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July 2026 • Volume 87 • Number 4

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July 2026

VOLUME 87

NUMBER 4

ISSN 0010-0870

Articles

- 415 **Two Decades of Critical Information Literacy: A Review and Analysis of the Literature**
Eamon Tewell
- 433 **Student-Taught Coding Workshops in the Academic Library**
Tina Li and Catherine R. Barber
- 445 **The State of Critical Indigenous Studies Liaison Librarianship: A Landscape Analysis**
Kathryn Randall, Alexander Watkins, and Adrienne VandenBosch
- 459 **Big Deal Cancellations and Scholarly Publishing: Insights from Faculty and Graduate Student Interviews**
Madelaine Hare, Philippe Mongeon, Samuel Cassady, and Catherine Johnson
- 486 **Information Literacy Instruction Redux: What Are Instruction Librarians Doing Now?**
Heidi Julien, Jesus Montiel Hernandez, Melissa Gross, and Don Latham
- 501 **Tracing Thematic Evolution in *College & Research Libraries*: A Co-LCSH Analysis of Book Reviews (1997–2023)**
Kemal Yayla
- 521 **The Algorithmic Librarian: AI, Data Curation, and the Future of Research Collaboration**
Lady Catherine R. de Leon

Reviews

- 532 *A Complete Guide to Creative Technology Spaces in Academic Libraries: Media Labs, Makerspaces, and More*, Emily Thompson, Vanessa Rodriguez, Eric Johnson, Kelsey Sheaffer, and Oscar K. Keyes. Reviewed by Michelle Mussuto.
- 534 *Artificial Intelligence for Academic Libraries*, Clifford B. Anderson and Douglas H. Fisher. Reviewed by Arya Wijaya Pramodha Wardhana.

Two Decades of Critical Information Literacy: A Review and Analysis of the Literature

Eamon Tewell*

Critical information literacy (CIL) uses teaching and learning in libraries to understand and act upon oppression in information systems. Over the past 20 years critical information literacy has been explored, refined, debated, and critiqued. What can the recent literature tell us about the direction of CIL and critical librarianship more broadly? This research explores CIL's recent past through an analysis of 128 publications from 2016 to 2024 and four thematic areas. Lastly, this article identifies issues and failings of CIL and considers what should come next as a theory and practice that seeks to move information literacy toward more liberatory aims.¹

Introduction

Critical information literacy (CIL) seeks to understand and act upon how libraries and other information systems both contribute to and can oppose systemic oppressions such as racism, sexism, and ableism. CIL has taken on new roles and an increased sense of urgency in response to global concerns, such as disinformation and authoritarian leaders, and continues to generate ideas that encourage library workers and learners to seek to democratize knowledge and access to information. Drabinski and Tewell define critical information literacy as “a theory and practice that considers the sociopolitical dimensions of information and production of knowledge and critiques the ways in which systems of power shape the creation, distribution, and reception of information” (2019, p. 1).

This research study seeks to answer two questions:

1. What themes are present in the current CIL literature?
2. Based on the current CIL literature, what areas and perspectives are lacking or underrepresented?

Twenty years after CIL's initial appearances in the literature, it has been the subject of many works theorizing, applying, and critiquing it. Interest in CIL continues to expand and flourish, and it has contributed to challenging entrenched ideas in libraries and information literacy. The literature has seen a considerable increase in researchers applying CIL to their specific settings and specialties, providing useful nuance and insight. Despite its advances CIL has remained limited in consequential ways, including an inattention to race and White

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¹Portions of this article have previously been published as part of the Association of College & Research Libraries 2025 Conference Proceedings.

supremacy; lack of recognizing labor and working conditions as a fundamental aspect of teaching in libraries; North America-centric representation and interests; and a focus on and within higher education, which limits CIL's broader potential and applicability. First, a brief look at critical information literacy's foundational years will provide context.

Background

Critical Information Literacy: Foundations, Early 2000s–2015

Critical information literacy has accumulated a considerable presence in the library and information science literature, as well as at conferences, especially in North America. As such, the literature and particularly early works in CIL are North America-centric. Foundations of the early critical information literacy literature include articles by Kapitzke (2003), Swanson (2004), Elmborg (2006), and Jacobs (2008), all of whom argue for the importance of an information literacy theory and practice that accounts for political and ethical issues in information environments. Kapitzke applies poststructuralism to critique the concept of information literacy, while Swanson, Elmborg, and Jacobs draw upon critical literacy theory and composition studies to consider the roles of teaching librarians. Critical theory, as well as composition studies, continue to be used to analyze information literacy and the educational work of libraries. However, as early as the cornerstone volume edited by Accardi, Drabinski, and Kumbier, *Critical Library Instruction: Theories and Methods* (2010), inspiration for reimagining information literacy took many forms, which included queer, feminist, and critical race pedagogies. Highlighting the links between information literacy and social justice, Higgins and Gregory's edited volume *Information Literacy and Social Justice: Radical Professional Praxis* (2013) extended the conversation with further inspiration from Paulo Freire and the field of critical pedagogy.

A major step in practical applications of critical information literacy came with the publication of Pagowsky and McElroy's two-volume *Critical Library Pedagogy Handbook* (2016), which contains a collection of essays, workbook activities, and lesson plans that are readily applied to teaching. Notably, regarding the mainstreaming of CIL and its more widespread visibility in North American librarianship, these volumes were published by the American Library Association. Also contributing to theoretical and practical advancements at this time was the edited volume *Critical Literacy for Information Professionals* (McNicol, 2016). Simultaneously, research into critical information literacy themes and practices was conducted by Downey in *Critical Information Literacy: Foundations, Inspirations, and Ideas* (2016), as well as articles by Tewell (2016, 2018). Shortly afterward considerable work expanded CIL's theoretical inspirations, from Greek theories of time to critical geography to media studies (Drabinski, 2017; Nicholson, 2018; Tewell, 2017). Now, 20 years after CIL's initial appearances in the literature, it has been the subject of many additional works theorizing it, translating it into classroom practice, and providing long overdue critique.

Method

Critical Information Literacy Literature: 2016 to Present

To locate the critical information literacy literature that has been published since a 2015 review conducted by Tewell, searches of three databases including Library and Information Science Abstracts (LISA); Library and Information Science Source (LISS); and Google Scholar were conducted. The LISA and LISS databases were selected due to their focus on

library and information science, a field in which CIL has been established as a concept and practice. Google Scholar was selected due to its broad indexing and search algorithm that contrasts significantly with subscription databases to increase the likelihood of locating publications not discoverable within LISA and LISS. Search terms included “critical information literacy,” “critical pedagogy and libraries,” “critical literacy and libraries,” and “critical library instruction.” Additionally, controlled vocabularies were used in LISA and LISS, as well as the “cited by” and “related articles” functions in Google Scholar, to identify relevant publications. Once these searches no longer generated new publications, the list of publications was reviewed to remove items that did not address critical approaches to information literacy or critical information literacy specifically (e.g., articles that focused on critical thinking).

Regarding geographic scope, publications in languages other than English were included to the extent that they appeared in the searches conducted. Other authors have researched and written on critical information literacy and related concepts in other global contexts, which contribute important perspectives beyond this paper’s primarily English-language focus. For example, Cherian et al. (2022) surveyed academic librarians working in the state of Kerala, India, regarding their attitudes toward critical information literacy and critical librarianship, while Santos (2024) reflects on critical information literacy’s evolution and application in the Philippines. Crilly (2024) reviews case studies of critically informed actions in academic libraries that encompasses antiracism and decolonization with an emphasis on the United Kingdom, and Manhique et al. (2023) surveyed Portuguese- and English-language literature on critical information literacy literature up to 2021.

Research

Publication Trends

To provide insight into when and where publications were completed, the year of publication, number of CIL publications by country, and type of publication were calculated. Year of publication (see Figure 1) and type of publication (see Figure 2) were identified

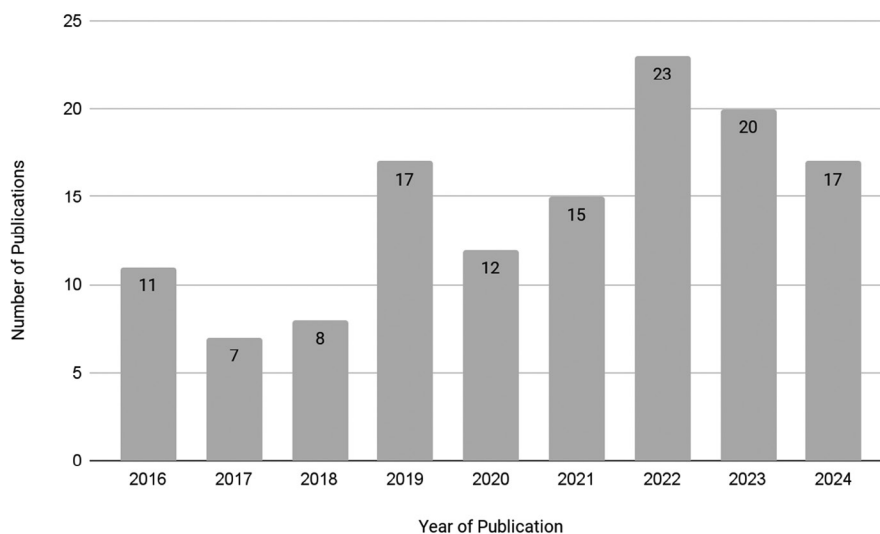


Figure 1. CIL Publications by Year, 2016–2024

FIGURE 2 CIL Publications by Type	
Publication Type	Number of Publications
Journal article	101
Book chapter	11
Conference proceeding	9
Book	4
Thesis/Dissertation	2
Encyclopedia article	1

using citation information, while the publications by country category (see Figure 3) was based on an author’s country of residence using the affiliation noted in the publication. In cases of multiple authors, if all authors of a publication resided in the same country, only one tally was made, whereas if authors were based in different countries, each country was counted once.

In addition to the above summaries, the journals that most frequently published articles on CIL-related topics were identified. A total of 56 distinct journals published at least one article on critical information literacy between 2016 and 2024, and 12 journals published two or more articles related to CIL. A summary of CIL article publications by number of appearances in a given journal is included as Figure 4.

Themes

Thematic areas were developed by reviewing article titles and abstracts in a spreadsheet and then assigning each publication keywords that described its primary topics or focus. This same review was conducted a second time with the dual goals of creating more generalizable themes and consolidating topics (as long as a publication topic remained accurately represented). This resulted in eight thematic areas which, for better conceptual clarity, were grouped under four larger thematic categories that encompassed the subthemes. The identified themes include 1) Conceptualizing and Theorizing; 2) Pedagogy and Teaching Practices; 3) Responding to Contemporary Politics and Technologies; and 4)

FIGURE 3 CIL Publications by Country	
Country	Number of Publications
United States	60
United Kingdom	19
Brazil	14
Canada	13
Croatia	8
Sweden	6
China	3
Spain	3
Nigeria	2
South Africa	2
Finland	1
India	1
Mozambique	1
Philippines	1
Serbia	1

FIGURE 4 CIL Article Publications by Journal	
Journal	Number of Publications
<i>Journal of Information Literacy</i>	15
<i>Communications in Information Literacy</i>	12
<i>Information Research</i>	5
<i>Journal of Documentation</i>	5
<i>In the Library with the Lead Pipe</i>	3
<i>The International Review of Information Ethics</i>	3
<i>Reference Services Review</i>	3
<i>College & Research Libraries</i>	2
<i>Em Questão</i>	2
<i>Journal of Academic Librarianship</i>	2
<i>Journal of Academic Libraries</i>	2
<i>Journal of Librarianship and Information Science</i>	2

FIGURE 5
CIL Literature Themes and Subthemes

Theme	Subtheme
Conceptualizing and Theorizing	
	Considering the Bounds of Critical Information Literacy
	Applying Models Outside of Library Science
	Investigating Information Practices
Pedagogy and Teaching Practices	
	Specific Teaching Practices
	Applications for Scholarly Disciplines
Responding to Contemporary Politics and Technologies	
	Disinformation, Post-Truth, and Democracy
	Emerging Technologies
Critiquing Critical Information Literacy	

Critiquing Critical Information Literacy. A summary of the themes and subthemes is included as Figure 5, and each theme is later explored in more detail.

Conceptualizing and Theorizing

Questions of what constitutes the bounds of (critical) information literacy and associated information practices have been increasingly present in the literature, along with CIL's application to different learning contexts and the adoption of models outside of library and information science that could inform LIS research and practice. A number of researchers have recently studied how information literacy is presented through discourse analysis and related approaches (Bezerra & Beloni, 2019; Johansson & Limberg, 2017; Multas & Hirvonen, 2019; Seale, 2016; Walton & Cleland, 2017), and challenges to its adoption and recognition in present-day information environments (Haider & Sundin, 2022a; Hicks, 2024; Oliphant, 2021; Šobota, 2024; Šobota, 2023), as well as examining its theoretical foundations and contributions (Bezerra, 2021; Flierl & Maybee, 2020; Špiranec, 2018; Webber & Johnston, 2017). Notably, tensions between the “empowerment” that academic information literacy outwardly promises—contrasted with the deficit-oriented approach it often adopts internally—have been made clear by Hicks and Lloyd (2021), while cline and López-McKnight offer a useful decolonial reading of information literacy as a project and product of empire (2024).

Studies that apply models or ways of thinking outside of library science to information literacy represent a second component of the Conceptualizing and Theorizing theme. These represent a wide range of theories, adopted for their conceptual, as well as practical, implications. These works draw upon literacies in other fields, including rhetoric and composition studies (Baer, 2016; Chiewphasa & Sisk, 2022; Doyle, 2019; Johansson, 2023; Kuglitsch, 2018; Pavelić & Špiranec, 2021; Zanin-Yost & Freie, 2020); concepts originating in Greece and Germany (Drabinski, 2017; Elmborg, 2022); Indigenous identity and ways of knowing (Littletree et al., 2023); human geography (Nicholson, 2018); user experience (Hicks et al., 2022); political theory (Cope, 2017); media studies (Tewell, 2017); antiapartheid activism (Schneider & Bastos, 2021); and critical theories including anticolonialism, Black feminist theory, feminism, and

Marxism (Tanus & Gomes, 2024; Moreno, 2023; Doyle & Brisola, 2022; Schneider & Bezerra, 2023).

Research that investigates different populations' information practices as they relate to critical information literacy are also present in the recent literature. This research studies job categories or workers more broadly (e.g., social workers) (Sharun, 2023), or how workers use information in protection of their rights (Šobota & Špiranec, 2022). Others examine how individuals apply critical information literacy to their use of mainstream and social media to combat violence against women (Mudhai et al., 2016); how adolescents critically assess sources and bring infrastructural awareness to digital information environments (Haider & Sundin, 2022b); and the personal dynamics between information literacy and citizenship (Clouesley, 2021).

Pedagogy and Teaching Practices

Many practitioner-researchers are integrating theory with practice by applying critical information literacy to their work, which represents many different areas of focus and interest. The Pedagogy and Teaching Practices theme consists of two subthemes: Specific Teaching Practices, which includes numerous articles and two edited volumes; and Applications for Scholarly Disciplines.

Seeking to share how they, and potentially other library workers, can adopt critical approaches to information literacy, many authors have described using CIL in formal learning settings. These topics include specific subjects and settings that range from using maps to ask questions about how power and control is exerted (Hebert & Laddusaw, 2020; Tranfield, 2019), to teaching online information retrieval using a social justice lens (Sinnamon et al., 2024), with many others sharing sites of inspiration for their teaching as well (Brayton & Casey, 2019; Cai'e & Lifeng, 2022; Campbell, 2023; Fritch, 2018; Steinberg, 2020; McDowell & Vetter, 2022). Collaborations between librarians and teaching faculty represent another area of interest in the literature (Bartow & Mann, 2020; Mecnas et al., 2021; Paterson & Gamtso, 2023; Torrell, 2020), alongside the related topics of outreach and community collaboration (Brewster et al., 2021; Irving, 2020; Smith, 2018). Additional specific teaching practices offered include applying professional frameworks (Bauder & Rod, 2016; Branch, 2019; Mohamed, 2019); possibilities and limitations of CIL in the context of capitalism (Ellenwood, 2020; Espinel & Tewell, 2023); and critical pedagogy in graduate-level library and information science courses (Cooke, 2020; Rapchak, 2021). Other authors critically examine instruction models (Nicholson, 2016; Pho et al., 2022) and the increasing presence of online CIL instruction (Saroza, 2023; Withorn, 2023).

The edited volumes *Critical Library Pedagogy in Practice* (Brookbank & Haigh, 2021), and *Critical Literacy for Information Professionals* (McNicol, 2016) collect chapters on critical information literacy practice and theories in addition to including a wealth of ideas for classroom implementation. Notably, all the mentioned publications represent higher education contexts. Only two publications concerning teaching practices relate to public libraries; these address the topics of encouraging public library workers to adopt CIL pedagogy in their work with people who are incarcerated (Hancock, 2021) and critical public librarianship, especially as it relates to library collections (Garrett, 2020).

Situating critical information literacy in relation to various scholarly disciplines has been a major development in the literature. In an examination of how information literacy has influenced and is adopted by selected fields and disciplines, Hicks et al. found—through

small-scale qualitative mapping—that, “information literacy has been most visibly leveraged into professional fields and disciplines, including in areas where librarians are more commonly working (e.g., higher education and nursing)” (2023, p. 561). Other research has explored critical information literacy praxis specific to business (Stonebraker et al., 2017), criminology (Stockdale, et al., 2022), music history and music (Conor, 2019; Wells et al., 2022), and STEM (del Junco, 2024; Storksdieck, 2016). Critical information literacy has also been applied to specific disciplinary courses, in the cases of engineering (Kastner & Cheng, 2019), legal research (Ward, 2022), public health (Linares-Gray, 2022), neuroscience (Gold & Leininger, 2022), and visual art (Beatty & Hernandez Jr., 2019). Undertaking a study that interviewed academic researchers concerning possibilities for critical information literacy in decolonizing the university, Marsh found that CIL holds potential to “facilitate positionality, practice relationality and consider transitionality,” including “scaffolding a decolonising approach to learners’ navigation of information and processes of knowing” (2022, p. 4).

Responding to Contemporary Politics and Technologies

Critical information literacy offers a means to respond to political changes and technological developments, and to not only raise such issues for discussion but to critically question and challenge them. A considerable number of researchers have considered CIL in relation to its potential for responding to societal challenges, such as combating disinformation, contending with “post-truth” ideologies, and supporting democratic ideals, as well as those which are more technological in nature.

Concerning the subtheme of Disinformation, Post-Truth, and Democracy, critical information literacy has been proposed as an effective means of teaching how to evaluate online sources, especially the proliferation of “fake news,” mis-information, and disinformation (Brisola & Doyle, 2019; Cooke, 2018; O’Hara, 2024; Rajić, 2022; Wendt et al., 2024). Other authors call upon library and information science workers to take up “information activism” in defense of social justice and human rights to more effectively respond to hate speech and disinformation (Cuevas-Cerveró et al. 2023; Martínez-Ávila & Cuevas-Cerveró, 2022) and to adopt “revolutionary information literacy” as a way to contend with capitalist systems that promote disinformation (LaDue, 2024). Other researchers suggest reading clubs that use a CIL foundation to counter the post-truth era (Zubac, 2023) and propose CIL as a teaching strategy uniquely suited to education in a post-pandemic era, both for university students and lessening the digital divide (Liao & Tian, 2022; Figueiredo & Borges, 2021). Critical information literacy’s role in supporting civic engagement, and democracy more broadly, has been explored by researchers from theoretical and civic engagement standpoints (Bonnet et al., 2019; Lawal, 2019; Polizzi, 2020). Most notably, Esmail (2023) surveys the struggle for control over the contemporary information environment, including attacks on libraries that include book bans, censorship challenges, and targeted harassment campaigns, as well as how critical information literacy can be used to spur collective action. Similarly, Bezerra and Schneider’s (2022) edited volume *Critical Information Literacy: Theory, Consciousness and Praxis* collects leading work on critical information literacy research and practice in Brazil.

The second subtheme is Emerging Technology, which researchers view from a variety of perspectives. Researchers have applied critical information literacy concepts to new technologies and ways of finding and creating information, including algorithmic culture and increased reliance on algorithms, especially as related to awareness and agency (Haider &

Sundin, 2021; Lloyd, 2019); data visualization and time-based bias and politics (Johansson & Steglund, 2021); the massive growth in data and data infrastructure (Špiranec, 2019); participatory web environments (Špiranec, 2016); creating a training program for European librarians to address emerging digital challenges (García-Quismondo, 2024); and, most recently, generative artificial intelligence applications (Wang et al., 2024).

Critiquing Critical Information Literacy

Critique of CIL itself represents a fourth thematic area. It is no coincidence that larger systems of domination are present within and reified by critical information literacy, as CIL research has remained a largely White and North American endeavor. It is perhaps not surprising that, while racism and cultural imperialism should be major concerns of CIL, they remain under-discussed and largely unattended to. This preserves the existing power relations that, in principle, CIL seeks to disrupt. Some research has interrogated CIL's contradictions and shortcomings across various lines.

CIL has always recognized the importance of critique as applied to libraries and information systems, but it took over 15 years for considerable critique of CIL itself to emerge. Leung and López-McKnight (2020) have critiqued CIL's inattention to racialized oppression and White supremacy, which have been strikingly underexplored in its theory and practice. Other critiques oriented toward critical librarianship and CIL were published in the same special journal issue reflecting on the volume *Critical Library Instruction: Theories and Methods* (2010). This special issue included Feretti's (2020) consideration of critical library work's failings when extended past the classroom into the workplace and one's relationships with colleagues, as well as Seale's (2020) identification of the institutionalization of critical librarianship and the management of critique that comes with widespread acceptance, leading to depoliticization. Relatedly, Tanus (2022) explores the "social institutionalisation" of progressive and critical librarianship using the existing literature.

