of ongoing research. As a starting point, we propose that librarians and library scholars consider Barad's (2006) concept of agential realism when interrogating how agency may be represented and enacted between librarians, society, and technology. Agential realism is an "epistemological-ontological-ethical framework that provides an understanding of the role of human and nonhuman, material and discursive, and natural and cultural factors in scientific and other social-material practices, thereby moving such considerations beyond the well-worn debates that pit constructivism against realism, agency against structure, and idealism against materialism" (Barad 2006, 26). Adopting this more critical approach in future library research around AI can better account for the complex interactions revealed in this research and makes clear how various stakeholders can take accountability for their role in shaping technological change in libraries.

Limitations

This paper is not without limitations. One limitation is the small sample of interview participants. The one participant interviewed provided useful and important ideas about what might be needed to prepare LIS graduate students for their future work, whatever it may look like. Building on these insights with additional accounts of student perspectives in future iterations of this study will strengthen our claims and allow for new ones to emerge. Additionally, the fact that we did not have control over the questions asked of the panel meant that there were fewer opportunities to directly compare their views with those of the interviewee. However, the benefit of this is that the panel questions inspired additional questions to include in our follow-up student interview.

Conclusion

We have set out to demonstrate how librarians' discursive accounts of technological change invite reconceptualizing social constructivism and technological determinism as a spectrum rather than a binary, which can better address the negotiation of agency between humans and technology in libraries. Through our research, we have found that the answers to our initial questions are as complex as the AI technologies that motivate them; librarians discursively represent agency as materially enacted by both technology and human actors, including external stakeholders and larger social and economic conditions, and implicitly recognize that the trajectory of technological change in libraries is anything but passive. While the spectrum model can provide a more nuanced view than extreme forms of determinism and constructivism, librarians' perceptions of AI demonstrate the potential of thinking beyond the spectrum altogether. In this context, the feminist STS principle, which "requires remembering that boundaries between humans and machines are not naturally given but constructed, in particular historical ways and with particular social and material consequences" (Suchman 2020, 11), is worth considering. Based on the panelists' and interviewee's insights, we argue that this applies to libraries as well: Critical library perspectives can go beyond singling out specific expressions of technology, which are historically contingent and may not be complexly captured by either deterministic or social constructivist views. Instead, they can embrace technology as deeply inseparable from our lived experiences as humans, where the question goes from "How much agency is given to technology versus the human user?" to "How can agency be reconceptualized as existing within the transgression of boundaries where humans and technology are indistinguishable and yet in constant dialogue with one another?"

In summary, practical takeaways for supporting librarian agency amid technological changes that emerge from this investigation include the following:

- Be forthright about the skills librarians bring to the table to overcome discourses of obsolesce perpetuated by external stakeholders.
- Continue to help patrons understand the limits of AI technology and demystify its inner workings.
- Prioritize MLIS education and professional development around the history of technological change in libraries and the strategies librarians employed to adapt to those changes.
- Critically engage with new technologies to enhance confidence in our ability to respond.
- Establish partnerships between librarians and library scholars to address existing knowledge gaps.
- Move past the tool view in our discursive constructions of technology.

Future directions for this research include further elaboration on the limitations of the tool view of technology within library and information science and its implications for our understanding of agency within these discourses. Additionally, we hope to gain a greater understanding of how librarians view the role of the technology industry and individual leaders within that industry in the process of technological change, which was not specifically asked about within this study. Further, we plan to utilize the concept of agential realism to look more specifically at how the discursive constructions of technology in the media and within their education and professional development impact librarians' own discursive constructions of technology in their work. We have received Institutional Review Board approval from Syracuse University to expand on our pilot interview and conduct additional interviews with practicing librarians, LIS professors, and LIS students.

We encourage library scholars and practitioners to take a nuanced, complex approach to how they view agency within interactions between humans and technology. We acknowledge that moving beyond the spectrum of technological determinism and social constructivism is a radical act; much like imagining a world without gender, it requires us to imagine new paradigms grounded in the values and desires of the people who work under them. This question is philosophical by nature, but philosophy alone will not answer it. It will require the sustained, collective, and imaginative efforts of librarians and their communities to resist the technologically determinist discourses perpetuated by the technology industry that aim to suppress our agency, and we see this research as just one step in the mobilizing efforts in our fields to do so.

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Sarah Appedu, MSLIS, is a doctoral student in information science and technology in the School of Information Studies at Syracuse University. She has worked as an academic library employee with responsibilities related to scholarly communication services, reference services, instruction, and programming. She received her MSLIS from the University of Illinois Urbana-Champaign and now conducts research on the ways in which discourses around technology shape the complex interactions between human beings, sociotechnical systems, and the natural world.

Jasmina Tacheva is an assistant professor in the School of Information Studies at Syracuse University, where she teaches courses on the ethics and politics of data and artificial intelligence. She earned her PhD in management from the University at Buffalo and is currently pursuing a doctorate in comparative literature at the same institution. Her research focuses on the intersection of data and technology studies with transnational queer feminist theories.