A special issue on critical information literacy in the *Journal of Information Literacy* includes a reflection from the editors, which acknowledges a lack of focus on race, as well as an authorship predominantly representing North America and the UK, which are substantial issues present in the critical information literacy literature at large (Smith & Hicks, 2023). Other critiques of CIL include a lack of engagement with racism and critical race theory (Haigh, 2024; Pashia, 2021); underrepresentation of working-class knowledge and information experiences (Flynn et al., 2023); that social justice-oriented teaching can become hypocritical when content and teaching methods are not aligned and lacks critical self-reflection (Vong, 2024); and that pushback from academic faculty, other librarians or administration, and students posed threats to implementing CIL in classroom practice (Williams & Kamper, 2023). Further examinations of labor, power, and critical library pedagogy have been undertaken by Mirza et al. (2023), who suggest that CIL discourses of agency and empowerment inadvertently emphasize individualism instead of collective action, and argue that meaningful recognition of library labor is a key component of any meaningful pedagogy.

CIL Issues and Failings

This review of the literature reveals several prominent interests in critical information literacy research, but what and who is underrepresented or absent from the literature altogether is equally important to consider. Critical information literacy currently lacks attention to certain

essential topics, including race and labor. CIL's lack of focus on race and White supremacy is particularly troubling given library and information science's history and demographics. Inadequate recognition of labor and working conditions as a fundamental aspect of information literacy is another failing. Additionally, the critical information literacy literature consists of a primarily North America-centric representation and thereby is largely informed by Western ways of knowing and engaging with information, as well as a focus on and within higher education settings that greatly limits the possibilities for CIL theory and practice. These concerns have been voiced in the literature and are further explored below.

Race

Racism and White supremacy animate the foundations and ongoing practices of libraries and dominant information systems across the Global North, which makes the absence of attention to race in the CIL literature troubling. This failing is especially concerning in a field which is, in North America, predominantly White, and which must reckon with its past and present complicity in upholding systems of racialized oppression (Espinal et al., 2018). As Ferretti observes, "libraries, like academia, are historically white serving, have been complicit in the white racial project of the United States during the 19th century, and perpetuate the racial inequity in the field today through mechanisms such as unpaid labor" (2020, p. 142). This complicity reflects libraries' histories and embeddedness within American society. While there are numerous examples of resistance to systems of White supremacy, libraries often reflect the dominant paradigm (Selby, 2019; Malone, 2015).

The overall lack of acknowledgment of race in CIL discussions is highly problematic as it signifies such issues are not a primary concern and thus reinforces the underlying ideologies of White supremacy. Another question is what impact would be made if CIL researchers did in fact center and confront racism as demanding urgency and action. While this would represent a necessary corrective in the literature, without action it would still lack material changes. Leung and López-McKnight question such greater narratives of progress, noting that, "progress in the profession is generally defined by a liberal marker of attainment that has no real, concrete impact in the lives of those most marginalized" (2020, p. 14). Writing about critical librarianship in particular, the authors find that in ignoring White supremacy, critical librarianship "mirror[s] the false promises of diversity and inclusion initiatives and advance[s] the reification of White Supremacy" (p. 16). To begin to engage with systems of oppression in information platforms and practices, critical information literacy must meaningfully address White supremacy and the legacies and continued presence of racism in libraries and information literacy.

Labor

The critical information literacy literature also largely fails to meaningfully discuss labor and the material conditions that shape one's engagement with information literacy, whether as a teacher, learner, or both. Ferretti has pointed to this issue, particularly how critical pedagogy has led to changes in information literacy instruction but has not made a dent in library workplaces, including how colleagues continue to uphold existing power relations (2020). In their exploration of labor and critical library instruction, Mirza et al. argue that critical library instruction's "overemphasis on the agency and ability of an abstract charismatic teacher works instead to reinscribe neoliberal logics and white savior narratives in libraries, working

against solidarity and collaboration” (2023, p. 116). cline and López-McKnight also identify this thread of individualism—and the result of critical information literacy and information literacy more broadly—as “acculturating us to the oppressive, extractive, capitalist/colonial systems in which they are enmeshed—even if they are attentive to these structures or have an analysis of power—rather than dismantling them or fundamentally changing the world and how it is configured” (2024, p. 10). Assuming that library instructors already have agency within a classroom or other spheres greatly simplifies existing power relations, recklessly positions educators as “already empowered” and learners as requiring empowerment, and leads directly to the potential for White savior assumptions and narratives (Mirza et al., 2023).

An inattention to labor in the literature also represents a missed opportunity in identifying and making meaningful connections with learners, as well as other workers. In identifying how to address the challenges that capitalism poses to critical information literacy practice, Espinel and Tewell suggest that academic library workers focus on the information economy and scholarly communication systems in their teaching, but also “identify shared issues within their workplaces to organize around, and build coalitions outside libraries to transform what is possible for academic labor and student learning alike” (2023, p. 573). These criticisms of critical information literacy’s shortcomings in changing the workplace, its centering of individualist and overly simplistic narratives of change, and lack of considering opportunities for building shared power among workers are significant and should be addressed moving forward.

Western-Centric

The existing critical information literacy literature is highly influenced by, and often produced using, viewpoints that prioritize Western and Eurocentric perspectives. Lloyd draws attention to this, suggesting that

IL as it is currently presented is an anglicized concept which centralizes power and the construction of authority within a western system, which by virtue accommodates a primarily western-informed view of what constitutes information and knowledge and methodologies which are authorized for teaching and learning (2024, p. 25).

Lloyd offers that acknowledging and coming to terms with this Western-dominant influence is, “the first step to recognizing the bias in our entrenched approaches to IL” (p. 25). Because such worldviews shape the past and present of information literacy research and theory, it is even more important that additional perspectives—including recognizing the fact that learners always bring with them their own information literacy knowledge and practices—are actively involved in CIL theory and practice.

While the existing literature is steeped in Western-centric views and mostly originates from the Global North, a welcomed development is that more researchers from outside of North America are making substantive contributions to CIL conversations, especially those based in Brazil. As CIL grows increasingly examined and applied internationally, it is important to remain attentive to the potentially imperialistic nature of “exporting” critical information literacy with lack of regard for context, as argued by Pilerot and Lindberg in their analysis of international policy documents concerning information literacy (2011). A universal

version of CIL does not and should not exist because it is a situated practice deeply dependent on time, place, and the sociopolitical dynamics that shape who we are and the decisions we make. Instead, the concept and practice of information literacy should be used in the plural, as “information literacies ... invites more than one exclusive interpretation of what it means” (Pilerot & Lindberg, 2011, p. 356). While CIL presently lacks a robust knowledge base outside of Western systems, it is an area that appears to be improving.

Higher Education Focus

An overwhelming number of critical information literacy researchers and practitioners are based in higher education. CIL has a more academic orientation than some other subfields of information literacy, which are often more likely to consider information practices outside of academe and as it occurs in informal learning settings. CIL’s relationship to information literacy more broadly follows a similar trajectory, especially as it relates to higher education; however, it lacks a more expansive view on information literacy’s use and potential. In the review conducted, only two publications concerning teaching practices are not focused on higher education settings: one article encouraging public library workers to adopt CIL pedagogy in their work with people who are incarcerated (Hancock, 2021); and one thesis on critical public librarianship, especially as it relates to library collections (Garrett, 2020).

Writing about critical librarianship, Beilin observes that “the association of critical librarianship with academia carries certain risks, especially the danger that it will exclude many if not all librarians and LIS scholars outside academia who consider themselves ‘critical’ or committed to social justice” (2018, p. 196). CIL would undoubtedly benefit from considering where and how it can be applied outside of academic settings, with particular attention toward its aims of social justice. In the same way that critical information literacy’s Western-centric perspectives are detrimental and limiting, a focus on and within higher education ignores the many ways that CIL can and does occur in the workplace, informal learning, civic engagement, engaging with digital information platforms, and many other places.

Conclusion

Critical information literacy seeks to understand oppression as it occurs within, and is perpetuated by, libraries and information systems; ultimately, it advocated for library workers and learners to intervene in these systems to change them. This review and analysis of the literature indicates that the theory and practice of critical information literacy continue to flourish and expand. CIL has sought to intervene in the dominant information literacy discourse, which is often inattentive to the sociopolitical dimensions of information’s production and use. Much critical information literacy practice occurs through small-scale work efforts, making it difficult to discern what material impact, if any, CIL has had on teaching and learning in libraries. While CIL is often defined in opposition to mainstream information literacy concepts and practices, it can be argued that it has become integrated into this more dominant discourse in considerable ways (Seale, 2020). As the world faces developments such as the international rise of right-wing populism and technologies such as generative AI that pose grave ethical and environmental concerns, CIL itself cannot solve any widespread problems. However, it does hold potential for meaningfully addressing them in teaching and learning settings, especially when a critical lens is applied to present-day information tools and environments (Pho & Tranfield, 2024; Zvyagintseva & Blechinger, 2023).

What are the next steps for critical information literacy? In addition to coming to terms with the issues and failings described above, drawing upon other relevant movements and contemporary theories would represent an important step. To actively work toward causes such as antiracism and antisexism, those who research and practice critical information literacy can learn from activist and social justice movements. It is a significant first step to surface CIL-related issues through scholarship and teaching; however, these efforts often lack the ability to move learning, workplaces, and the field forward in larger ways (Leung, 2022). In this respect, learning the strategies of activists and what it takes to build movements can only benefit library and information workers. To effectively challenge that which is exploitative and unjust, it is essential to organize collectively and build shared power. As Beilin writes, “organizing and resisting the corporatizing and austerity measures of university administrations is a very concrete way to put theory into practice. The struggles for fair contracts and against lockouts and other actions against workers can mobilize critical librarianship into direct action for justice and democracy” (2018, pp. 205–206). Establishing analyses of power closer to home, within workplaces and local communities, is key to realizing CIL’s aims.

Finally, it is important to consider critical information literacy as not static and unchanging, but instead as “a dynamic concept that evolves by accounting for sociopolitical realities” (Šobota, 2024, p. 38). After all, cline and López-McKnight ask, what is the use of critical information literacy, or any literacies, if they do not support and facilitate

the development of critical consciousness, the formation and maintenance of collectivism and solidarity, and the larger abolitionist project of dismantling oppressive systems and institutions that regulate information, and creating new forms of information that are liberatory and communal?” (2024, p. 10).

Critical information literacy is necessarily an ongoing work in progress which, in its current formations, too often reinforces the very systems of racism and eurocentrism it seeks to interrupt. Yet by drawing upon the research done to explore critical information literacy and expand our understandings of information—including whether it is even possible to move information literacy toward a more liberatory future—the best chance for meaningful critical information literacy theory and practice is to take up this work together.

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Student-Taught Coding Workshops in the Academic Library

Tina Li and Catherine R. Barber*

Research data services (RDS) library staff provide essential training for research reproducibility. As demand increases, RDS staff may consider employing students as workshop instructors. This article describes a case study of a pilot project in which an undergraduate student taught library workshops for Python novices. We share the benefits that this instructional format presented in our setting, from the perspectives of the student instructor and the workshop participants. We also offer reflection questions for RDS staff who are contemplating implementing student-taught workshops.

Student-Taught Coding Workshops in the Academic Library

In the past decade, computational research and data science applications have become increasingly prominent within disciplines beyond computer science (Ponsero et al., 2020). This development has been fueled by the emphasis on scientific reproducibility and open research within science, technology, engineering, and medicine (STEM) and social science fields (e.g., National Academies of Sciences, Engineering, and Medicine, 2019), as well as the emergence of cross-disciplinary fields, such as digital humanities. Concurrently, the use of technology to accomplish research data-related tasks such as curation, analysis, visualization, and sharing has become a prevalent focus of academic library instruction (Kang & Sinn, 2024; Sapa, 2024).

In response to the need for specialized support in this area, many colleges and universities have established research data services (RDS), broadly defined as “services that address the full data lifecycle” (Tenopir et al., 2013, p. 70). Libraries are the most common providers of RDS within academic settings (Radecki & Springer, 2022), and academic librarians generally view RDS as important (Rachlin, 2022; Tenopir et al., 2019). An emerging trend within RDS is the provision of workshops on coding in an open-source language (e.g., Python or R), as well as deeper dives into programming applications (e.g., Oliver et al., 2019). Depending on available resources, libraries may employ data librarians, other academic librarians, library support staff, or even students with programming expertise to teach such workshops, particularly as demand for RDS outpaces supply (Fuhr, 2022).

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The impetus for our case study was a similar supply versus demand challenge within our setting, Fondren Library at Rice University. Our patrons consistently expressed interest in Python-related workshops, and we were aware of the broad popularity of Python instruction at other university libraries (Kang & Sinn, 2024). However, at the time of the study, the library's Data Services Specialist, Catherine Barber, was a Python novice. To address this gap, the library sponsored a pilot project in which an undergraduate student with advanced Python skills, Tina Li, was recruited and trained to teach Python workshops under Barber's mentorship. Although student instructors had previously taught coding workshops at Fondren, there had been no prior effort to systematically evaluate student-taught workshops. In this article, we describe the benefits and challenges that the student instructor and participants experienced, and we highlight considerations for librarians and other library staff as they contemplate employing undergraduate students as RDS instructors.

Literature Review

Research Data Services Workshops

Several studies have demonstrated positive effects of RDS workshops in academic libraries. LaPolla and colleagues (2021) found that RDS workshop participants frequently used what they had learned in the workshops, which contributed to greater work efficiency. Similarly, Staudt Willet and Rosenberg (2023) reported beneficial outcomes of two educational data science workshops. Participants' confidence in working with data and their perceived ability to overcome getting stuck increased from pre- to postworkshop.

To develop workshops on foundational coding and data science skills, many libraries have used an evidence-based curriculum developed by The Carpentries organization (<https://carpentries.org>). Carpentries workshops employ recommended practices for teaching programming at an introductory level, including participatory live coding in a syntactically simple language, with frequent opportunities for practice and feedback (Brown & Wilson, 2018; Scherer et al., 2020). In a mixed methods study assessing the impact of Carpentries programming workshops on the computational reproducibility of biomedical research, Deardorff (2020) conducted in-depth interviews and quantitative assessments with 14 biomedical researchers before and after participation. Although the results did not show a statistically significant difference in quantitative skills, the qualitative interviews revealed high levels of post-workshop programming literacy and an interest in further training (Deardorff, 2020).

In contrast, Feldon and colleagues (2017) found no significant advantages of short-format programs in terms of graduate students' research skill development, scholarly productivity, or socialization, despite the participants reporting high levels of satisfaction and perceived value from these programs. This incongruity between perceived value and empirical outcomes prompted the authors to question the value of short-format learning experiences and to emphasize the importance of longitudinal and performance-based outcome assessments.

Feldon et al.'s (2017) critique of short-format workshops echoes some of the concerns raised about library one-shot instruction more generally (e.g., Cook, 2022). For example, limited instructional time and minimal opportunities to receive ongoing feedback during practice may hamper learners' long-term retention of content. Nonetheless, short-format workshops offer some advantages: From a learner's perspective, such workshops are often free and convenient, while for librarians, workshops are often more efficient than individual consultations.

Student Instructors in RDS

The strong demand for RDS and relative shortage of data librarians (Cox et al., 2019) prompt the question of whether RDS departments should hire knowledgeable students to provide services. Academic libraries have a long history of employing students (Benjamin & McDevitt, 2018), and recent scholarship has called for creating more experiential learning opportunities for student library workers (Everett & Bischoff, 2021). One promising experiential learning strategy is near-peer teaching, in which more experienced students teach their peers. Learners perceive near-peer teachers to be well-suited for roles such as facilitator, information provider, and role model (Bulte et al., 2007). Furthermore, near-peers can be effective in teaching coding and programming skills. For instance, Pon-Barry et al. (2017) trained near-peer mentors to conduct peer code review and feedback sessions in an introductory computer science course. Both near-peer mentors and learners reported substantial benefits, with learners citing improvements in their confidence and understanding and instructors expressing enthusiasm for their experience with the program.

A common theme in the near-peer literature is that students require support to develop confidence and competence in their teaching skills (Irvine et al., 2018). When they are well-prepared, student instructors' work produces positive outcomes and is viewed favorably by learners. Tips for preparing students to engage in near-peer teaching include providing information about how to teach, giving opportunities to ask experts questions prior to teaching, and receiving observation and feedback from expert teachers (Bulte et al., 2007).

Method

Research Question and Design

Following Coates et al.'s (2018) recommendation to center RDS evaluation on a "well-defined question" (p. 4), our case study began with this question: "What are the benefits and challenges presented by student-taught workshops for learners new to coding in Python?" The case study design adopted elements of McNiff and Whitehead's (2011) action research cycle, an iterative process of action, evaluation, and reflection. Actions included training the student instructor and developing and implementing the workshops. Evaluation entailed exploring the benefits and challenges of the workshops through multiple lenses, while reflection involved synthesizing the results and offering considerations for other RDS staff.

We used a convergent mixed methods approach, in which qualitative and quantitative strands are conducted concurrently. In this approach, the resulting data are triangulated and synthesized to obtain a deeper understanding of the research phenomena (Creswell & Plano Clark, 2017). The study was deemed exempt from review by the Rice University Institutional Review Board. The time frame for the study was October 2023 through March 2024. Relevant project materials can be accessed through the Rice Research Repository (<https://doi.org/10.25611/VQ8C-XY19>).

Student Instructor Training and Workshop Development

A central aspect of the student instructor's preparation was a comprehensive review of the literature on effective teaching strategies. Literature on live coding, paired programming, and near-peer teaching was integrated to create an instructional framework. In addition, training involved guidance on teaching key programming concepts, informed by the Carpentries curriculum and by Barber's (i.e., the mentor's) experience with teaching similar workshops

in R. Other library staff members with knowledge of Python were available for consultation, though such consultation ultimately was not used because of Li's (i.e., the student instructor's) proficiency in Python.

We chose Python for its widespread popularity, relevance to the job market, simplicity, and readability, which makes it particularly conducive to beginners with limited programming experience (Koulouri et al., 2014). The workshop curriculum was inspired by introductory computer science courses at Rice University and incorporated topics such as the print function; object types such as integers, floats, strings, and Booleans; manipulation of variables; fundamental arithmetic and comparison operations; and the principles of writing and utilizing functions. These concepts were chosen for clarity, accessibility, and practical relevance to equip participants with a solid understanding of fundamentals.

Developing and preparing the workshops required three months of weekly meetings and approximately 50 hours of independent work by Li. A pivotal preparatory step occurred one week before the first workshop: Li fully rehearsed the workshop while Barber acted as an attendee. Barber timed the rehearsal and posed questions that might come up, from the perspective of a Python novice. Rehearsing provided an opportunity to review workshop material, fine-tune teaching techniques, and calibrate the pacing of the sessions. Moreover, the rehearsal served as a platform for Li to refine explanations of intricate concepts and strategize responses to potential participant inquiries, thereby contributing to overall instructional preparedness and efficacy. Ongoing discussion and feedback before and after each workshop allowed us to debrief and identify small improvements, while ensuring a consistent learning experience across workshops.

Implementation

Digital flyers and social media posts announced two free introductory Python workshops sponsored by the library. Sixty-six people registered, and 39 people (59%) attended a workshop. Learners included university staff (44%), undergraduate students (31%), graduate students (21%), and faculty or guests (4%). A wide range of disciplines was represented, including biosciences, business, other natural sciences, psychology, and statistics. No prior experience with coding in any language was required to attend the workshops. Most learners reported that their goal for the workshop was to gain an introduction to Python.

Each workshop occurred on a mid-week evening in January of 2024, lasted two hours, and was taught in-person in a computer lab within the library. The format of workshop sessions was a combination of lecture-style explanations with participatory live coding demonstrations (Nederbragt et al., 2020). Li welcomed learners and provided an overview of the agenda. Barber then described the research and provided instructions for participating. Consistent with Sufi et al.'s (2018) recommendation to implement direct measures of learning outcomes in workshop evaluations, we used preworkshop and postworkshop quizzes, which comprised identical sets of eight multiple-choice items. Following the pre-quiz, Li introduced Google Colab (<https://colab.research.google.com/>) as the platform for coding and presented highlights of Python as a programming language.

Most of the workshop entailed teaching a series of topics through participatory live coding. Li explained each topic, demonstrated the code associated with the topic, and walked through additional examples of the topic. Using their own devices or the lab computers, learners coded along with Li. At the end of each topic segment, Li presented a practice exercise, which learners

worked through individually, in pairs, or in small groups before the student instructor discussed the answers with the entire group. Finally, we distributed the post-quiz worksheets, which learners had five minutes to complete. To avoid participants simply memorizing the correct answers, Li did not review the pre-quiz or provide answers to quiz items during the workshop. However, we provided participants with an answer key via a post-workshop email to facilitate self-assessment and further reinforce learning.

A Google Forms survey was available online via QR code at the end of each workshop session. Learners also received a link to the survey URL in a post-workshop email. Similar to procedures used in related research (e.g., Staudt Willet & Rosenberg, 2023), we adapted five items from the Carpentries post-workshop survey (Jordan et al., 2018), including comfort with learning and ability to apply learning; instructor knowledge and ability to answer questions; and instructional methods. Response options were on a five-point Likert-type scale ranging from “Strongly disagree” to “Strongly agree.” In addition, we included two open-ended items from the Carpentries survey (Jordan et al., 2018): “Please describe the major strengths of this workshop,” and “Please describe any ways the workshop could be improved.”

Evaluation Strategy

To evaluate the project, we drew upon three data sources: student instructor reflection, workshop participants’ survey responses, and workshop quizzes. Li wrote observational notes during the workshop development and implementation phases. These notes covered Li’s experience of teaching the workshop and lessons learned. Shortly after teaching both workshops, Li reviewed her notes and wrote a first-person narrative of her reflections.

In addition, we obtained consent from 14 workshop participants (36% of learners) to use their quiz and survey data. Data organization was carried out before data analysis to safeguard participants’ anonymity. Using unique participant codes, we matched survey responses with quiz scores. After removing the codes from the dataset and replacing them with numeric codes, we destroyed the link between the codes. For each Likert-type survey item, we calculated the percentage of the sample who endorsed a particular response. We also collaboratively identified themes across responses to the open-ended survey items.

We analyzed quiz data from participants who completed both the pre-quiz and the post-quiz ($n = 10$). Although the results cannot be generalized to other contexts, we have included the quiz analysis to demonstrate one method for evaluating student-taught workshops. We calculated the mean and standard deviation of total pre- and post-quiz scores and the percentages of participants who answered each quiz item correctly. We then compared the percentages of participants who improved, worsened, or experienced no change in total scores from pre- to post-quiz. Finally, we calculated a measure of effect size (Cohen’s d), which provided a standardized measure of participants’ average change from pre- to post-quiz.

After analyzing the qualitative and quantitative data, we merged the findings to obtain a deeper understanding of benefits and challenges within our setting (Fetters et al., 2013). Merging involved reviewing the findings from each data source and extracting points of commonality and contrast to address the broader research question. To support our findings’ trustworthiness, we aligned our research design with our research goal; strove for fidelity within the data collection and data analysis procedures; and enhanced the utility of our case study by linking our findings to broader considerations for RDS staff (Levitt et al., 2021).

Results

Li's Reflection as Student Instructor

As the workshop developer and instructor, my perspectives were shaped by my background as an undergraduate student in statistics and data science, a programmer proficient in object-oriented languages like R and Python, and as a researcher passionate about data literacy. My programming skills were developed through coursework, research projects, and internships, particularly those focused on data analysis and statistical modeling. While I didn't learn new technical content through this workshop series, this experience taught me about pedagogy, preparation, and interpersonal dynamics, especially through the lens of being a student instructor teaching fellow students.

One of the more unique aspects of this experience was navigating my dual identity as both a peer and an instructor. On one hand, I found that my status as a fellow student helped me relate more easily to participants. I had a better understanding of what it is like to struggle with new material, and I could anticipate points of confusion based on my own learning experiences. I used that awareness to develop lecture materials and exercises that were both accessible and appropriately challenging. During the design phase, I enjoyed returning to the fundamentals of coding and reframing them through a beginner's lens. Creating practice problems that encouraged critical thinking and active engagement was tough but rewarding.

However, being a student instructor also had challenges. I worried that participants might not take me as seriously because of my age or perceived lack of authority. While most participants were respectful and engaged, there were moments when a few spoke over me or expressed irritation in ways that tested my confidence. These moments made me more aware of the balance between being approachable and maintaining authority. As the workshops progressed, I learned to respond with a mix of empathy and firmness, and I recognized that frustration with the material and not with me personally was often the root cause.

The support I received from the library staff consisted of access to instructional materials and the freedom to shape the sessions based on what I thought would best serve the learners. That said, my mentor, Barber, did not have significant experience in Python, which added a layer of pressure during preparation. Knowing that I was the main point of expertise on the topic meant that I had to be particularly thorough in anticipating questions and structuring material in a clear, intuitive way. While that was challenging, it also gave me a sense of ownership and pride in the final product.

In terms of delivery, I learned a lot about instructional presence and classroom management. I incorporated humor into the workshops to reflect my personality and build a friendly, low-pressure environment. On a particularly cold day, I joked about setting the "temperature" variable to -100, which got some laughs and lightened the mood. Seeing participants nod along as I explained concepts gave me a confidence boost and helped me feel connected to the group. Still, I recognized areas for improvement. I spoke too quickly at the beginning of the first workshop due to nerves, and I occasionally found it difficult to project my voice clearly. These are things I'm now more mindful of and plan to improve in future teaching roles.

Overall, teaching these workshops was a very meaningful experience. It pushed me to grow not just as a programmer or educator, but also as a communicator and leader. I am proud of what I accomplished and look forward to building on this experience and continuing to support data literacy in academic spaces.

Participants' Perceptions of the Workshops

Three themes emerged from participants' responses to the open-ended survey items: instructor behaviors, workshop content, and instructional strategies. Within each of these themes, we identified strengths and areas for improvement.

Instructor behaviors that facilitated learning included Li's knowledge of the content and the clarity with which she presented it. For example, one participant shared, "I think the instructor did a great job explaining the concepts and providing examples/exceptions." Another participant stated, "The instructor was able to discuss the topic clearly and stop for people who needed extra explanations or more time to compute." In addition, participants commented on Li's "availability" and "relatability." One participant also commended Li on the "friendly atmosphere."

The main aspect of instructor behavior that needed improvement was the amount of time spent on topics. However, some participants wanted more explanation and others less. For example, some participants stated, "[Be] more concise on each topic so everything in the agenda could be discussed in 2 hours," and "From my experience level it felt a bit slow." In contrast, others felt that it was "rushed" and commented, "Wish it was a longer workshop since it would leave room for all the questions," and "I went in with zero background in computer science or coding and felt a little lost at times, like I was trying to catch up to the lesson."

Regarding the workshop content, participants indicated that it was a good introduction to Python and that they liked the mix of lectures and practice exercises. They were generally satisfied with the scope of content; however, this varied somewhat based on participants' level of coding knowledge. For example, one participant appreciated the "Good basic definitions," and another shared, "Loved how I was able to learn the basics of Python. We got to learn how the basic [sic] of it all worked and what we needed to know for just starting off." In contrast, those with more experience felt that they would have preferred more sophisticated content. For instance, one participant stated, "I have coding background in R and Julia so I think I would have benefitted [sic] more from an intermediate workshop or one geared toward those with coding experience but not Python specific experience." Another participant noted, "The IF THEN ELSE construct is an integral part of coding and was not able to be discussed as we ran out of time."

Instructional strategies included the methods used to teach the content. Several participants reported that the practice exercises were a strength of the workshops. One participant reported liking the quizzes, and another noted the utility of Google Colab as a user-friendly integrated development environment: "I really liked using the Google coding platform to make it easy to practice without navigating software." Suggestions for improvements included facilitating "more active participation between the people in the class" through "discussion," and spending less time typing comments on the code during the workshop. Two participants also requested a "handout" or "reference sheet" as a learning aid.

The themes from participants' responses to the open-ended items mapped onto their responses to the Likert-type items; complete results are presented in Table 1. In terms of instructor behavior, participants were overwhelmingly positive: Over 90% of participants agreed or strongly agreed with all the items. Furthermore, there was strong agreement about comfort with the workshop, the clarity of the instructor's answers, and the instructor's level of knowledge. Slightly more mixed were participants' perceptions of their own ability to apply what they had learned and of the efficacy of teaching methods; nonetheless, none of the participants disagreed with any of the survey items.

TABLE 1
Participants' (n = 14) Responses to Survey Items

Survey Item	Strongly Agree	Agree	Neutral
I felt comfortable learning in this workshop.	79%	21%	0%
I can immediately apply what I learned at this workshop.	43%	50%	7%
I was able to get clear answers to my questions from the instructor.	86%	7%	7%
The instructor was knowledgeable about the material being taught.	86%	14%	0%
The instructional methods helped me to learn the coding skills being taught.	64%	29%	7%

Note. No participants endorsed Disagree or Strongly Disagree for any item.

Participants' Learning

Based on the pre-quiz scores, many participants in our sample had some prior knowledge of either Python specifically or of programming more generally, as pre-quiz scores ranged from two to six out of eight possible points. Despite this, 90% of participants increased their quiz score by at least one point; the remaining 10% (one participant) experienced no change from pre to post. Average quiz scores increased from pre ($M = 4.4$, $SD = 1.2$; 55% correct) to post ($M = 6.6$, $SD = 1.1$; 83% correct), Cohen's $d = 1.95$, which was a large change. This finding was consistent with participants' self-assessment of their own learning on relevant survey items.

Synthesis

Both the student instructor's and the participants' responses were overwhelmingly positive. Training and mentorship strengthened the student instructor's confidence and helped her to discover her unique teaching style, which participants experienced as knowledgeable, relatable, and clear. Participants felt comfortable in the casual setting and appreciated the instructional methods, such as practice exercises and active learning. Participants also felt the workshop provided a good introduction to Python and taught them skills they could apply. In the short term, average recall of workshop concepts increased by almost two standard deviations.

However, participants were mixed in their satisfaction with the pace and scope of the workshop. We did not gather information about learners' prior knowledge before the workshop, which made it impossible to tailor the workshop to their learning needs. Furthermore, it was challenging for Li to cover all the planned material with a heterogeneous audience. She also experienced some challenges with establishing her authority as an instructor, particularly given the unexpected circumstance that she was not a near-peer to most of the audience, which heavily skewed toward university staff and graduate students.

Discussion

Our case study suggests that the workshops were beneficial to both the participants and the student instructor. Li's empathy for participants and ability to draw upon her own experience as a learner appeared to contribute to participants' positive feedback on the instructor and the learning environment. Participants generally agreed that they would be able to apply what they learned, which aligns with previous studies indicating improvements in workshop participants' confidence and perceived ability (Deardorff, 2020; Staudt Willet & Rosenberg, 2023). Furthermore, Li enjoyed the process and felt that it supported her

professional development. Because this was a pilot project that involved one iteration with a very small sample in a single location, the specific results are unlikely to generalize to other settings. However, the process of developing, implementing, evaluating, and reflecting on these workshops highlighted benefits and challenges that may be of broad interest, particularly to RDS staff. With this in mind, we offer reflection questions for library staff as they consider implementing student-taught coding workshops.

Reflection Questions for Library Staff

1. *Will there be sufficient time and mentorship for instructor training?* Mentorship and training helped Li feel comfortable and confident about teaching, which is consistent with Irvine et al.'s (2018) finding that in-depth training strongly contributes to student instructors' confidence and competence. The specific amount of time required depends on the student, context, and workshop content, but a three-month preparation period was beneficial in our setting. Within the training and implementation phase, essential components included rehearsal, debriefing, and ongoing feedback.
2. *What support is available for evidence-based teaching practices, particularly active learning?* In our case study, participants reported that the student instructor's active approach benefited their learning, which was further supported by the substantial increase in participants' knowledge of Python concepts from pre to post. This is consistent with Berssanette and de Francisco's (2021) finding that active learning contributes to better outcomes in computer science education. Active learning strategies in the workshops included participatory live coding with a user-friendly platform, worked examples, and practice opportunities, all of which are recommended in the literature on teaching coding (e.g., Brown & Wilson, 2018). Seeking support from the institution's teaching and learning center may facilitate this aspect.
3. *Does the library have mechanisms for pre-workshop communication with participants to understand what they already know about programming and to clarify their learning goals?* As in previous studies (e.g., Medeiros et al., 2019), the diversity of participants' prior programming experience was the biggest challenge of the workshops. Teaching programming to a group of learners who have varying levels of pre-existing knowledge benefits from a tailored approach (Mohamed, 2022), which is not always possible in a short-format workshop. In our case study, participant heterogeneity appears to have been a drawback; some participants suggested that the workshops were too introductory, while others wished that the workshops were longer and slower paced to allow for more questions. Being able to communicate with participants ahead of time about their background knowledge and expectations would have provided valuable guidance on how to tailor instruction.
4. *Is it feasible to chunk workshop content into smaller segments and hold a workshop series, rather than a single session, to ensure sufficient coverage of each topic?* Li found it challenging to cover the planned material in a reasonable time frame. For practical purposes, each workshop was two hours; however, this was insufficient time to teach all the concepts while still allowing space for questions and practice. Creating audience-specific workshops and reducing the amount of content within each workshop may help. One participant alluded to this idea, stating, "it will be nice if they can offer ... a level 1, 1.5, 2 and so forth to learn more ... Python and what it is

used to create ... [and] we can see a finished product.” This feedback is consistent with Oliver et al.’s (2019) approach of offering an introduction to a programming language followed by specific applications.

5. *Will an RDS staff member mentor the student instructor on issues such as classroom management and navigating the teaching role as a near-peer versus non-peer?* De Menezes and Premnath (2016) have suggested that cognitive and social congruence between learners and teachers contributes to the success of near-peer teaching. Li was not a near-peer, relative to most participants’ age or academic level; nevertheless, social congruence can be inferred from participants’ descriptions of Li as “sincere,” “relatable,” and “friendly.” In short, Li’s student status did not appear to detract from the perceived value of the workshop. However, although Li intuitively navigated occasional participant disruptions with empathy and patience, she felt that it would have been helpful to have anticipated points of potential friction and to have brainstormed solutions during the rehearsal. Furthermore, preparing to teach an audience with a wider range of experiences and roles would have been helpful. These strategies may support a student instructor’s ability to build and maintain rapport with all participants.

Future Directions

The use of a mixed methods case study design inspired by key elements of the action research cycle had several benefits. It provided a richer understanding of the student instructor’s and participants’ experiences (Creswell & Plano Clark, 2017). It also adopted recommendations from previous workshop research by including a short quiz as a direct measure of learning (Sufi et al., 2018). Furthermore, embedding the data collection process within the workshop enhanced the project’s ecological validity (Fahmie et al., 2023). These design choices contributed to a realistic evaluation of the workshop within our context and setting.

However, many of these design choices sharply limited the generalization of findings to other contexts and settings. Chief among the limiting factors were the small convenience sample, a single student instructor, the lack of longer-term assessment of learning, and the absence of a control group. Nonetheless, the case study allowed us to explore the feasibility of student-taught coding workshops in our library and to understand the challenges that such workshops might pose. Future studies may explore workshops designed for more targeted audiences to understand the unique needs of learners at each level and to identify appropriate instructional strategies. Larger longitudinal studies of student-taught workshops could shed light on the degree to which participants retain the knowledge they have gained. Furthermore, follow-up interviews with participants could determine whether the workshop prompted them to obtain additional programming training or apply the material to their own research or programming projects.

Conclusion

Our case study demonstrated that student-taught coding workshops offered both benefits and challenges to the student instructor and participants in our library. Student-taught workshops may be a viable solution to staffing needs; however, this decision may rest on each library’s unique context. By conducting action research-informed case studies such as the one we described in this article, academic librarians and other RDS staff will be well-positioned to implement, evaluate, and reflect on student-taught workshops within their own settings.

Author Note

This study was supported by the Fondren Fellows Program at Rice University's Fondren Library. We also acknowledge the Center for Teaching Excellence at Rice University for providing resources on evidence-based practices. We are grateful to Todd Ferguson, Tom McCabe, Lisa Spiro, and Carissa Zimmerman for consulting on implementation and write-up. We have no conflicts of interest to disclose.

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The State of Critical Indigenous Studies Liaison Librarianship: A Landscape Analysis

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This study examines the overlapping presence of Critical Indigenous Studies (CIS) programs and CIS liaison librarians at large, research-oriented colleges and universities in the United States and Canada. This landscape analysis investigates current trends in academic libraries' support, vis-à-vis liaison librarianship, of Critical Indigenous Studies programs, as well as Indigenous library patrons. Initial findings suggest that while an increasing number of North American colleges and universities are establishing CIS programs, library support in the form of liaison librarianship lags behind. The article concludes with large-scale policy questions and recommendations for academic libraries.

Introduction

The modern field of Critical Indigenous Studies (CIS) emerged from the Indigenous activism of the 1960s, holding its first conference at Princeton in 1970. CIS scholars rejected the supposed objectivity of other academic disciplines, especially those historically (and currently) involved in the colonial work of studying and teaching about Indigenous populations, which these disciplines defined as “The Other,” for the benefit of the colonizer. Instead, CIS scholarship centers Indigenous Knowledge (IK), belief systems, and leadership (Cook-Lynn, 1997). CIS programs were not and are not academically isolated but are instead actively involved in the “preservation and development” of Native cultures (Morris, 1986).

This emergence of such a new, inherently interdisciplinary field—one that departs radically from traditional academic epistemologies and research practices—posed, and remains, a challenge for libraries. The field requires approaches to collection development, instruction, and outreach informed by Indigenous practices and epistemologies. Liaison and subject specialty librarianship is the main way many libraries support the research and teaching of faculty and students in particular disciplines. In this model, librarians typically have an assigned set of liaison departments with which they build relationships while developing knowledge of these subjects' unique library needs. In the best cases, liaison librarians build trusting relationships, teach discipline specific information literacy, and develop targeted collections for

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students and faculty in their subject areas. In this landscape analysis, we survey the state of CIS programs and library support at major colleges and universities, guided by the following questions: Where and in what kinds of universities are CIS programs found? Which libraries have risen to the challenge posed by CIS programs by supporting them with librarians who have subject matter expertise?

Literature Review

In the last 25 years, many college and university libraries followed broader academic movements by calling first for multiculturalism and diversity, as well as principles of inclusion, equitable access, and decolonization (Alexander, 2013; Gosart, 2021). Many libraries align this work within their universities' umbrella policies to support specific demographics such as Indigenous, Black/African American, and Asian American and Pacific Islander student populations, (Roy et al., 2021; Haykal & Crabtree, 2021; Bucy, 2022; Hare & Abbott, 2015; Stieglitz, 2020). Academic libraries often lend their support to historically marginalized populations through liaison librarianship programs and collection development policies.

Liaison librarianship generally focuses on "engagement, collection work, research support, teaching and learning, [and] scholarly communications," as well as data management and bibliometrics (Arendt & Peacemaker, 2023). There is not, however, a "single set of services" that is universally understood as fundamental liaison responsibilities (Arendt & Peacemaker, 2023), particularly for those librarians' whose subject areas include comparatively new disciplines or area studies. Librarians who are responsible for supporting area or cultural studies centers and departments must consistently consider "the implications of supporting research that transcends boundaries between individual countries, disciplines, and languages" (Pitman, 2015). For the purposes of this research, area and cultural studies is defined as the multidisciplinary study of specific regions of the world and the cultural communities associated with or inhabit them (Pitman, 2015). Examples of these types of programs in U.S. colleges and universities include but are not limited to Critical Indigenous Studies; African and African American Studies; Latinx and Chicano Studies; Jewish and Judaica Studies.

Liaison librarianship is often defined by the building of relationships with faculty and students. The literature consistently stresses the value of this relationship building and interaction as core to evolving services to meet changing user needs (Kuchi, 2022; Ochola & Jones, 2001; Rodwell & Fairbairn, 2008; Thull & Hansen, 2009). Kuchi compares liaison services favorably to other more transactional library services; liaisons "support, empower, enhance, collaborate" (2022). After the University of Arizona reorganized away from having assigned liaisons, the library lost connections with students and faculty (Elliott et al., 2013). Through a labor-intensive study they were able to gather faculty needs; however, the university was unable to offer a substitute for liaison-built relationships with faculty and students. A range of studies have found that faculty value liaison librarian services (Cooke et al., 2011; Mozenter et al., 2000; Tennant et al., 2006; Yang, 2000). Arendt and Lotts conducted a survey of liaisons and their faculty to match perceptions. In their study, faculty who knew they had a liaison were 10% more likely to be satisfied with the library compared to faculty who weren't sure if they had a liaison. The survey also assessed how valuable faculty found different types of liaison services, including collection development, communication about the library, and library instruction among many others. It found that large majorities of faculty valued almost

all services offered by liaisons. For example, 75% of faculty thought in-class library instruction to be very important or important, and 70% of faculty found integration of information literacy into the curriculum to be important (Arendt & Lotts, 2012).

The literature demonstrates that liaisons' collaborative relationship building creates effective two-way communication, allowing libraries to more effectively understand and support the needs of their users, as well as informing teaching faculty about the services and resources of the library. Trust and relationship-building may be especially important for students and faculty of color (Patterson Silver Wolf et al., 2019). Becks' interviews of faculty of color found that many of their research areas were not well covered by library collections and that instead they had built personal collections and workarounds to be able to conduct their research (2023). Before these interviews, their needs had been unidentified and unmet. Thus faculty, and especially faculty of color, working in areas without an assigned liaison are likely to be underserved by their library, especially in libraries that otherwise operate through a liaison model. In addition, such faculty may not be aware that they are being underserved due to lack of communication and education around what the library can offer.

Librarians serving area and cultural studies departments and disciplines must not only successfully carry out general liaison responsibilities, as mentioned, but also establish a baseline of trust and mutual understanding between the scholarly community and the university libraries (Pitman, 2015). For many librarians working with historically marginalized patrons and fields of study, there are decades—if not centuries—of mistrust from historic policies of colonization and segregation, in both access and collection development (Bucy, 2022; Hare & Abbott, 2015; Stieglitz, 2020; Dudley & Blackbird, 2021; Pun et al., 2021).

Liaison librarians working with Indigenous populations and Indigenous Studies programs have a unique opportunity to shape the “academic library as a partner of Indigenous communities, rather than uncritically reinforcing and reproducing the values of the dominant society” (Dudley & Blackbird, 2021). Indigenous liaisons have addressed libraries' historical complicity in colonization and reframed their libraries' relationships with Indigenous communities in several key ways including enhancing access to library collections; creating library research guides highlighting Indigenous resources within collections; correcting harmful and inaccurate cataloging terminology; reorganizing Indigenous Knowledge (IK) within existing collections to better reflect Indigenous ways of knowing; collaborating with Indigenous students to provide resources and support tailored to their needs; ensuring that representations of Indigenous people in libraries are respectful, accurate, and accessible; and training library staff to provide culturally competent service and support (Pun et al., 2021; Dudley & Blackbird, 2021; Bucy, 2022; Hare & Abbott, 2015; Stieglitz, 2020).

Notably, most of these endeavors have been implemented (to varying degrees of success) and assessed by libraries and librarians in Canadian, Australian, and New Zealand institutions, in part due to national legislation surrounding Indigenous advocacy and reconciliation efforts (Gosart, 2021; Dudley & Blackbird, 2021; Bucy, 2022; Hare & Abbott, 2015; Stieglitz, 2020). Further, Indigenous librarianship, which “examines how the cultural practices, empirical conditions, and political aspirations of Indigenous communities shape the notion of knowledge, and the practices of knowledge organization and management,” offers a path forward for all librarians to “foster procedures and norms to guide responsible and respectful care for materials with Indigenous content that are preserved outside of Indigenous communities” (Gosart, 2021).

Methodology

Data Collection

To address the guiding questions for this survey, key pieces of data were identified as necessary to the information we were seeking to quantify: the presence of liaison librarianship programs; specific CIS liaison librarians; and academic CIS programs or departments. We examined the college and university websites that listed degree programs—as well as majors, minors, concentrations, and certificate programs—to identify the type of CIS curriculum available to students. We then assessed the corresponding libraries' web pages for lists of liaison librarians and their supporting subject areas. Following the collection of these data points, we then collected key demographic details for each institution including enrollment size, geographic location, private or public distinction, and level of degrees granted. Again, these data points were collected using the information on each institution's website. The dataset for this study is openly available (Randall, 2024).

School Selection

The colleges and universities included in this assessment were selected because of their institutional affiliation with one or more of the following organizations: the Association of Research Libraries (ARL); the Colorado Association of Research Libraries (CARL); the Canadian Association of Research Libraries (CARL/ABRC); Research I Institutions (RI); the Association of American Universities (AAU); and the National Collegiate Athletic Association Division I Football Bowl Subdivision (Division I-A).

These organizations were selected because the participating colleges and universities represent U.S. and Canadian institutions of higher learning with extensive research and degree programs; libraries with research and scholarship focus; and diverse student populations and geographic locations. Additionally, CARL was selected to assess regional institutions; to provide broader context for the authors' home institution; and to study a wider variety of institution types beyond research-intensive institutions, such as community colleges, small liberal arts schools, STEM-focused institutions, and regional universities.

Traditionally, conference-level analysis of peer and partner institutions is appropriate to ascertain trends among regional or interrelated colleges and universities. Moreover, many NCAA conferences have corresponding academic partnerships that result in established standards for cooperative collecting and research policies for the libraries at those institutions.

The NCAA conference of the authors' home institution was dissolved in 2023, and the former participants joined multiple other conferences. Moreover, as multiple Division I-A Conferences were fundamentally restructured in the 2023–2024 academic year, it became apparent that a more comprehensive assessment of Division I-A institutions would be necessary for this survey, which is why all Division I-A conferences were included.

It should be noted that Tribally Controlled College and Universities (TCCU) and Native American-Serving Non-Tribal Institutions (NASNTI) were not included in this round of analysis. These institutions, alongside other Minority Serving Institutions (MSI), will be discussed in a subsequent evaluation.

In short, the institutions included in this study represent a comprehensive selection of research-intensive U.S. and Canadian colleges and universities and their libraries. As a result, there are a total of 234 unique institutions included in this survey.

CIS Programs

Much like the various terminology used to describe the role of liaison librarians, academic institutions use a remarkable variety of terms to describe the multidisciplinary programs of study related to CIS, such as Native American, American Indian, Indigenous, First Nations, Aboriginal, Métis, as well as distinct nations, tribes, and communities. For the purposes of this study, we have elected to use the term Critical Indigenous Studies (CIS) to describe the college and university programs in this assessment. We recognize that a single term neither encapsulates all aspects of the programs in this discipline nor the diversity of these populations. However, the term Critical Indigenous Studies (CIS) effectively conveys the distinct nature of this multidisciplinary area of study.

Further, we define CIS programs as distinct areas of academic study that provide a combination of required and elective courses, as well as related extracurricular and programmatic activities, and that are organized for the achievement of specific learning outcomes related to the multidisciplinary understanding of Native American, American Indian, Indigenous, First Nations, Aboriginal, and Métis people, as well as distinct nations, tribes, and communities. Similar to area and cultural studies, as mentioned in the literature review, CIS programs are inherently interdisciplinary or multidisciplinary programs as they incorporate not only the study of these historic and contemporary cultural communities, but also their ways of knowing and knowledge systems, and the impact of colonization and legal discrimination into their programmatic learning outcomes.

These programs may culminate in a variety of ways including, but not limited to, undergraduate and graduate degrees, degree concentrations or areas of focus, minors, certificates, and honors. Moreover, several different disciplines, such as anthropology, history, and interdisciplinary/independent studies, offer degree concentrations in CIS and CIS-related topics. As these disciplines provide specific CIS learning outcomes and curricular opportunities (as indicated by their universities' websites), they were included in the survey as CIS programs. Given the relative naissance of CIS programs and this area of study, we included these disciplinary CIS programs because their learning outcomes and roles within their respective institutional settings appear to serve parallel academic functions, even if they may not offer the same communal support for Indigenous students. Those institutions with nonacademic programs that offered only CIS-focused extracurricular activities and support were not counted as CIS programs in this survey.

Liaison Librarians

While these librarians are identified by different terms and titles at their respective home institutions, for the purposes of this study, we are using the term *liaison librarian*. As mentioned in the literature review, responsibilities and services carried about by liaison librarians vary across institutions; however, they serve a distinct function within academic libraries.

For this assessment, "subject specialists," "liaison librarians," and librarians who were identified by their institutions' websites as providing a specific, disciplinary or subject-based expertise were counted as liaisons. For the purposes of this research, those liaisons who are indicated by their libraries' websites as providing subject matter expertise, research and collection development services, outreach and engagement, teaching and learning, and additional scholarly resources for Native American, American Indian, Indigenous, First Nations, Métis, and distinct nations, tribes, and communities were identified as CIS liaison librarians.

Moreover, many liaison librarians support multiple disciplines and subject areas; we have included those liaisons in this study, alongside their peers who only support one area, to ensure all CIS liaisons are counted. Positions that could conceivably include CIS (e.g., a generic area studies librarian) but that did not explicitly call out this work were not included in the count without additional evidence (e.g., a research guide) that the librarian provided these services.

Limitations

We recognize that the quality of support provided by liaisons and their degree of subject expertise in CIS may vary significantly, especially at libraries where liaisons have many assigned disciplines. With this in mind, we understand our results as evidence of libraries that have recognized a need to support CIS programs and students, and not as a qualitative indication of the presence of high-quality, focused, and expert liaison library services in this area. The study does not account for positions that may have been vacant or unfilled during the period under study—although this likely would have marginal effect on the results—because in many cases, an interim would be assigned to the subject area and posted to the library's website, in which case they would be considered to have a liaison.

Conversely, if a position remained vacant without an interim for an extended time, we feel the classification of “no liaison” is appropriate. This study also misses liaisons who are not listed on the library's website; however, as this kind of liaisonship is usually focused on more internal departmental communication to the library, rather than student support and subject expertise, we argue that this kind of service is not the focus of this study. Additionally, of the libraries studied, only a few do not offer services through some version of a liaison model (5.6%). The study is focused on major research institutions and therefore the predominance of liaison models is not generalizable to all colleges and universities due to the size and resources available to these institutions. The inclusion of CARL, however, provides an array of academic institutions beyond research-intensive institutions, including small liberal arts schools, community colleges, and STEM-focused institutions, and may therefore provide a sense of the situation in a wider variety of schools.

The data presented here represents a snapshot of the landscape of CIS liaison librarian services as of 2024. It does not reflect changes in government priorities and funding resulting from the 2025 U.S. federal transition. Importantly, it captures information that has subsequently been deleted or obscured by institutions due to U.S. executive orders and state laws targeting diversity and inclusion work.

Results

Figure 1 presents the current landscape of CIS programs and CIS library liaisons in the United States and Canada at major research institutions. Institutions are mapped at the location of their main campus. Circles are color coded by the presence of CIS programs and CIS liaisons, illustrating where CIS programs can be found, as well as which libraries support these programs with a liaison librarian. To present a full picture of schools with CIS programs, this map includes the 13 schools in the dataset whose libraries do not provide services via a liaison model, categorized as not offering a CIS liaison. In the subsequent analyses, these schools are omitted to provide a fairer assessment of library services for CIS programs. The overall numbers for institutions in this study can be found in Table 1.

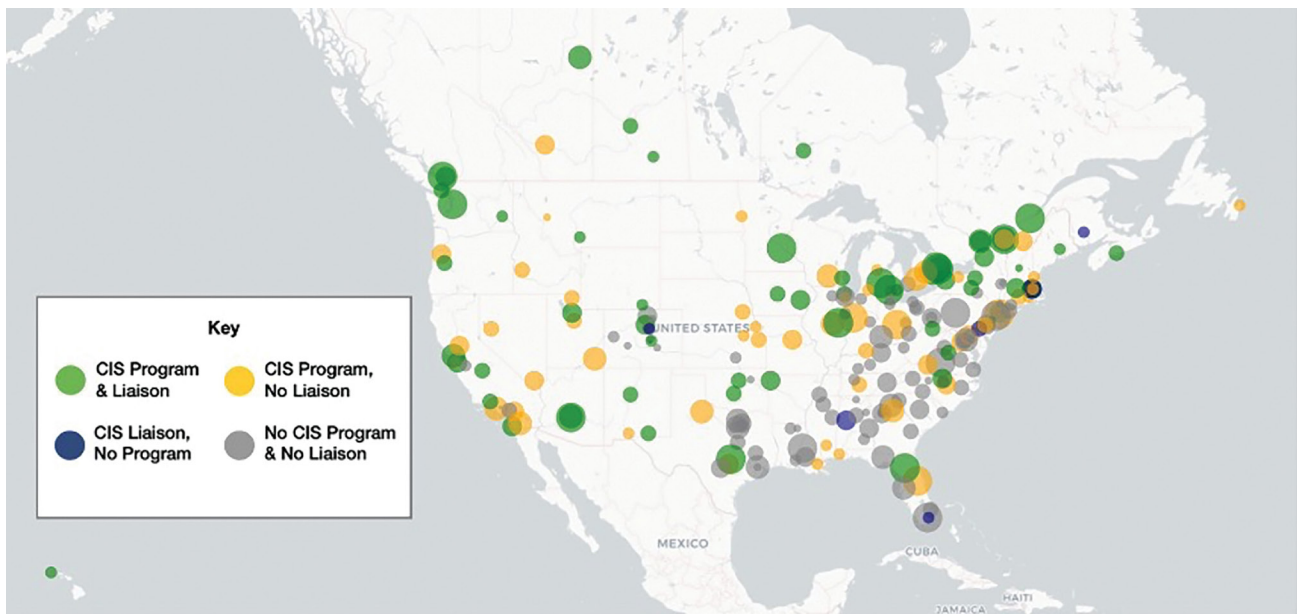


Figure 1. Library Support for Critical Indigenous Studies Program in the United States and Canada by Student Population

TABLE 1 Overall Institution Data			
Institutions by CIS and Liaison Program Status	Number of Institutions (Percentages by Subcategory)		
Institutions with CIS Programs	126 (54%)		
No Liaison Program	➡	5 (4%)	
Liaison Program	➡	121 (96%)	
CIS Liaison		➡	65 (52%)
No CIS Liaison		➡	56 (48%)
Institutions Without CIS Programs	108 (46%)		
No Liaison Program	➡	8 (7%)	
Liaison Program	➡	100 (93%)	
CIS Liaison		➡	8 (8%)
No CIS Liaison		➡	92 (92%)

As seen in Figure 2, the presence of a CIS program or degree varied between 49% and 69% in the U.S. organizations under study. The Canadian universities were a clear outlier, with nearly all studied universities having a CIS program. Almost all major university libraries had some kind of liaison or subject specialist program, with percentages consistently above 95%; the only exception was CARL, a Colorado specific organization with a mix of small and large institutions. CIS liaison librarians were concentrated in institutions with a CIS program but consistently lagged behind the number of overall CIS programs that exist. Once again, Canadian universities were significantly ahead of their U.S. counterparts. Interestingly, CARL

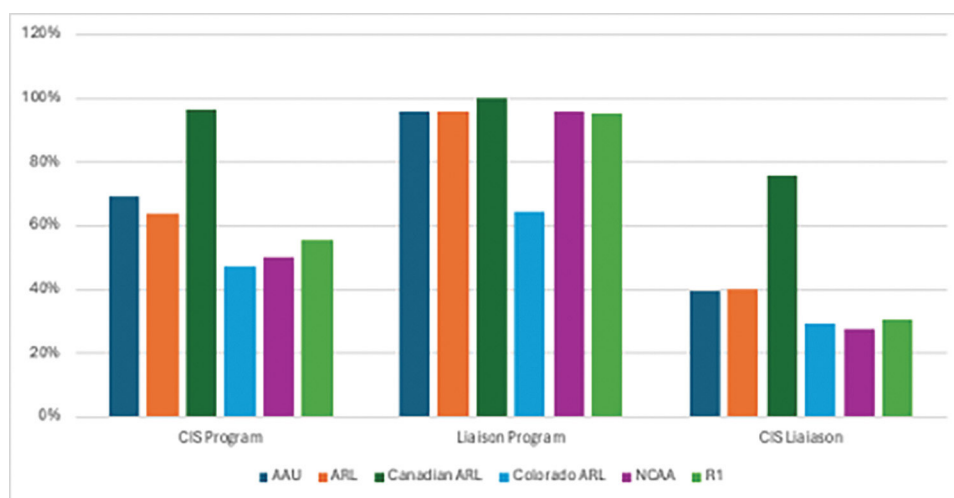


Figure 2. Presence of Critical Indigenous Studies Resources

libraries, despite having a much lower percentage of schools with liaison librarian programs, had a similar rate of CIS librarians compared to other organizations with much higher rates of liaison programs. This suggests that, while CARL libraries are less likely to have liaison programs, when these universities do have such programs, they are much more likely to include a CIS librarian.

Figure 3 illustrates the distribution of schools that either have no CIS program, have a CIS program but do not have a CIS liaison librarian, or have a CIS program and do have a CIS liaison librarian. It shows that, except for those institutions in the Canadian ARL, the percentage of schools with both a CIS program and a CIS librarian remain the minority, hovering between 26% and 39%. The NCAA, R1, and CARL specifically, lag behind regarding the presence of a CIS program. Colorado ARL libraries have a much smaller instance of CIS programs without corresponding library support.

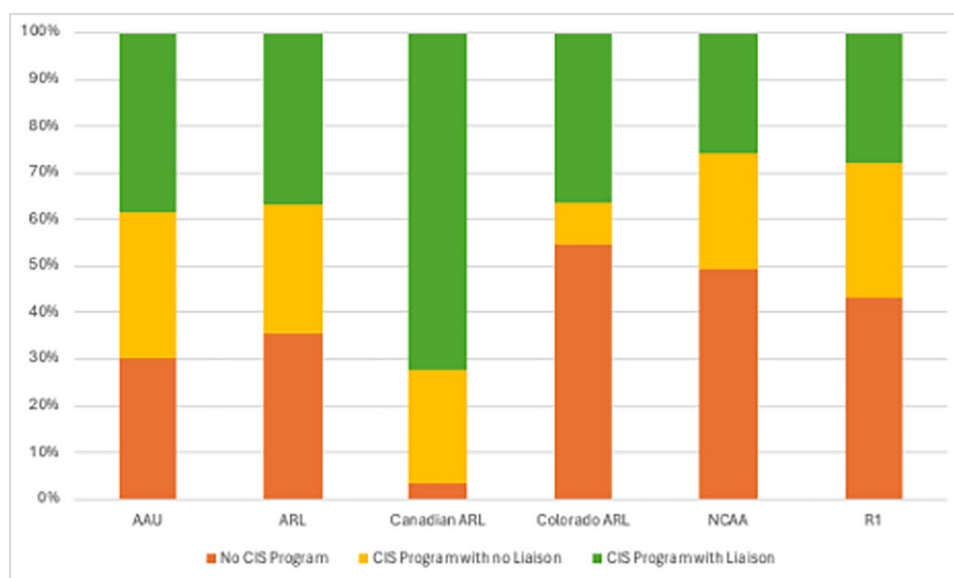


Figure 3. CIS Program and Liaisons by Institutional Affiliation

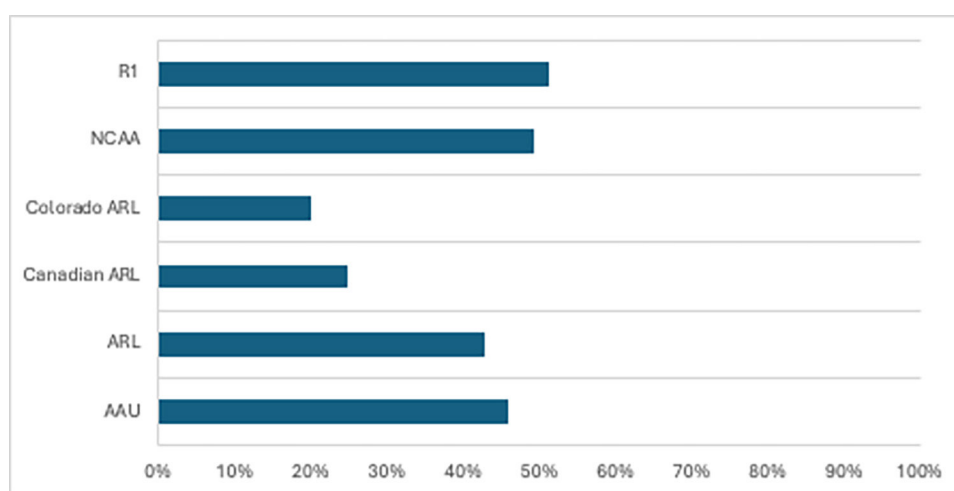


Figure 4. Percentage of Schools with a CIS Program That Do Not Have a CIS Liaison

As Figure 4 clearly shows, of the institutions whose libraries operate with a liaison model, roughly half of all CIS programs in the U.S. lack a liaison librarian who would provide specialized outreach, collection building, instruction, or research assistance. In the Canadian schools present, only 25% of CIS programs lack a liaison. Meanwhile up to 51% of Carnegie Research Intensive universities have a CIS program that has no publicly assigned liaison librarian. Of the 11 member institutions of Colorado ARL (CARL), six operate without a liaison model and were omitted from analysis. Of the remaining five, only 20% (one library) did not have a liaison supporting CIS programs publicly listed.

While this is admittedly a small selection of institutions, there is more variety in student enrollment size present in the CARL institutions, unlike the other groupings of institutions listed in this analysis. We believe this demographic variety directly correlates to the types of services offered by the corresponding libraries, specifically the choice to operate with or without liaison models. While student enrollment might affect decisions to operate in a liaison model, CARL institutions are still successful at offering liaison support for the CIS programs. Drawing definitive conclusions regarding any possible correlation between student enrollment, liaison models and CIS programs is the topic for a later investigation. Of the U.S. schools affiliated with groups that have more member institutions, ARL libraries have the fewest CIS programs that lack a liaison at 43%, perhaps reflecting the increased investment in libraries required to be an ARL member (although this percentage is still high).

Discussion

Does Size Matter?

As seen in the figures above, the sizes of the colleges and universities included in this landscape analysis range from very small to very large institutions. Although the selection of institutions included in this survey is not a comprehensive sample with generalizable conclusions, we were surprised to discover that institutional size does not appear to be as significant a determinant of CIS programs and liaisons as originally expected. This result could reflect institutional selection, given the fact that, of 234 colleges and universities included in this survey, 72% have a population of more than 15,000 students and are overwhelmingly focused on research and

scholarly output. More data from smaller institutions is necessary to conclude that size is not a significant factor in the presence of a CIS librarian.

Additionally, libraries that support academic institutions of all sizes have liaison librarianship programs, even as differences among liaison expectations and responsibilities vary from institution to institution. The frequency of liaison programs appears to illustrate the significance of this function, particularly in research-focused libraries, even as academic librarians across the profession debate the future of this kind of work.

These observations raise the question: How do smaller institutions and their libraries compare? Do colleges and universities with lower student enrollment have CIS programs, and do their respective libraries have liaison programs with CIS liaisons? Smaller institutions may not have the same level of resources and funding to put toward research and scholarly output as their larger peers; however, that is not necessarily an indicator of the presence of CIS programs or CIS library liaisons.

Geographic Trends

As mentioned previously, academic institutions of all sizes across the U.S. have CIS programs. These schools, however, are disproportionately located in the Western region of the country, in states such as Montana, Idaho, Wyoming, Utah, Colorado, New Mexico, Arizona, Nevada, Washington, Oregon, California, and Hawaii. We hypothesize that these institutions established and supported CIS programs due to the historic and contemporary presence of Indigenous populations in this geographic region.

The density of CIS programs in this region is particularly noticeable in comparison to institutions in other regions of the United States (e.g., the Midwest, South, and Northeast). While these Western institutions appear to be addressing their historic relationships with regional Indigenous communities, Indigenous people have called every region of North America, or Turtle Island, their home. Therefore, why have colleges and universities in the Midwest, South, and Northeast not followed suit and reconciled their colonial pasts with their Indigenous neighbors to the same extent as their Western peers? Has the legacy of forced displacement made the Indigenous peoples of these regions less visible and therefore easier to ignore?

Moreover, the Canadian institutions included in this survey stand in contrast to the colleges and universities of the United States, with 97% of Canadian institutions supporting CIS programs. As mentioned in the earlier sections of this article, Canadian institutions are legally bound by the Truth and Reconciliation legislation to recognize and address their complicity in settler colonialism, in part by supporting CIS programs. However, much like the previous discussion of size, most of these Canadian schools are large, public institutions with a focus on research and scholarly output.

The presence of CIS programs is not necessarily proof that colleges and universities are showing up for their Indigenous communities earnestly or are genuinely investing in their Indigenous neighbors. And, conversely, schools without CIS programs may be supporting Indigenous students and local tribal communities in other ways. As this is not a qualitative study, we cannot answer these questions. This is, however, an opportunity to assess how many major research institutions and their corresponding libraries are supporting the Indigenous communities local to them through the presence of CIS programs and library liaisons.

Implications for Libraries

Only 28% of the institutions of higher learning assessed in this survey have both CIS programs and CIS liaisons in their respective libraries. That only a minority of colleges and universities libraries, 73 in total, provide a CIS liaison librarian is disappointing. What makes this observation particularly unsatisfactory is that 54% of colleges and universities (126 institutions) have established CIS programs, but only 52% of these programs are supported with a liaison librarian (see Table 1). These institutions have seemingly recognized the significance of supporting the Indigenous people, tribes, and nations who intersect with their academic and campus communities. Moreover, libraries at institutions which have both CIS programs and CIS liaisons could incorporate foundational tenets of Indigenous librarianship into their institutional practices of librarianship through liaison work. By providing support and resources for Indigenous people and Indigenous Knowledge (IK), these libraries could provide culturally safe spaces, provide resources for tribal communities, and support Indigenous scholarship and the instruction of IK across disciplines.

The number of CIS programs at major universities without an assigned subject specialist librarian is highly concerning, especially considering the prevalence of liaison librarian programs. We speculate that one reason for a lack of CIS liaisons is that these units are often positioned more precariously and/or less officially within academic institutions; they are often formed as centers, programs, certificates, etc., rather than as a true department or major. This may lead to libraries underserving CIS due to reasons they may believe are neutral (e.g., they only provide liaisons to departments); however, in reality, this reflects the systemic oppression represented by the under-recognition and precarious positioning of marginalized knowledge in the academy. Instead of reinforcing this oppression, libraries should be attentive to historical imbalances in support and resources and should work to rectify long standing disparities regarding which disciplines and areas of study are supported by the library and which are not. The impact of libraries underserving CIS programs affects collection building, cataloging, research assistance, and outreach. All these areas have challenges and needs unique to CIS librarianship; yet without a specialist to both conduct this work and advocate for these needs, they are highly likely to go unmet.

CIS faculty are likely to need research materials that have been under-collected by libraries due to the domination of Whiteness in the libraries, academia, and publishing (Rybin Koob et al., 2022). Indeed, it takes dedicated work and attention to shift the library's collection to reflect the needs of CIS scholars. Without a liaison librarian, CIS faculty may see a library that doesn't collect in their research area and assume the library isn't and wouldn't support their research. They may be reluctant to approach the library to request that their needs be met due to a lack of institutional trust, dismissals of requests by other librarians, or simply because they assume the library has no interest in building such collections (Becks, 2023). Building trust and opening lines of communication between the library and CIS scholars is an essential part of the work of a CIS librarian. Because CIS scholars are less likely to get their research needs met than scholars of other disciplines without a specialist, the low number of CIS liaison librarians is especially concerning.

Students who study Indigenous topics are less likely to receive instruction that acknowledges the authority of Indigenous Knowledge, that recognizes Indigenous research methods, or that is sensitive to the oppression and exploitation of Indigenous people by researchers and research (Archibald et al., 2019; Lambert, 2014; Tuhiwai-Smith, 2023; Watkins, 2017; Watkins

& Randall, 2024). Library users may be more likely to find offensive and inaccurate cataloging describing Indigenous identities. Researchers will not be able to receive expert research assistance from a specialist librarian. Users may be reluctant to use the library, are likely to suffer from library anxiety, and/or may not receive the necessary outreach that welcomes them into the library and increases their chances for success. These are just a few examples of CIS librarians' work and of how CIS faculty and students are likely to be underserved by libraries that lack a specialist.

While this study focuses on the connection between CIS liaisons and CIS programs to highlight underserved library users, having a CIS program is not a prerequisite for having a CIS librarian. Indeed, the eight libraries in the sample who had a CIS liaison, but no CIS program are to be commended. While Critical Indigenous Studies is a specific academic discipline, Indigenous Knowledge (IK)—information and knowledge from traditional Indigenous ways of knowing—crosses all disciplines. IK forms an important part of knowledge in a wide range of disciplines including medicine, forestry, art, history, environmental science, and sustainability, among many others. Incorporating IK into library collections is an essential part of building an inclusive collection, one that is not exclusively dominated by a monocultural Western way of knowing. Bringing IK into a library collection, especially in a way that is respectful and nonexploitative, is difficult to do without a subject librarian with a background and understanding of Indigenous ways of knowing. Most universities have an Indigenous faculty and student population who, regardless of discipline, should see their traditional knowledge systems valued and respected by the library.

This landscape analysis demonstrates how large, research-oriented colleges and universities are seemingly moving in a direction that values a diversity of perspectives and knowledge vis-à-vis the presence and support of CIS programs. Moreover, it shows how academic libraries have not kept pace with this movement, as evidenced by the disproportionately low number of CIS liaisons across colleges and universities. Academic libraries play a critical role within their campus communities. They have a responsibility to provide appropriate and equitable resources and services to all their patrons, but most especially to those patrons who have been historically underserved by libraries in the past and whose needs are different from those of settler students and faculty.

Conclusion

Institutions across higher education have been forced to recognize their complicity in historic and ongoing policies that reaffirm White supremacy through discriminatory practices, particularly in the last several years. Many colleges and universities have used this opportunity to establish cultural centers, faculty lines, and other funding packages for areas like Indigenous Studies, Asian, Asian American and Pacific Islander Studies, and Black, African American and Africana Studies. Academic libraries should follow suit by providing these programs with liaison librarians, collection development policies, and programming for these and similar cultural areas of study, especially in light of recent White-supremacist attacks on DEI curricula and initiatives.

Academic libraries have the opportunity to take initiatives centered on diversity, equity, and inclusion to the next level by incorporating principles of decolonization and intersectionality. By increasing their connections with CIS programs within their respective institutions, libraries can collaborate with faculty, staff, and students to ensure that they are reflected in

the libraries' resources, collections, and services. These relationships will take time, however, as institutional legacies of colonization, objectification, and racism are not quickly or easily overcome. But if librarians can build on their existing work to move toward a shared goal of equitable access and toward addressing historic failures within libraries, then perhaps CIS programs and Indigenous members of campus will no longer be as underserved as they have been by academic libraries.

What would it take to see more CIS liaisons in North American college and university libraries? Based on the number of CIS programs and CIS liaisons in their libraries, Canadian schools appear to heed the initiatives laid out by the Truth and Reconciliation Commission to educate their students about the history of colonization. Is this kind of legislation the only way for the United States to catch up to their Canadian peers? Libraries are working with limited resources and must make difficult decisions about where to place their personnel resources. We argue that, even without legislation, correcting historical imbalances and providing equitable resources to underserved communities must be a priority for libraries, which means prioritizing positions such as CIS librarians.

Significant questions remain around the state of CIS librarianship. How do smaller institutions compare to the larger ones present in this study? How might library resources differ between Minority Serving Institutions (MSI) and Predominantly White Institutions (PWI)? How have executive orders and state laws targeting diversity and inclusion affected support for CIS in libraries? These questions are the target of our ongoing research, and we hope to address them in future publications. These questions are also key to understanding larger trends in academic libraries' support for Critical Indigenous Studies as a discipline, as well as the Indigenous students, staff, and faculty who navigate higher education and its legacy of colonization.

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Big Deal Cancellations and Scholarly Publishing: Insights from Faculty and Graduate Student Interviews

Madelaine Hare, Philippe Mongeon, Samuel Cassady, and Catherine Johnson*

Big Deal cancellations are increasingly undertaken by academic librarians faced with rising subscription costs and shrinking collections budgets. While past research has focused on librarians' decision-making processes and communication strategies, this study aims to understand the perspectives and experiences of faculty and graduate students with Big Deal cancellations through interviews at three medium-sized Canadian institutions. It considers cancellations as a collaborative process of information exchange, rather than a top-down process. This study's findings can inform how cancellation projects might be undertaken with enhanced understandings of their lived realities of Big Deals and the current state of scholarly publishing.

Introduction

The term “Big Deals” was coined by Kenneth Frazier after electronic journal (e-journal) packages emerged in the mid-1990s (2001). Catalyzed by the rise of digital publishing, commercial publishers offered academic libraries the option to purchase subscriptions to bundles of journals under multi-year contracts, seemingly as a pragmatic cost-saving measure that would expand their collections faster than individual purchasing would allow (Mongeon et al., 2021). Big Deals also facilitated the enhanced efficiency of electronic resource management by reducing the number of licenses and access platforms managed by librarians (Glasser, 2013). Many libraries across the globe took advantage of the availability of Big Deals, while others opted to continue purchasing journal subscriptions à la carte (Bergstrom et al., 2014). Libraries that did opt into these licensing agreements were confronted in the following years with rising

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subscription costs that exceeded annual library purchasing budgets, prompting the need to cancel these Big Deals in the name of financial survival (CARL, 2016; Hoeve, 2019).

The cancellation, or “unbundling,” of Big Deals are usually not clearly delineated activities involving the simple termination or nonrenewal of a subscription contract. It is a complex process often triggered by strained budgets requiring cost-cutting measures (Ivanov et al., 2020). Librarians will usually weigh the value of journals (typically predicated on diverse measures of usage) against their cost (Jurczyk & Jacobs, 2014; Botero et al., 2008; Lemley & Li, 2015). This process is generally complex and lengthy, involving data-driven decision-making supplemented by qualitative insights from faculty as to what resources they find most necessary in their research and teaching (Enoch & Harker, 2015; Hardy et al., 2016; Gagnon, 2017; Hoeve, 2019; McLean & Ladd, 2021; Ambi et al., 2016). Librarians will often work in conjunction with senior library or institutional administration who govern the process or have the final say on journal cuts. Librarians undertake strategic communications related to journal cancellations at the library either throughout or after the decision-making process, often leveraging the knowledge of liaison librarians and their relationships with faculty to communicate tactfully and effectively (Johnson & Cassady, 2024; McLean et al., 2021).

Journal subscriptions and cancellation projects exist in the context of the current scholarly publishing system. New developments—such as read-and-publish deals and open access models—both factor into how academics navigate the academic publishing space and influence their understanding and acceptance of Big Deal cancellations. It has been found that faculty and graduate students are highly interested in scholarly publishing but are lacking in knowledge, particularly about subscription and publishing costs (Owens & Manolovitz, 2021; Schiavo, 2024; Welhouse & Boock, 2023). Levels of awareness of, and knowledge about, scholarly publishing influence faculty and graduate students’ publishing behaviours, as well as their perception of and reactions toward cancellation projects (Lusk et al., 2023; Webber & Wiegand, 2022).

Cancellation projects occurring at higher education institutions in the past decade have generated varied reactions from faculty and students. Cuts at the University of Ottawa in 2016, for example, elicited concerns related to researchers’ ability to effectively undertake their work and the reputation of the institution (Mills, 2016). Journal cancellations at Memorial University of Newfoundland also generated apprehensions about graduate students’ capacity to complete their research, as well as speculation about how losses in access to resources might impact the recruitment of future students (Howells, 2015). At the University of Calgary, faculty’s shock resulted in panic around the cancellations; however, the administration both conveyed the cuts as a correct step toward purchasing resources that singularly and purposefully address faculty interests, and emphasized alternative access modes (Strasser, 2017). McLean et al. (2021) note that communications campaigns to faculty and students can make crucial differences in how cancellation reviews and decisions are understood and supported. Indeed, responses often parallel the campus community’s awareness of challenges in scholarly publishing and their economic implications for academic libraries (Olsson et al., 2020).

Research Objectives

In the past two decades, librarians, as service-oriented practitioners, have concerned themselves with how best to consult faculty and students in cancellation decisions, educate them about the need for and process of cancellations, and deliver messaging in tactical ways that both inform and assure faculty that their academic activities will not be adversely affected by

cancellations (McLean et al., 2021). This exploratory study aims to provide a nuanced understanding of faculty and graduate students' awareness, knowledge, perceptions, and experiences related to scholarly publishing and Big Deal cancellation projects at their respective institutions. It considers Big Deal cancellations as a collaborative process of information exchange, rather than a top-down process. This investigation is part of a larger project (Johnson & Cassady, 2024; Cassady et al., 2025) examining Big Deal cancellation processes at Canadian universities.

Methods

Data Collection and Processing

Recruitment

Data were collected through semi-structured interviews in English or French with six university faculty and seven PhD students (some who also work as lecturers or part-time faculty) at three medium-sized Canadian universities between 2020 and 2022 (see Table 1). Faculty and graduate students were invited to participate in interviews through email.

TABLE 1 Interviewee Summary			
University	Interviewed faculty members	Interviewed PhD students	n
Lyra U	2	3	5
Orion U	1	1	2
Andromeda U	3	3	6
N	6	7	13

The names of higher education institutions and interview participants have been anonymized, and all publisher names have been omitted. Note that participant codenames indicate their affiliation (first letter: L, O, or A) and role (F represents a faculty member, and G a graduate student), for example: participant L3G is a graduate student at Lyra U.

Interviews

Faculty members and graduate students (PhDs) who consented to participate in our study and have their audio recorded engaged in 30-minute to one-hour interviews over Zoom. Two to four members of the research team conducted the interviews (see Appendix A). Recordings were transcribed using the online transcription service Scribie (<https://scribie.com/>). Six interviews were transcribed by French-speaking research assistants. Three of these were transcribed into English by research assistants, and three were translated into English by DeepL software (<https://www.deepl.com/en/translator>), then checked for accuracy by the French-speaking research assistants.

Data Analysis

Codebook Development and Coding Process

Interviews were coded by at least two members of the research team in Excel. A codebook was developed through close reading of transcripts and in conversation with the research team. Recurring patterns were consolidated for consistency until consensus was reached on nine broad themes: Participant; Knowledge of Journal Crisis; Access; Connection to Library;

Cancellation Project; Determining Journal Value; Cost; Open Access; and Current Publishing Model. These nine themes encompass 39 sub-themes (Appendix B), which were used to code transcripts.

Thematic Analysis

Thematic analysis of the coded data was conducted to identify recurrent topics and concepts discussed by interview participants (Urquhart et al., 2010). Clarke and Braun (2016) explain the utility of thematic analysis for “experiential research which seeks to understand what participants think, feel, and do,” and which can be used for inductive analysis on small, heterogeneous datasets, capturing both manifest and latent meaning (p. 297). This analysis provides a nuanced understanding of the awareness, knowledge, perception, and experiences of faculty and graduate students with Big Deal cancellations at their institution.

Statistical Summary

A descriptive statistical summary of the responses by each participant for each theme was generated using R Statistical Software (v4.2.1; R Core Team 2022) and is presented in Table 2. It shows the respondent occurrences for each theme (one for each interview participant), showing that all participants refer to every theme. Access had the highest average response rate per participant, followed by Determining Journal Value and Current Publishing Model. Interestingly, Access, Current Publishing Model, and Determining Journal Value had the highest standard deviation (SD), meaning some participants were likely to mention them at high rates and others very low. This is indicated through the minimum and maximum responses, which show that Access has the highest SD; it was mentioned 30 times by one interviewee but only four by another. The lower response rate and low SD of Cost, Open Access, and Knowledge of Journal Crisis suggests that participants either consider these themes less important or possess less awareness or knowledge about them.

TABLE 2 Statistical Summary of Responses to Each Code									
Code	N	M	SD	Var	min	q1	median	q3	max
Access	13	14.769	8.852	78.359	4	9	11	21	30
Determining Journal Value	13	11.000	4.983	24.833	4	7	10	15	21
Current Publishing Model	13	10.769	4.106	16.859	6	8	10	13	20
Connection to Library	13	9.615	4.350	18.923	5	6	10	11	20
Cancellation Project	13	8.308	4.733	22.397	2	5	8	10	20
Cost	13	7.538	4.352	18.936	2	4	8	10	15
Open Access	13	5.231	2.713	7.359	1	4	5	6	10
Knowledge of Journal Crisis	13	4.385	3.280	10.756	0	2	4	6	12
Participant	13	3.462	3.126	9.769	1	1	3	5	12

Note. The Participant theme (comprising the sub-themes Position, Department or Faculty, Years of Experience, and Area of Research) was used to identify the personal characteristics of interviewees and provide context to coded responses. While not presented in this analysis to protect the privacy of participants, this data aided with the interpretation of responses for each theme.

Findings

The statistical summary of the results of interview data illustrates at a high level the main themes that participants engaged with. Findings are organized in sections by each of the nine

broader themes and are contextualized with participant responses to provide granular insights, illustrating faculty and students' perceptions of and experiences with each one. The most illuminating and representative responses were purposefully selected to reflect strong patterns in the data and to highlight either common opinion or divergence from it (Lingard, 2019).

Knowledge of Journal Crisis

Awareness and Knowledge of the Journal Crisis

Faculty and graduate students were asked about their knowledge of the lucrative business models prevalent in academic publishing, an important context for understanding the necessity and implications of Big Deal cancellations. Interviewee knowledge ranged from minimal understanding: "I must confess that I have no idea how much it costs to access a journal. So, I have no idea what is at stake here" (A5G), to general understanding:

I know that it costs a fortune and that the big publishing houses are very voracious and that they have an extremely profitable business model where we work for them for free and then after that they turn around and charge ridiculous prices to libraries (A4G).

A few participants were able to distinguish between individual and bundle subscriptions but were uncertain of how they worked (L1F; L2F; L5G). Some reported no knowledge about the issue, noting it was not on their radar (L4G).

Some faculty felt that awareness of this issue by colleagues was generally low: "I don't know how many of my colleagues know that there are bulk subscriptions" (L1F). Another participant mentioned:

I'm a little disappointed, with just sort of, like, the knowledge of how academics and universities work ... I have realized over the years that I am the only one that is really paying attention to a lot of these things (O2G).

Some participants' awareness of the crisis was limited to the financial strains of the university:

No, I have a very vague idea, but I know that they require, they acquire subscriptions and handle journals through that way. I know that we have an embedded librarian in our college who consults with our faculty and faculty in other colleges, obviously about areas of research interest that require support from library services, but the business model and how they go about it, they get a budget from the central university. And that's about the extent of my knowledge (O1F).

However, they were fuzzy on the specifics:

I know I don't know the prices. I have a general idea, but I also know that there are package deals because you subscribe with Routledge, but you know, the more you take, it's like anything, the more discount you get. But after that, you know, let's say Routledge, it's a half million bill, it's a \$250,000 bill? Now I have no idea (A6F).

Faculty and students were also somewhat aware of other universities' responses to the journal crisis (A6F; A5G), particularly with instances that elicited more publicity, such as the University of California's boycott of certain publishers and consequent cancellations (O1F; O2G). Interviewee O2G hoped these sorts of larger initiatives would compel other institutions to similar action: "I think what universities are doing right now in terms of cancelling a lot of these subscriptions will hopefully help." In this way, the size and reputation of institutions pushing back against price gouging was also deemed significant for inspiring others to follow suit.

How Faculty Are Informed of the Journal Crisis

Information channels from which faculty derived their knowledge of the journal crisis included their respective institutions, higher education magazines, social media platforms (namely Twitter, now X), and conversations occurring within disciplines. This information sharing was typically

nothing really substantial, beyond what was kind of going on, more on Twitter, or social media discussions, with people in other places within the university, so the librarians, as well as just the broader conversation in general, but nothing super localized (O2G).

Faculty also tended to get information from librarians: "Anyway, what I did is I talk to them and that's how I learn the gossip," or at the library, "Sometimes my students used to work at the library, and they would overhear things" (L2F). Professional or student connections were also a source of information:

I was part of the original group of [Organization]. So, we did a whole thing where we critiqued very heavily the business model of journals like, 'Why are we paying for this stuff in the first place when it's public dollars that are funding everything that's being done?' (L3G).

A PhD student noted that, "I had the opportunity for almost two years to attend departmental assemblies. I never saw the issue raised among the faculty" (A5G). This indicates how immersion and reliance on certain systems can result in a lack of awareness, often observed more clearly by those external to them.

Current Publishing Model

Faculty and Graduate Students' Attitudes Toward the Scholarly Publishing System

Every interviewee viewed the scholarly publishing system simply as absurd, referring to it as "a parasitic system that makes money off of a community that is publicly funded" (A6F), "appalling and shameful," and "very greedy" (A1F), a "cash grab" (L2F), and "extremely messed up" (L3G), as well as noting that "the cost of these journal subscriptions is astronomical and frankly stupid" (O2G). One felt "gobsmacked at the highway robbery that seemed to be ... evident in the cost" (O1F), and another considered, "I guess I'm trying to think of any other industry where someone is paying you to then go and do free labor for another for-profit company ... it's insane" (O2G). L1F pointed out that "academic publishers have some of the

highest profit margins of any field.” O1F noted that “the publishers are in essence, biting the hand that feeds them.” The notion of “theft” (A1F) and the idea of “double-dipping,” or publishers profiting multiple times from the same work were mentioned: “Society pays four times for our work. We find that a bit much” (A2F).

Another element faculty and graduate students took issue with was the perceived lack of added value despite high fees. The rise of digital publishing was thought to reduce or eliminate costs and so participants felt that they should be receiving higher quality review and editorial services than they currently are. Many commented on how most of the work was done by academics from universities:

The editors of the journals work at universities. The people who publish the stuff work at universities. The people who do the peer review work at universities. All of those people are paid by the universities; they’re doing it to build their CV probably (L3G).

A5G summarized the current state succinctly: “A system of professors who are paid by universities to produce science that will be validated by a publication that will have to be bought back by the university. It is nonsense.”

Further, interviewees felt that the current system perpetuated unreasonable rates of production: “There may not be an overproduction, but there is a hyperproduction, all the same, of scientific references. Then it has to find outlets” (A3G). One viewed this as the consequence of a capitalist system but was not entirely against for-profit publishing; however, they felt moderating it was vital to ensure it was not adversely capitalized on: “I’m not against ... commercial publishers who make a little profit ... It’s all a *question of proportion*” (A2F). This high rate of production was thought to generate other questionable practices in academic publishing:

We compare with what Bourdieu wrote ... It is perhaps this in fact that motivates many to quote so much in our articles. To spin the wheel a little, to quote to be quoted. So, in relation to that I am quite critical. To what extent it is really connected with the business model ... I think it’s probably linked a little bit (A3G).

A2F stated,

Well, I would say that we can also hold up a mirror to ourselves, with the tendency to overpublish that is developing, so the monster that is in front of us, we have partly created it. And even if we are aware of it, I am not very sure that we are doing much to stop it.

In essence, the publishing system was described as a positive feedback loop because publishers ultimately “create dependency” (A6F).

Ways of Shifting the Needle

Many viewed the ability to create change as difficult (due to its entrenchment in scholarly communication), though achievable: “And there are so many problems ... with obviously a

system that is well installed. So, getting the system to move is complex" (A5G). Some felt that change needed to be top-down and involve legislation to regulate the publishing industry: "They're big publishers. You know, it's a very, very, very powerful oligopoly. And they still control quite a bit of what's done. So, unless, you know, there's a law, something where the federal government gets involved" (A6F). Another call for government intervention was issued by L4G:

I think it should be government. I think it can definitely be a collective, collaborative approach. And you're going to get economic inequities there ... If we want research to matter to people, we need it to be accessible to them.

Some participants felt publishing should be operated by academic institutions, such as universities or funding agencies (L3G; L2F).

Among those that considered change an easier reality, A6F stated:

That system shouldn't even really exist, because it's a negation of the very origins of what we do ... It's pretty much one of the easiest systems in the world to change ... When you look at who's doing the work and everything, it's us. Take away those people, we're still here. We do 90% of the work.

They described buying back publicly funded research, which remained inaccessible, as "Kafkaesque" (A6F).

One graduate student was aware their institution mandated Open Access:

I know that there is a global reflection on accessibility. I know that now Andromeda U is pushing ... I know that it is their policy, so I know that there are reflections in this direction (A5G).

Participant A6F felt strongly that change was not to be negotiated with publishers but seized by authors: "You don't discuss the terms of his demise with him, you eliminate him and then say, 'Look, you've still made good cash for all these years.'" This was because, A5G felt, publishers intentionally make their systems unclear and difficult to disentangle: "And I really have the impression ... that they are quite comfortable with this opacity."

O2G suggested that the impact of individual action was limited:

There are individual actions that people can take by no longer reviewing for certain journals or choosing not to publish in certain journals and that sort of thing. But there's only so far that individual action can go.

A2F advised that change should not be anticipated to occur overnight, especially when taking a humanistic approach to change:

I think you have to have a minimum of patience. Of course, when you have a whole editorial team, you don't necessarily want to throw them out overnight,

especially since they're people you know. And so, if it has to take ... fifteen years for this transformation to be done, when technically it could have been done in two years, well if it takes into account the people, I'm not hostile.

In addition to reworking the existing publishing model, faculty discussed the difficulty in changing the behaviours of academics publishing within those models. Early career researchers were thought to be in more vulnerable positions, and so one participant felt it was the responsibility of established faculty to create change:

it has to come from what you called the elite, actually the older ones ... people who are at a career level where they don't depend on publications at all. I wouldn't expect it to be associations of doctoral students who militate for this because it would tend to be dangerous (A2F).

L3G felt the main problem would still be convincing faculty to change their habits due to the larger systems of evaluation in place and the need for academic survival: "The problem is that faculty want tenure at university ... a lot of the systems that have been developed support the notion of keeping your publications in these really established journals, with high impact factors, that are behind a paywall." A6F had noticed changes in how quantitative evaluation was conducted for evaluation purposes, however:

We in the department have started to try to think the same. I see it in the aggregations, in the promotion files; we don't look that much at the impact factors, it's not important. It's, 'Have you published?' Then if you have, in your field, then you know, we ask a lot more questions because we don't want to start playing that game of saying well, because when you start quantifying everything, you know, I mean, there's no end to it. So, we try to resist in our own evaluations.

Cost

Awareness of Financial Factors Necessitating Cancellations

Most faculty and graduate students were aware that journal subscriptions were expensive but were speculative about exact costs. Some had investigated journal costs:

I have a general idea because sometimes ... I'll come across the subscription prices ... You know sometimes you go 'Oh my god.' You've got \$1,000, and you've got \$5,000 to \$10,000. And then the thing is, not all journals put the prices up (A6F).

This obscurity was observed by others: "If I go to Communication and Organization, I look at the beginning of the premium: 'To subscribe, please contact ...' They don't even give the price" (A5G). Many were unaware of their library's budgets, even when made available to them (O1F).

A few interviewees were aware of budget cuts at their institution that subsequently affected their ability to access journals (O1F; O2G). One faculty member recognized that their awareness (brought about by a communicative dean of libraries) might not be typical: "We

were more aware of and probably cared more about the budget than maybe the ordinary professor would" (O1F). They continued,

I hear them blaming the budget and whether they understand that the costs are extraordinary because ... at least, partly laid at the feet of the publishing houses, as well as reductions in university budgets. I'm not sure if they understand where the causes for the additional expenses are coming from, but I think they understand that there was essentially no choice (O1F).

Some participants were empathetic to the library's predicament with Big Deal cancellations, commenting that budget cuts were not an indication of the university's devaluation of their work, but rather the exercise of effective financial management: "I don't see those lack of connections to those articles as being not supportive of my research, I see that as very much a budget, and just the cost-benefit analysis" (O2G). Other participants were ambivalent; acknowledging the tension between financial feasibility and the responsibilities of an institution: "I know it's very, very expensive, which is why I tread carefully when I criticize things because we're limited with funding" (L5G).

Cancellation Projects

When asked specifically about cancellation projects, faculty and graduate students expressed a variety of opinions regarding how they were consulted and/or how cancellations were communicated. Discrepancies resulting from gaps in these processes and any resulting changes in access had strong bearing on the attitudes of faculty and graduate students toward the cancellations.

How Cancellations Were Communicated

Methods of communicating about cancellation projects varied. Information sharing via word of mouth occurred more pre-pandemic (L2F). Cancellation notices were delivered via email, institutional websites, social media, and information sessions. Library leadership and liaisons were lauded for being particularly effective at communicating with faculty:

Our dean of libraries really did do a very thorough job in terms of trying to inform us as to the 'whys' of what was going on, and because we do have a system of embedded librarians, it helps to convey the information (O1F).

Similarly, participant A2F found their director of libraries convincing:

Then his presentation was very clear as to the reasons, the calculations that had led to it, the way to mitigate precisely the effects by saying, 'Whatever you ask yourself, we'll order piecemeal and then re-evaluate the costs.' All this had been extremely well thought out, and creating new power relationships seemed to me, at that time, necessary (A2F).

Faculty in turn attempted to support such efforts: "When she would come to me as the dean of the college, I always made the time to get her onto the agenda for any meetings ... I think

it is critically important" (O1F). Others found that communications were lacking: "we did have some meetings with our library services and that was never something that came up ... it wasn't something that was a direct message of, 'Hey, you're no longer going to have access'" (L3G).

Faculty and graduate students also learned of cancellations through happenstance, such as through their research process when they could not access certain publications (L4G). Participant O2G felt that faculty were bound to discover these cancellations if they were actively conducting research: "Do they research? I always wonder when people don't realize that they don't have access, it's always something that fascinates me, I don't know how they don't run into that." Some learned of cancellations at their institution through this study:

[W]hen this study invitation came out, that was the first I heard that there was stuff that was cancelled. I was like, 'What, really? Maybe that explains why I can't get some stuff' (L3G).

L5G noted that they only wanted to be informed about cancellations relevant to their field:

I wouldn't want to hear about every cancellation, only within the health sciences literature ... but that might be difficult to even figure out who needs to hear that. It could be ... on the library website, just a web page to say the status, so if there was a decision related to a cancellation, that could be there.

Students felt that they were not in the loop:

Most of the times when you do interact with our supervisors ... there wasn't a conversation of, 'Hey, are any of you having issues finding sources now with these changes, is it impacting your research and what you're able to get access to?' So that hasn't come up (L4G).

Attitudes Toward Cancellations

Participants' attitudes about Big Deal cancellations ranged from annoyance to strong objection, though this did not jade their attitude toward the library. Some mentioned their right to access information: "I have a philosophical objection because we are being ... It feels almost like being censored when you don't have access to a wide range of journals" (O1F). Some participants, like L2F, expressed an opposition to cancellations:

We got a letter some time ago, about a seemingly innocuous thing, about how to serve you better kind of thing ... And I told everybody, 'My God, they are going to cut.' That's why they are asking. We are not that stupid, you know. I know the pattern. I've been around. 'We are not cutting, but can you tell us what kind of journals you want?' I said, 'All of them' (L2F).

Participants largely felt that they lacked agency: "In the end, I have very little recourse to the services of the university" (A3G). L2F felt they lacked organized action: "What do you

do, you pick up a shovel and chase them? There is nothing we can do. Nothing. We cannot strike, what can we do?" A6F explained, "I would say probably because we're pretty much all on the same page here, in a sense that there's no one who wants to defend a system like that tooth and nail."

Some faculty attitudes toward journal cancellations were positive as they resisted for-profit publishing: "My reaction would have been, 'Ah, yes, good, we are divesting from [publisher] to some limited extent, good job.' And then I would have carried on" (L1F).

Access

Alternative Means of Accessing Resources

Maintaining access is a key consideration when navigating Big Deal cancellations. Faculty mitigated loss of access in myriad ways with some advantages and disadvantages. Placing an interlibrary loan (ILL) request was among the most common steps taken, either revered for its convenience or disliked for its tediousness. O2G noted that a few extra minutes of "online sleuthing" or waiting an extra day to receive an article still saved them a trip to the library, whereas L3G perceived ILL as a "painful" and time-consuming process. Alternate access methods used by participants were not only influenced by a motivation for access but how data might inform decision-making. One interviewee voiced a commitment to placing ILL requests to provide librarians with data:

If it's ... from a journal that is one that I would really like access to, I try to ... put in a request through the library itself so that they have that information in their system that researchers are trying to access particular titles (O2G).

A graduate student noted that when pursuing alternative routes of access, they still place requests on an item, "at least logging that so that the libraries have that information because otherwise I realize if the library doesn't know that people need it, they're not going to have that data" (O2G). L5G stated: "I know that that usage gets tracked and I'll try to pick a nursing database to give more hits to something that I recognize, something that I'm trying to support."

Another common means of accessing information was contacting authors of articles (A5G), which also acted as a networking mechanism: "Actually, the reason that I would maybe want to contact the author is if it is very relevant to my research, and it's a contact that I want to make anyways" (O2G). Some found it more expeditious: "I reached out to the author. I could find her, she's from Australia, I emailed her and someone from her team emailed me less than a day" (L5G). Some relied on their supervisors who are more embedded in the research system, though the case of L3G shows that a researcher's *distance* to a journal at times does not influence their ability to access it: "My thesis supervisor publishes a lot in that journal ... and I was like, 'I can't access it', and she couldn't access it either, so she emailed the author. And she's one of the editors of the journal" (L3G). Others outsourced access to their administrative support: "I send her the article that I want and then she sends me a link ... I feel like she's making arrangements with other librarians and then there's some kind of pool" (A1F). Interviewees also used other credentials for institutions to which they are affiliated to gain access to their catalogues (O1F, L5G).

Apart from social connections, participants also relied on information technology outside of their library's online catalogue: search engines such as Google Scholar (L3G) were

commonly used, while others went straight to illegal sites like Sci-Hub for its speed and ease of use. “In the worst case, I happened to go through some Russian sites that were of questionable quality. But politically, I had absolutely no problem with it, as all this research was done financially and publicly” (A6F). ResearchGate was commonly used, though some noted its inconsistency. “Through ResearchGate ... you can get access to some of the ones that have been made accessible ... others you have to actually request the individual to give you access to it ... it’s very inconsistent” (L4G). This irregularity influenced researchers’ use of academic libraries and made them cautious about going to it as a first place to search:

I will directly access what I need through other paths on the internet. Then the second solution is that I go through the university’s proxy to have access to the few remaining periodicals, which are becoming fewer and fewer (A1F).

The proliferation of preprint servers also provided a new gateway to information, even mitigating larger concerns around access (O2G). O2G noted that “I was really hesitant towards pre-prints when I first started my PhD, I kind of saw them as super sketchy, but I think the use of pre-prints might be changing people’s use of articles too.”

Concerns Around a Loss of Access

Alternatives were often discussed in relation to the amount of time needed to compensate for a loss of access, though some participants held conflicting views. O2G felt that “hunting down articles” took extra time, but “I would say that my research is still plodding ahead at the same speed and that it hasn’t really affected me a lot more than just a minor annoyance at this point.” Other participants differed: “Now, three-quarters of the time, the article is not there anymore. So, there is a kind of lag. Frankly, it’s a pain” (A1F). Some participants accepted the lack of access: “A lot of the time, it’s just like, ‘I can’t get this journal. I’m going to have to do without it’” (O1F), even prompting them to consider whether the source was necessary to their work: “I might say, ‘Well, do I really need that article?’ And I kind of go back to the abstract and then reassess my research question and say, ‘Oh ... Maybe it’s not actually that important’” (O2G). In this case, the one drawback acknowledged was the loss of visibility for the author of the article.

Access concerns were also expressed about groups who would be disproportionately affected, including smaller disciplines, early career researchers, and students. One participant noted that junior faculty, “will have greater difficulty in accessing the various pieces of work that they need in order to get themselves established” (O1F). L2F noted, “I remember the place where I most frequently can’t get access to an article that I would like access to, is for undergraduate classes, students are doing research.” L1F echoed the same concerns about student access: “I have other ways of accessing journals; students don’t.” L1F also expressed concern about smaller disciplines: “I would be concerned that I and then presumably other people in very small disciplines at the university would be the ones most likely to lose access to journals that we needed.” L3G was concerned with how cancellations would affect students and informed decisions about where to enroll:

If you’re getting information that’s important for the success of some of your students that have a particular database, they need to know before they sign up

that they're not going to have access to this stuff, right? Not when they're in the middle of the program.

Acceptance of a lack of access was influenced by the size and financial state of institutions. Participant A5G felt "lucky enough to be at Andromeda U, a huge research university," whereas L3G noted:

I was all excited to go to Lyra U because they have all of these tools, and I thought they would have more access to resources ... I figured out that a lot of the resources that I couldn't get through Lyra U, I could actually get through [other university] ... you'd think that at a larger university, you'd have access to everything.

Concerns about access were also colored by the *cause* of the lack of access. One participant voiced more support for Big Deal cancellations if "it's to try to change a business model ... what this operating model says today also has an impact on citizens who want to have access to science, who want and are interested in science." A5G took issue with having to "pay more for open access" in an already inequitable system of science (A5G). They worried that a lack of access would affect the diversity of research:

That's why I think that these are extremely problematic and complex issues, but they are important issues, the accessibility of research. That is to say that cancellation campaigns if it is to try to change the models, put pressure, yes, go (A5G).

Connection to Library

Relationships and Interaction with the Library

There was consensus among interviewees that "the library ... is extremely important" (L2F) and highly used, though the nature of relationships to it changed over time. "Libraries are one of my favorite places and I hang out in the library. I just don't get into the stacks anymore. It's faster to go online" (O1F). Relationships also developed through different channels of communication; some arose through interaction on social media sites such as Twitter, others through proximity in professional environments (O2G). Overall, every participant expressed a positive relationship with librarians and appreciation for their service, noting an alignment of professional values and interests. "There is really a very firm professional conscience and ... how shall I say it, perfectly compatible with these ideas that I have developed previously that seem important to me" (A2F). L2F empathized with librarians, feeling that they bore the brunt of faculty dissatisfaction with the results of journal cancellations.

Interviewees' interactions with librarians ranged from minimal: "not something that I would say is very, very frequent" (A4G), "have a little bit of that rapport" (L4G), to major: "our dean of libraries led a major information series of sessions to let us know about the issues with regards to these bundled subscriptions and the cost of them" (O1F). The nature of outreach ranged from consultations to collaboration. A few participants noted that librarians were embedded within their departments and made efforts to be present and consult with faculty: "She shows up at our faculty council meetings in the college. She consults with our

faculty" (O1F). On the frequency of these consultations, A2F relayed that librarians "often come to us and say, 'Here's the list of we have to do, for example, we have to make cuts, what do we have to cut?' Or the other way around, effectively, "Do you have any particular purchasing needs?" Participant A2F also offered an example of the way they saw librarians collaborate with faculty:

Our librarian was doing what he called 'scouting,' in fact, it was all the books he was planning to buy. He would send us roughly the reference of the book, and then a sort of back cover ... So, it wasn't him who took the time to write something, not having the time to read all the books he had bought. And then it was sent to all the teachers. I found that extremely useful (A2F).

Faculty Consultations and Involvement in Acquisitions

The consensus was that faculty should be consulted, though there was ample trust in librarians' abilities. For instance, one interviewee noted librarians had a good understanding of the important periodicals to attain and so consultation was sought more frequently concerning other acquisitions:

It is more frequent for manuals or books and less for periodicals because I think they know or understand what important periodicals are. So, I don't remember that they would have contacted me to find out whether we should subscribe to such and such a periodical (A4G).

In contrast, another participant was more skeptical of librarians' knowledge of crucial journals:

They'd have to delve pretty deep, and it's often easier just to sort of get the superficial, which are the ones that are used the most, kind of questions as opposed to that deeper understanding of which are the ones that are critical for a particular discipline (O1F).

One participant acknowledged that more could be done on the part of faculty and students to get involved with library acquisition:

I think in terms of the role of faculty and students asking for that, in my experience, if you say, 'Hey, this is really important,' it gets it onto the librarian's radar and that can be something that they can work towards, and oftentimes they want to help work towards (O2G).

Some felt they were not afforded ample opportunity to participate. "We have a library committee on which I sit, but it doesn't meet often" (A6F). Another faculty member described how the lack of faculty awareness inhibited their ability to get meaningfully involved in acquisition but felt that they should still be consulted: "But to the extent the faculty can give useful feedback, I think they should be part of the conversation" (L1F).

Determining the Value of Journals

Surveys were a common method librarians used to solicit input on cancellation decisions. Most faculty saw them as valuable for deciding what to cancel and how to fill gaps left from cancellations (A3G), as well as for filling in librarians' gaps in domain knowledge (O2G). Some commended librarians for their commitment to consulting faculty:

I know that she goes to considerable effort to track people down and hound them a bit to get that information. When I ... receive such a request, I do answer (O1F).

Others felt that surveys were insufficient for elaborating on why certain journals were important to their research (L4G; L5G). L3G conceded that due to the size of some universities, individual consultations were not an entirely realistic approach:

I think really a survey is the only thing that they could do ... I think that if they tried to interview everybody ... before they made a decision, decisions would never get made (L3G).

Usage statistics (such as downloads) were seen to be the most objective metric to assess the value of journals. L1F felt that citations mattered less than usage because

I'm in a field where no journals have particularly high index factors, so things like how frequently these articles are cited, that'll vary a lot by field. And so, I feel like the actual access by people at the institution of the journal is the important one.

They believed that usage statistics must be balanced against the cost of journals. "Obviously, if a journal is, you know, \$5 a year, it probably doesn't matter how many people are accessing it, not that any journal is \$5 a year" (O2G).

Open Access

Attitudes and Concerns About the Open Access Model

Attitudes and experiences with open access publishing illuminate how researchers navigate the rapidly changing research system, as well as how they make decisions about both consuming and producing research. Open access was viewed favourably among participants, though some were happy to support closed access publications if the funds went to support scholarly societies, for example, because they did "useful things" with the costs of subscription and publishing (L1F). O1F reified the importance of open access for lower-income countries but was not hopeful of its promise:

I know that I have a number of international colleagues who are in second and third world countries, and open access is a godsend for them so that they can actually access those some of those ... I wish everything were free, but ... I'd like to have a pet dragon too, so [chuckle].

Faculty possessed several concerns around predatory (or deceptive) publishing (O1F; L2F). A few participants had fallen into the trap of predatory publishing before. L5G noted “we’re entering these landmines all the time, it’s a very messy space ... I think we need more education and support in terms of navigating that. But yeah, I would publish open access.”

A PhD student emphasized the need for developing academic literacy:

Academic literacy or something like that, in terms of how do you even navigate that? And I feel like all of us as grad students need to really look at that. I started asking the team, there were many authors on this paper, and I said, ‘We’ve been approached to publish this research. Here’s the journal. I can’t find it as a predatory journal; does anyone have any concerns?’ (L5G).

Open access was considered by some to be old wine in new bottles—that is, the same problem in a different form:

A lot of conversations with another colleague or a collaborator of mine that’s actually very anti-open access has been really interesting ... I was like, ‘My gosh, but what about access to knowledge?’ And then hearing his reasons as to why ...It’s basically just off-loading the cost to someone else. And it’s still the publisher that’s making off with sacks of money at the end of the day (O2G).

Attitudes Toward Publishing Open Access

Article processing charges (APCs) were identified as a real barrier to publishing, especially for early career researchers. Participant A5G noted:

It’s certainly the paywall system, the open access system, that becomes a pressure, even on a PhD student. It’s a doctoral student like me who is going to publish. He’s going to think, ‘Okay, am I going to put [*sic*] \$3,000 to get my publication open access because I know my open access is going to be more cited? I’m going to get my citations up, my impact factor up, whatever, and so it’s going to make me more employable down the road.’

O2G noted that when they were a student, their primary investigator covered the costs of open access journals so that the work they published would receive more citations. APCs were also factored into venue decisions:

I think for many, especially depending on how much research you do, if you want this to be your career, and you plan to publish a lot, that can rack up very, very quickly ... If I’ve got 15 publications, am I going to pay for all 15 (L4G)?

One graduate student identified the lack of publication fee support for researchers: “I also recognize that the cost that gets put back on to researchers and just cannibalizes research grants is a significant detriment” (O2G). This was made more difficult, as another researcher

noted because “federal, Social Sciences and Humanities Research Council (SSHRC), or Fonds de recherche du Québec (FRQ) grants at the provincial level, there are now obligations to publish in open access, at least to a limited extent” (A2F). Another faculty member identified the idiosyncrasies of disciplines as a factor impacting the utility of open access:

Open access is of course important and it’s very clear that the Tri-Agencies¹ are pushing us towards open access for all of that, but open access is not currently sufficient for the work that I do because a number of the journals that are critical for my field are not truly open access (O1F).

O2G observed a citation advantage in publishing open access as compared to closed journals but described how they went two pages over their limit for an open access publication and “it cost us 400 pounds sterling,” though they ultimately decided that “the data and the information that was in those pages was worth the publication costs for those page charges.”

Apart from hefty publishing fees, however, participants were concerned with how open access journals factored into research evaluation. Participant A4G expressed that:

They are generally considered second class, and the problem is a question of quality, of impact. They don’t appear in the usual leaderboards and so when it comes time for promotion, well they have no weight. So, it’s not recommended.

Analogously, A6F felt there was a “survival aspect” to choosing where to publish, noting that though they felt pressure earlier in their career to publish in top journals, publishing open access was “definitely something I want to do more and more, now that I have more latitude, and I have more freedom.” Prestige was considered a significant factor by another faculty member: “When you are a specialist, it’s the ones that you know that you would like to publish in this one or that one for this or that type of article, because they have a reputation” (A2F). Others were more focused on finding venues suitable for their work, stating it was the most important criterion to them and opportunity to set an example: “I think that we ought to be, as a leader, walking the talk ... but I still think it’s more important to publish in the journal that will most address the audience that you want to reach” (O1F).

Discussion

This section collates the most significant findings from each theme and connects them to practice. Big Deal cancellations as processes of information sharing and exchange are also discussed.

Involvement in the Cancellation Process

In terms of consultation and participation in cancellation decisions and the process at large, the majority of faculty and graduate students interviewed generally felt that they were

¹Referring to Canada’s tri-partite funding body comprising the Social Sciences and Humanities Research Council (SSHRC), the Canadian Institutes of Health Research (CIHR), and the Natural Sciences and Engineering Research Council (NSERC).

adequately consulted and informed by the library, though surveys or inquiries from the library tended to elicit fear about cuts. Several participants desired a better understanding of what data from faculty and students would prove most useful in their decision-making. Some went to lengths to place ILL requests even if they sought or found alternate access routes to provide librarians with data that a resource was in demand (e.g., O2G and L5G). These participants typically had more knowledge about the context of cancellations and the scholarly publishing or library system than their peers. In fact, disparities in knowledge between faculty and graduate students, as well as how this affected the latter's agency in the scholarly publishing system, were observed (O2G; L1F). In this regard, some felt that publishers were purposefully opaque (A5G). Indeed, this is an example of hermeneutical injustice, described by Fricker (2007) within a larger framework of epistemic injustice, where interpretive resources are purposefully denied or obfuscated, impacting one's ability to understand their social experience. This further impresses the notion that those who are more informed can better contribute to such processes, making them more collaborative. The need to improve academic literacy (i.e., knowledge and competencies around scholarly publishing and navigating academia) was brought up by participant L5G, while O2G proposed mandatory library training for graduate students. Instilling researchers with academic/publishing literacies would not only empower them to better navigate it themselves but also support librarians who would work with faculty with a better understanding of librarians' unique position as arbiters in scholarly communications.

Many participants expressed either a desire to help librarians and to get involved in the process of journal acquisition and cancellation, or a belief that they had a responsibility to get involved and use their voices (O2G). Some felt prohibited because they were unsure if their input was wanted or useful or felt they lacked opportunities to participate (A6F; L1F). This suggests that increased contact could position libraries to improve the knowledge and academic literacies of faculty and graduate students and to better empower them to help. Effective modes for establishing contact and building relationships with faculty and graduate students include social media, information sessions, and professional societies. Similarly, exploring different methods of soliciting faculty and graduate student input regarding acquisitions, as well as involving them at earlier stages in collections, processes can help include them in cancellation decisions and keep them informed about the library's current holdings.

Experiences with Cancellations and Their Effects

How Big Deal cancellations affected access to journals varied. Some faculty adapted to finding alternative methods of access through personal channels (e.g., supervisors, colleagues, authors), indicating how the journal crisis may emphasize the importance of networking, as well as increased reliance on senior academics and scientific societies to provide access. Notably, mutual support was a common approach to navigating issues of access, suggesting that academic communities may be coordinating across institutions, disciplines, or even countries. Graduate student testimonials sharing that they relied on their supervisor to provide access emphasize this. However, even here, access was variable. Some faculty could not access material published by journals for which they sat on editorial boards or encountered other barriers. Some researchers remained relatively independent, hunting for resources they needed online through places other than their library's catalogue (e.g., Sci-Hub, ResearchGate, Google Scholar, preprint servers). One participant declared, "I was not missing anything.

I can't say that I couldn't do my research" (A6F). Some interviewees possessed an informed appreciation for the tension between balancing library budgets and acquiring needed journals with accompanying challenges, while others were unaware of budgetary concerns, the acquisition process, publishing models, or the journal crisis itself.

Further, participants expressed concern about those more vulnerable to the impacts of cancellation decisions, namely, smaller disciplines, early career researchers, and students. Moreover, participants felt that they lacked means of recourse and that post-cancellation surveys about resource needs were neglected (A3G; A2F). A6F's scenario, in which resources were bought back because of their feedback, is an example of successful post-cancellation communication; other faculty found even mere the possibility of buybacks comforting. Librarians can 1) prioritize vulnerable groups in their decision-making, 2) communicate cancellations more directly, 3) enhance messaging regarding alternate access route resources, and 4) follow-up post cancellation to determine the nature and impact of the cancellation's effects. Maintaining efforts after cancellations to engage with faculty may also mitigate impact or backlash after cuts have been made.

Increasing Understanding

There may be more buy-in from faculty and graduate students if there is ideological alignment with the cause of cancellations, such as in the case of A5G, who noted that, if they knew that cancellation projects were attempts to shift the current model of publishing, they could accept ramifications, such as the loss of access to certain resources. Here, opportunities to appeal to, and engage with, the value systems of faculty and graduate students may be a strategy librarians can take to increase support, or at least understanding, around cancellations. Accordingly, participants resonated with librarians' firm professional consciences (A2F) and often considered how their own choices would affect others working within the system. For example, O2G would contact authors of works they accessed through other means to let them know their work was being read. This shows a socially conscious approach and identifies how faculty establish workarounds not just in relation to access but in making sure scientific mechanisms—such as credit (i.e., citations and visibility)—are not disrupted. The effects of cancellations are thus influencing how researchers uphold and engage with the norms of science research. These findings indicate that there may be increased buy-in from faculty about cancellations if a moral or philosophical alignment can be established with their cause.

Changing the Current Publishing Model

There was resounding consensus among interviewees that change in the current publishing model was needed. Open access was a notable development in scholarly publishing discussed by participants, but perceptions and attitudes varied regarding its viability for *accessing* research as compared to *publishing* research. Findings show that open access was a well-used and relied upon alternative method of accessing publications. Participants valued openness for this reason, though they encountered limitations in the extent of open material. As such, open access may act as a mediating factor in faculty and graduate student concerns around Big Deal cancellations. However, participants' relationship to open access for knowledge dissemination purposes varied greatly. Concerns around research evaluation and venue prestige were repeatedly cited as a key factor in researchers' choices of where to publish and were a

major influence on the uptake of open access. Research assessment reform is an intervention point currently under concerted attention from the scholarly community (e.g., Coalition for Advancing Research Assessment (CoARA) (<https://coara.eu/>) and The Declaration on Research Assessment (DORA) (<https://sfedora.org/about-dora/>); the findings of this study thus reinforce the current research evaluation system as a significant barrier to change in researchers' behaviours, particularly in decisions to publish open access.

Examples of the individual-level action participants adopted included no longer reviewing for, and/or choosing not to publish in, specific journals. Several participants proposed the idea of libraries and funding agencies as publishers was a potential means of reclaiming control and ensuring the low costs of scholarly publishing (L3G; L2F). Indeed, in the past few years, there has been a great deal of scholarship on the topic and increased efforts to move in this direction (Bonn & Furlough, 2015; Gwynn & Craft, 2019; Lippincott, 2017).

Cancellations as Processes of Information Sharing and Exchange

This study also illuminated some dynamics of information sharing and exchange around Big Deal cancellations and faculty and graduate students. These processes were bidirectional between certain sources and actors (e.g., between librarians and faculty and graduate students), and unidirectional among others (e.g., faculty reading a university policy on a website). Interview data revealed varying degrees of faculty and graduate students' awareness and knowledge of Big Deal cancellations and scholarly publishing due to these processes. Some participants possessed base-level awareness of the fact that cancellations were occurring and why, while others with deeper knowledge were more engaged and wanted to participate in the process. The channels used for information sharing and exchange about scholarly publishing and Big Deal cancellations occurred include university websites and policies, librarians, colleagues, staff, students, scholarship, higher education magazines, social media, and participants' own experiences in academia. These findings provoke consideration of how these channels can be harnessed not only to generate more awareness, but also to facilitate knowledge building (i.e., the understanding and ability to critically engage and develop agency to influence or enact change) as a bidirectional process in which faculty and graduate students are actively engaged participants. This would reinforce the development of deeper understanding that Big Deal cancellations and scholarly publishing as processes that are not top-down, but occur laterally across actors, and through external channels to the library and institution.

Conclusion

This study presents results from interviews with 13 faculty or graduate students from three medium-sized Canadian universities and is not representative of all perceptions and experiences of faculty members from higher education institutions. It nonetheless provides a glimpse of the awareness, knowledge, perspectives, and experiences of faculty and graduate students, and it offers insight into how librarians and institutions could approach Big Deal cancellation projects as a more collaborative process.

The findings revealed that the culture of research evaluation and academic tenure and promotion requirements strongly influence faculty and graduate students' publishing behaviour. Ample literature on research assessment reforms exists (see de Rijcke, 2023, for an overview of current debates and developments in research assessment), and the Declaration

on Research Assessment (DORA) (<https://sfdora.org/>) has prompted coordinated change through funders, publishers, and institutions and researchers. However, much is left to be understood about faculty and graduate students' decision-making and behaviors surrounding open access. Future work could aim to investigate information channels and the process of information exchange between academics about open access and other aspects of scholarly publishing. Additionally, intersections between the rise of open access and preprint servers with Big Deal cancellations could be further explored.

Several interview participants mentioned the desire to participate in Big Deal cancellation processes but didn't know their place in the process or how they could be of most use to their library colleagues. Developing understandings of how faculty and students could support the library in catalyzing change in the current system of scholarly publishing would improve practices of mutual support.

Concluding Remarks

This study has explored faculty and graduate students' perceptions and experiences with Big Deal cancellations, and it hopes to foster reflections on the role of faculty and graduate students as not just recipients of cancellation information but as collaborators in the process. As libraries move away from Big Deals and continue to navigate a constantly evolving scholarly publishing landscape, collaborating with (i.e., informing and involving) faculty and students may help them to feel less blindsided about cancellation decisions; better prepared and equipped to locate and use resources post-cancellation; more empathetic to the position of librarians; and empowered to navigate scholarly publishing and contribute to meaningful change.

Acknowledgments

The authors are grateful for the contributions of Toluwase Victor Asubiaro, Asen Ivanov, Nicole Delellis, and Helene Bigras Dutrisac, who contributed to early stages of this study. We are grateful to the editors and reviewers of *College & Research Libraries* for helpful feedback and editorial assistance.

Funding

We are grateful to the Social Sciences and Humanities Research Council for providing funding for this project.

Author Contributions

M. H.—Data curation, formal analysis, writing—original draft, Formal analysis, validation, writing—original draft, writing: review and editing; S. C.—Conceptualization, data curation, funding acquisition, investigation, methodology, project administration, software, resources, supervision, writing: review and editing; C. J.—Conceptualization, data curation, funding acquisition, investigation, methodology, project administration, software, resources, supervision, writing: review and editing; P. M.—Data curation, investigation, methodology, supervision, validation, visualization, writing: review and editing.

Conflicts of Interest

There are no conflicts of interest in this project.

Data Availability

Interview data reported in this study was anonymized. For purposes of privacy, interview transcripts and coded data will not be made available.

Ethical Approval

Research ethics approval was granted for this project by Western University Non-Medical Research Ethics Board (# 114491).

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Appendices

Appendix A: Interview Questions

1. Before we begin, could you tell us about your area of study/research/teaching, your professional status (or where you are in your doctoral journey), and tell us how long you have been working at ___?
2. A) Do you use periodicals in your work? How important are they to your research/teaching? Are there any journals that you feel are essential to your work? Does the university provide access to these periodicals? How important is the timeliness of the periodicals you use? Do you need access to the most recent works or is it acceptable for you to have access to content six months or a year after publication? Have you ever been unable to access an item you needed?

- B) If you can't access a periodical you need, what do you do? Could you tell us about a time when you had to use a means other than your library to access an article? Do you use print periodicals? (When was the last time you used the in-person library and print resources?)
3. Have you ever asked the library to subscribe to periodicals you need? Do you consult librarians about the resources you need? Is there a particular librarian or librarians you regularly consult regarding access to resources? What is your reaction when librarians call upon professors to identify important periodicals? Do you think professors and doctoral students should be involved in the selection or cancellation of resources?
 4. If you were to develop a list of criteria (e.g., cost, use, faculty use, references/citations, librarian expertise, etc.) to follow in selecting titles for cancellation, what criteria would you consider? As the most important? The least important? How convinced are you of the ability of librarians to manage library collections? Have you ever complained about unsubscribing from one or more periodicals?
 5. Do you have any idea of the cost of e-journal subscriptions at your university? Have these costs been the subject of controversy within your institution? Are you aware of open access periodicals? Do you think they are sufficient for your research? Have you ever published in an open access journal? Do you have any other ideas on ways to reduce the cost of access to scholarly journals?
 6. What concerns you most about the consequences of unsubscribing from a large number of periodicals? (Ask about hopes/fears if necessary: what is the best/worst case scenario?)
 7. What do you generally think of the current scholarly communication model where publishers get content, peer review and editorial work for free, then sell libraries access to these journals?

APPENDIX B Themes and Sub-Themes	
Themes and Sub-Themes	Code Occurrences
Participant	
Position	
Department or faculty	
Years of experience	
Area of research	
<i>Subtotal</i>	45
Knowledge of Journal Crisis	
Knowledge of journal acquisition process	
Knowledge of library concerns regarding business model	
Knowledge of other university's response to journal crisis	
Sources of information about journal crisis	
<i>Subtotal</i>	57

APPENDIX B Themes and Sub-Themes	
Themes and Sub-Themes	Code Occurrences
Access Alternative methods to access journals (including both illegal and legal methods) Examples of accessing journal the library does not have Concerns about access (positive or negative) Concerns around access-currency Concerns around access-cost Use of print journals Impact of COVID Method of searching for articles Use of e-resources	
<i>Subtotal</i>	<i>180</i>
Connection to Library Relationship with librarians Librarian involvement with faculty Trust in librarians Involvement in library acquisition (e.g., on faculty library committee)	
<i>Subtotal</i>	<i>125</i>
Cancellation Project Communication with faculty and students Knowledge of cancellation project Involvement of faculty in identifying important journals (e.g., filled out faculty survey) Faculty engagement with cancellation project Attitude towards journal cancellations	
<i>Subtotal</i>	<i>108</i>
Determining Journal Value Field specific considerations Criteria ranking Importance of journals to research and/or teaching Assessment of journal value Assessment of journal value- impact factor	
<i>Subtotal</i>	<i>143</i>
Cost Awareness of cost Budgetary concerns	
<i>Subtotal</i>	<i>98</i>

APPENDIX B Themes and Sub-Themes	
Themes and Sub-Themes	Code Occurrences
Open Access Author processing charges (APCs) Publishing in OA (advantages and disadvantages) Concerns about OA (e.g., predatory journals)	
<i>Subtotal</i>	<i>68</i>
Current Publishing Model Attitude towards current publishing model Alternative ideas on how to reduce journal costs Difficulty in changing faculty publishing behaviour	
<i>Subtotal</i>	<i>140</i>
Grand total	964

Information Literacy Instruction Redux: What Are Instruction Librarians Doing Now?

Heidi Julien, Jesus Montiel Hernandez, Melissa Gross,
and Don Latham*

An online survey of U.S. academic librarians with responsibility for information literacy instruction gathered data about instructional topics, practices, and challenges. Results are compared with data from an earlier survey. The results show some change over time, partly arising from the COVID-19 pandemic, as well as consistent challenges, including insufficient resources, complicated relationships with teaching faculty, and structural barriers impeding full implementation of the ACRL *Framework for Information Literacy for Higher Education* (2015). The data have implications for library managers and for programs preparing future instructional librarians.

Introduction

Information literacy instruction (ILI) is a significant and ongoing focus for academic libraries in the United States and globally. Particularly at a time when societal concern for misinformation and malinformation remains heightened and following the global COVID 19 pandemic (a period when these issues took on particular relevance), the role of academic librarians in promoting information literacy (IL) became even more critical. The efforts of librarians, as well as their success in achieving their instructional goals, are thus key to assuring librarians' relevance in this context. Indeed, the practices of instructional librarians have long been a focus of interest, both to researchers who seek to understand and strengthen librarianship, and to practitioners who seek to improve their practice. Broad-based understanding of the information literacy instructional practices of academic librarians has been promoted through research conducted in several countries, including the United States (Julien et al., 2018), New Zealand (Julien, 1998), and Canada (Polkinghorne & Julien, 2018). This paper presents the latest data set in that series.

Furthermore, understanding longitudinal trends in practice, particularly in an area of academic librarianship so central to the field (i.e., information literacy), is critical to track progress and to identify both opportunities for more effective practices and the support required for ensuring effectiveness. Building a base of evidence upon which to make positive change

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requires the periodic gathering of baseline data, such as that collected in this study. Thus, the research questions addressed by this study are:

- What are the instructional practices of academic librarians in the U.S.?
- What challenges do they face in their instructional roles?
- What are some of the opportunities for improvement in ILI practice?
- What changes have occurred in these practices and challenges since 2016?

Related Literature

While there are many definitions of information literacy, academic librarians are guided by definitions developed by the Association of College and Research Libraries (ACRL) in their teaching work. In 2015, ACRL made a major change to the official definition of information literacy, rejecting the old skill-based definition (ACRL, 2000) and replacing it with a more conceptual view guided by the attainment of six threshold concepts and related knowledge practices and dispositions (ACRL, 2015). The change was paradigmatic, complicating the performance of the ubiquitous “one-shot” instruction in which students are given the grand tour of information literacy skills in one sitting. Threshold concepts are meant to be developed over the course of a student’s program of study, and they are more difficult to assess. Another challenge is that faculty often prefer that librarians teach skills. While some faculty embrace the teaching of threshold concepts, others are more concerned with students being able to complete the class assignment.

How information literacy is taught and assessed is the topic of many papers in the professional literature. However, the literature has lacked a full-scale look at what instructional librarians do, how they see the challenges of their job, and how they think ILI can be improved. The first large-scale survey of instructional practice in the United States was reported in 2018 (Julien et al., 2018), just a few years after the adoption of the ACRL *Framework for Information Literacy for Higher Education (Framework)* (2015). Data collection asked about pedagogical methods, client groups of focus, assessment activities, marketing instructional objectives, incorporating the framework into instruction, the role of technology in instruction, the importance of relationships with faculty and administrators, as well as challenges faced by librarians. While the respondents in the survey were self-selected, participation was strong ($n = 622$). The data provided a baseline idea of the professional work of ILI librarians, demonstrating that ILI is a fundamental professional practice. The findings from this initial study provide a point of comparison to the new data collected in this study. Similar data has been collected in Canada (Polkinghorne & Julien, 2018) and Israel (Aharony et al., 2020), making it possible to observe trends in opinions and activities and issues over time. This project seeks to build on previously collected data to construct a longitudinal view that will demonstrate progress and that will identify the challenges and solutions librarians experience in seeking to support student success in school and beyond.

It should be noted that in 2020 two surveys targeting instructional librarians at community colleges were undertaken (Gross et al., 2022; Wengler & Wolff-Eisenberg, 2020). While these surveys focus on a subset of higher education, their findings also provide a snapshot of the professional work of these librarians. Wengler and Wolff-Eisenberg’s national survey of community colleges reports on data collected from 1,201 librarians concerning the integration of the *Framework* into ILI. They found that integration of the *Framework* was not widespread. Many of the respondents had not read the document all the way through, while 10 percent said they altered instruction to include the *Framework*. One-shot instruction continues as the norm, and the *Framework* does not fit this format. These librarians are interested in

professional development and would like to see a *Framework* tailored to their environment and to see community college leadership take a role in facilitating adoption of the *Framework*.

The studies (Gross et al., 2022; Julien et al., 2020) revealed significant differences between the work of community college librarians and those librarians who responded to the original national survey (Julien et al., 2018). These community college librarians' primary objective is to teach skills, particularly the ability to critically evaluate information. The conclusion was that the *Framework* is not having the same level of influence on community college librarians as on academic librarians generally (Julien et al., 2018). Assessment continues to be a challenge, as do issues such as a lack of resources and of faculty and administrative support; these findings have persisted through previous surveys of ILI across higher education (Julien et al., 2018).

Methods

The research questions were addressed using an online Qualtrics survey composed of 33 closed-response and open-response items (see Appendix 1). The survey was nearly identical to the 2016 survey (Julien et al., 2018), with minor updates to language suggested by two academic librarians at this study's authors' affiliated institutions. The survey included questions focused on respondent demographics, library context, pedagogical practices, instructional objectives, evaluation and assessment practices, marketing practices, support for instructional activities, and challenges faced. Respondents were also asked about their opinions on the definition of information literacy, who should take responsibility for teaching IL, and the impact of the *Framework*. The survey was distributed via the ACRL Instruction Section list on the American Library Association Connect platform in February 2024. The survey remained open for six weeks, and multiple reminders were posted to the list prior to closure of the survey. The call for participation asked that librarians with instructional responsibilities working in U.S. academic libraries complete the survey. Consent was implied by survey completion. Responses were anonymous; all data was confidential and maintained in password-protected, secure cloud storage. The study was given ethics approval by the University at Buffalo Institutional Review Board. While the total number of potential respondents is unknown, 229 usable surveys were submitted and included in data analyses. Quantitative data were analyzed using SPSS and Excel. Chi-square test calculations were used to compare 2016 and 2024 results to highlight changes over time.

Limitations

The study is limited in its geographic focus on the United States; thus, the efforts and experiences of librarians outside of this country are not included. In addition, the survey respondents are self-selected and could therefore be unrepresentative of the overall population of U.S. librarians.

Results

Respondents' Insights from 2016 and 2024

In 2024, the total number of respondents was 229, fewer respondents compared to the 2016 study ($n = 622$). Respondents could opt out of any question(s), and thus the item-level participation varied in both studies. The population size is similarly unknown, and therefore this was not a probability sample. Data from 2016 (Julien et al., 2018) was used to compare and identify changes in instructional practices.

In both 2016 and 2024, respondents described similar workplace associations. Table 1 shows that the largest proportion of respondents worked in universities in both 2016 (60%, $n = 227$) and 2024 (68%, $n = 135$), while the second-largest proportion worked in colleges or technical institutes in both 2016 (39%, $n = 148$) and 2024 (28%, $n = 55$). Also, the largest proportion

of respondents worked in institutions with fewer than 10,000 undergraduate students in both 2016 (62%, $n = 237$) and 2024 (60%, $n = 118$), while the second-largest proportion worked in institutions with 10,000 to 20,000 students in both 2016 (23%, $n = 88$) and 2024 (20%, $n = 39$).

TABLE 1
Respondents' Workplace

Longitudinal Timeline	2016	2024	
Your library is associated with a:	Frequency (%)	Frequency (%)	$\Delta\%$, Sig.
College/Technical Institute**	148 (39)	55 (28)	-11, .008
University*	227 (60)	135 (68)	8, .043
Other ^a	6 (2)	8 (4)	N/A
Total Respondents^b	381 (101)	198 (100)	
Size of Undergraduate Population	Frequency (%)	Frequency (%)	$\Delta\%$, Sig.
Fewer than 10,000	237 (62)	118 (60)	-2, .567
10,000 – 20,000	88 (23)	39 (20)	-3, .356
More than 20,000	57 (15)	41 (21)	6, .081
Total Respondents^b	382 (100)	198 (101)	

Note. Differences in the percentages were tested using a chi-square test for independence.

^aSample was too small for a chi-square test.

^bTotal exceeds 100 due to rounding.

* $p < .05$. ** $p < .01$.

The diversity in respondents' job titles did not change from the previous study. In both 2016 and 2024, respondents' job titles contained the phrase "information literacy" or "instruction." Examples of other job titles specified by respondents include "social sciences librarian" and "director of teaching and learning." Additionally, respondents reported no changes in how their institutions support different disciplines (e.g., art, engineering, and social sciences).

Regarding primary responsibilities for instruction at their institutions, respondents' reported patterns differed between 2016 and 2024. In 2016, reference/public service librarians were reported as the largest proportion (63%, $n = 226$), followed by full-time instruction librarians (55%, $n = 196$). In 2024, this pattern inverted, and full-time instruction librarians were reported as the largest proportion (73%, $n = 128$), followed by reference/public service librarians (39%, $n = 68$) (see Table 2).

TABLE 2
Instruction Staffing

Longitudinal Timeline	2016	2024	
Primary Responsibility for Instruction	Frequency (%)	Frequency (%)	$\Delta\%$, Sig.
Full-time instruction librarian***	196 (55)	128 (73)	18, <.001
Reference/public service librarians***	226 (63)	68 (39)	-24, <.001
Other librarians on staff	101 (28)	59 (34)	6, .089
Other staff, please specify*	43 (12)	31 (18)	6, .041
Total Respondents^a	381	176	

Note. Differences in the percentages were tested using a chi-square test for independence.

^aTotal exceeds 100 because respondents could choose more than one answer.

* $p < .05$. *** $p < .001$.

Time spent on instruction by non-full-time staff at the academic term start versus the rest of the year differed between 2016 and 2024. In 2016, non-full-time staff spent up to 25% at the start of the academic term (41%, $n = 137$), while in 2024, non-full-time staff spent 26% to 50% at the start of the academic term (39%, $n = 67$). Respondents reported similar answers for the remainder of the academic year in both 2016 and 2024, that is, that non-full-time staff spent up to 25% of their time on instruction in both 2016 (59%, $n = 199$) and 2024 (55%, $n = 96$). Respondents reported that staff spend 51–75% of their time on instruction at the start of the academic term in both 2016 (20%, $n = 66$) and 2024 (22%, $n = 39$); this decreased for the rest of the year in both 2016 (9%, $n = 30$) and 2024 (8%, $n = 14$). None of these differences reached statistical significance (see Table 3).

TABLE 3
Instruction by Non-Full-Time Staff

Longitudinal Timeline	2016	2024	
Staff Time on Instruction (non-full-time; start of term)	Frequency (%)	Frequency (%)	$\Delta\%$, Sig.
0–25%	137 (41)	62 (36)	-5, .209
26–50%	123 (37)	67 (39)	2, .674
51–75%	66 (20)	39 (22)	2, .463
More than 75%	10 (3)	6 (3)	0, .772
Total Respondents^a	336 (101)	174 (100)	
Staff Time on Instruction (non-full-time; rest of year)	Frequency (%)	Frequency (%)	$\Delta\%$, Sig.
0–25%	199 (59)	96 (55)	-4, .379
26–50%	107 (32)	63 (36)	4, .322
51–75%	30 (9)	14 (8)	-1, .736
More than 75% ^b	0 (0)	1 (1)	N/A
Total Respondents	336 (100)	174 (100)	

Note. Differences in the percentages were tested using a chi-square test for independence.

^aTotal exceeds 100 due to rounding.

^bSample was too small for a chi-square test.

Instructional Practices in 2016 and 2024

In both 2016 and 2024, most respondents indicated that teaching information literacy is a shared responsibility between faculty and the students themselves for many of the various concepts. However, most respondents conceded in 2016 (39%, $n = 98$) and in 2024 (49%, $n = 68$) that understanding how information is developed, structured, stored, and disseminated is a full responsibility of academic librarians. Likewise, in both 2016 (16%, $n = 39$) and 2024 (17%, $n = 23$), respondents agreed that understanding the legal and ethical implications of information is a full responsibility of academic librarians. Lastly, the largest proportion of respondents in both 2016 (60%, $n = 151$) and 2024 (60%, $n = 83$) indicated that understanding how to adequately search for information with different data structures is a full responsibility of academic librarians. Table 4 shows the perceived distribution of responsibility among various concepts essential for proficiency in information literacy.

TABLE 4
Respondents' Views on Academic Librarians' Level of Responsibility for Various Aspects of Information Literacy

Longitudinal Timeline	2016	2024
Recognizing when information is needed:	Frequency (%)	Frequency (%)
Not responsible	15 (6)	7 (5)
Partially responsible	114 (45)	116 (84)
Fully responsible	25 (10)	15 (11)
Other	98 (39)	N/A
Total Respondents	252 (100)	138 (100)
Understanding how information is generated, organized, stored, and transmitted:	Frequency (%)	Frequency (%)
Not responsible	2 (1)	2 (1)
Partially responsible	99 (39)	68 (49)
Fully responsible	98 (39)	68 (49)
Other	52 (21)	N/A
Total Respondents^a	251 (100)	138 (99)
Understanding some ethical, legal, economic, and sociopolitical information issues:	Frequency (%)	Frequency (%)
Not responsible	2 (1)	5 (4)
Partially responsible	131 (53)	110 (80)
Fully responsible	39 (16)	23 (17)
Other	77 (31)	N/A
Total Respondents^a	249 (101)	138 (101)
Understanding that there exists a wide variety of information sources beyond the obvious:	Frequency (%)	Frequency (%)
Not responsible	1 (0)	1 (1)
Partially responsible	105 (42)	90 (65)
Fully responsible	84 (34)	46 (33)
Other	60 (24)	N/A
Total Respondents^a	250 (100)	137 (99)
Understanding how to locate efficiently and effectively information from many sources:	Frequency (%)	Frequency (%)
Not responsible	0 (0)	1 (1)
Partially responsible	65 (26)	54 (39)
Fully responsible	151 (60)	83 (60)
Other	34 (14)	N/A
Total Respondents	250 (100)	138 (100)
Understanding how to use efficiently and effectively information from many sources:	Frequency (%)	Frequency (%)
Not responsible	2 (1)	4 (3)

TABLE 4
Respondents' Views on Academic Librarians' Level of Responsibility for Various Aspects of Information Literacy

Longitudinal Timeline	2016	2024
Recognizing when information is needed:	Frequency (%)	Frequency (%)
Partially responsible	113 (46)	94 (68)
Fully responsible	62 (25)	40 (29)
Other	70 (28)	N/A
Total Respondents	247 (100)	138 (100)
Understanding how to critically analyze and evaluate information:	Frequency (%)	Frequency (%)
Not responsible	0 (0)	0 (0)
Partially responsible	130 (52)	111 (80)
Fully responsible	39 (16)	27 (20)
Other	79 (32)	N/A
Total Respondents	248 (100)	138 (100)
Knowing how to think critically in general:	Frequency (%)	Frequency (%)
Not responsible	22 (9)	14 (10)
Partially responsible	139 (55)	115 (83)
Fully responsible	9 (4)	8 (6)
Other	81 (32)	N/A
Total Respondents^a	251 (100)	137 (99)

Note. No item was required for participants to answer, which accounts for the varying sample size from item to item. The 2016 data has an "Other" category because participants could choose to enter a free-text comment instead to answer the question, "Who else should be responsible?"

^aTotal percent may vary from 99-101% due to rounding.

Comparison of Groups of Focus

The second-largest proportion of respondents in 2016 (85%, $n = 279$) focused on assisting undergraduate students in certain subject disciplines, while in 2024 (92%, $n = 157$) respondents indicated this category as their largest proportion. A chi-square test showed significant differences in the focuses of undergraduate students between 2016 and 2024 ($\chi^2(1) = 5.70$, $p < .016$). Respondents reported the lowest proportion of assisting communities outside their institutions in 2016 (12%, $n = 38$) and 2024 (8%, $n = 14$) without any significant differences.

Respondents reported minimum changes in relation to their institutions offering formal instructional opportunities (scheduled in advance) between 2016 (92%, $n = 349$) and 2024 (91%, $n = 180$). Respondents working at institutions not offering formal instruction reported similar reasons for this in both 2016 and 2024: understaffing, feelings of burnout, short amount of time for teaching, and a sense that information literacy philosophies were not valued by faculty and administrators. Only 52% of respondents in both 2016 ($n = 179$) and 2024 ($n = 84$) indicated they had a written statement of objectives for their instruction.

Table 5 shows the distribution of topics covered by the respondents in 2016 and 2024. Respondents reported in 2016 that databases (94%, $n = 322$), search strategies (88%, $n = 301$), and library use in general (84%, $n = 287$) were the leading topics of instruction. Comparably,

the largest proportion of respondents in 2024 indicated that databases (98%, $n = 167$), search strategies (95%, $n = 162$), and library use in general (91%, $n = 155$) were the most prominent topics. The topic of generative artificial intelligence is not associated with this longitudinal study as this novel technology has become commonplace only in recent years. However, 21% ($n = 35$) of respondents reported this topic is part of their instruction in 2024. One respondent indicated, “We’re starting to think about how to address AI chatbots.” Future studies can measure the trend for instructing on this technology in academic libraries.

TABLE 5
Instruction Topics

Longitudinal Timeline	2016	2024	
Topics	Frequency (%)	Frequency (%)	$\Delta\%$, Sig.
Print indexes or abstracts	21 (6)	10 (6)	0, .914
Audio-visual materials	51 (15)	22 (13)	-2, .556
CD-ROM resources ^a	1 (0)	1 (1)	N/A
Government documents	52 (15)	26 (15)	0, .968
Library classification system(s)	103 (30)	52 (31)	1, .897
Online databases*	322 (94)	167 (98)	4, .028
Bibliographic management tools	174 (51)	99 (58)	7, .109
Open access resources	93 (27)	56 (33)	6, .171
Other print reference materials***	111 (32)	31 (18)	-14, <.001
Catalogue/OPAC*	264 (77)	114 (67)	-10, .016
Internet/world-wide-web	230 (67)	109 (64)	-3, .508
Library use in general*	287 (84)	155 (91)	7, .021
Electronic documents***	128 (37)	127 (75)	38, <.001
Search strategies (such as Boolean)**	301 (88)	162 (95)	7, .007
Citation metrics	95 (28)	42 (25)	-3, .471
Generative artificial intelligence ^b	—	35	—
Other, please specify	53 (15)	30 (18)	3, .525
Total Respondents	343	170	

Note. Differences in the percentages were tested using a chi-square test for independence.

^aSample was too small for a chi-square test.

^bGenerative AI technology is disseminated to the public after 2016.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 6 shows the methods of instruction employed by respondents between 2016 and 2024. There was a decrease in the reported hands-on instruction in computer labs between 2016 (87%, $n = 299$) and 2024 (80%, $n = 136$). A chi-square test showed significant differences among the responses for using hands-on instruction in the computer lab between 2016 and 2024 ($\chi^2(1) = 4.535$, $p < .033$). The proportions using essay assistance (workshops) also decreased among respondents between 2016 (20%, $n = 66$) and 2024 (12%, $n = 20$). A chi-square test identified a statistically significant association among the responses for essay assistance (workshops) between 2016 and 2024 ($\chi^2(1) = 4.554$, $p < .033$). Also, respondents reported an increased proportion of the use of video recordings (such as YouTube videos) between 2016 (53%,

$n = 182$) and 2024 (62%, $n = 106$). A chi-square test showed significant differences among the responses for using video recordings (such as YouTube videos) between 2016 and 2024 ($\chi^2(1) = 3.985$, $p < .046$).

TABLE 6
Methods of Instruction

Longitudinal Timeline	2016	2024	
Methods	Frequency (%)	Frequency (%)	$\Delta\%$, Sig.
Web tutorials	177 (52)	91 (54)	2, .681
Hands-on instruction in computer lab*	299 (87)	136 (80)	-7, .033
Individualized instruction (one-on-one, in-person)	298 (87)	157 (92)	5, .065
Courseware	49 (14)	22 (13)	-1, .678
Video recordings (such as YouTube videos)*	182 (53)	106 (62)	9, .046
Self-paced library tours	42 (12)	24 (14)	2, .551
Workbook program ^a	4 (1)	1 (1)	N/A
Lectures / demonstrations in subject classes	277 (81)	148 (87)	6, .075
Essay assistance (workshops)*	66 (20)	20 (12)	-8, .033
Additions to course notes for distance students	30 (9)	11 (6)	-3, .371
Group instruction focused on courses/subjects in the library	207 (60)	113 (66)	6, .178
Social media	48 (14)	14 (8)	-6, .060
Flipped classrooms	94 (27)	43 (25)	-2, .787
Embedded librarians	143 (42)	72 (42)	0, .886
Credit course	78 (23)	33 (19)	-4, .389
Noncredit course	26 (8)	9 (5)	-3, .334
Posters	20 (6)	13 (8)	2, .430
Group library tours	112 (33)	53 (31)	-2, .736
Library guides or handbooks web format	175 (51)	81 (48)	-3, .472
Library guides or handbooks paper format	72 (21)	25 (15)	-6, .087
Other	17 (5)	14 (8)	3, .142
Total Respondents	343	170	

Note. Differences in the percentages were tested using a chi-square test for independence.

^aSample was too small for a chi-square test.

* $p < .05$.

Role of Technology: A Comparison in Instructional Practices

Respondents' views on the impact that technology has on their instructional delivery and content were diverse in both 2016 and 2024. In 2016, the largest proportion of respondents indicated that technology has affected the delivery of their instruction quite a bit (42%, $n = 134$), while in 2024, the vast majority reported that technology has affected their delivery only slightly (47%, $n = 76$). The second-largest proportion of respondents in 2016 indicated it only slightly affected them (33%, $n = 106$), while in 2024, they reported it has affected them quite a bit (34%, $n = 5$). Regarding the impact that technology has on the content of their instruction, the largest proportion of 2016 respondents reported it affected them only slightly (41%, $n = 128$), while the highest percentage of 2024 respondents indicated it affected them not

at all (43%, $n = 66$). Even though the delivery of instruction in computer labs (in-person) shifted to Zoom meetings due to the COVID-19 pandemic, respondents reported positive attributes related to this technology. In 2024, respondents reported that the COVID-19 pandemic and the advancement of videoconferencing features contributed to a remote practice in which students could work on their own time (i.e., asynchronously). One respondent indicated there was “more use of instructional objects such as videos, lesson plans, or other digital objects that can be reused across locations.” Another respondent reported that “there were certain class activities (handouts, worksheets, etc.) that had to be rethought and reimagined for the online format.” Other respondents referred to other aspects of instruction; as one noted: “since the pandemic and especially since ChatGPT’s existence, we have shifted to a greater focus on mis/disinformation and authority-related topics when it comes to information literacy.”

Respondents were asked whether changes to technology have influenced student interest or participation in ILI. In the 2016 data, respondents felt that students were more engaged with hands-on practices that included technology (mobile devices to assess learning), relative to 2024 data (33%, $n = 131$ versus 26%, $n = 38$, respectively). A chi-square test showed significant differences between the survey years, specifically that advancement of technology was less influential on student engagement in 2024 ($\chi^2(1) = 14.572$, $p < .001$). Only 14% ($n = 55$) of respondents in 2016 reported that technological changes have not increased the interest of students compared to 33% ($n = 48$) in 2024 ($\chi^2(1) = 10.669$, $p = .001$). Also, the largest proportions of respondents reported that these technological changes improved their instruction in both 2016 (64%, $n = 182$) and in 2024 (47%, $n = 67$). However, in 2016 respondents were more likely than 2024 respondents to answer this question affirmatively ($\chi^2(1) = 11.501$, $p < .001$). In 2016, respondents believed that technology allowed them to reach more students as they used different learning tools. They believed that this allowed librarians to interact more with students and cater to their personal needs. In the 2024 data, respondents reported the development of new applications (e.g., Canva) and videoconferences (e.g., Zoom and Microsoft Teams) that helped them to organize and deliver adequate online instruction. Librarians suggested that online content is more accessible to students who often need to learn in an asynchronous environment. However, respondents mentioned that students’ emotions in videoconferences might not be easy to identify. Only 9% ($n = 25$) of respondents in 2016 reported that technology changes have not improved their instructions compared to 20% ($n = 29$) in 2024 ($\chi^2(1) = 11.330$, $p < .001$). From 2016 to 2024, instruction evolved to incorporate more online resources, became more influenced by technology, catered more to students’ needs for flexible schedules, and adjusted more to the specific needs that arose from the COVID-19 pandemic. The 2024 survey specifically asked about the effects of the pandemic. Respondents noted that onsite computer lab interactions shifted to online resources and videoconferences. And, as one respondent wrote, “it has forced us to reevaluate and update practices that hadn’t been assessed in quite some time.”

Table 7 compares the instructional objective perceptions of academic librarians in 2016 and 2024, ranked from most to least important. In 2016, respondents allocated the highest-ranking average to “teach students how to critically evaluate the quality and usefulness of information” (2.36), while in 2024 their highest-ranking average was to “teach students how to find information in various sources” (1.66). The second highest ranking in 2016 was “teach students general search strategies” (2.48), while in 2024 it was to “teach students how to

critically evaluate the quality and usefulness of information" (1.75). Also, in 2024 respondents indicated a high-ranking average for the "other" category; however, additional comments were not stipulated.

TABLE 7 Instructional Objectives Identified by Librarians		
Longitudinal Timeline	2016	2024
Objectives (ranked from 1, most important, to 6, least important)	Ranking Average	Ranking Average
Teach students how to critically evaluate the quality and usefulness of information	2.36	1.75
Teach students general research strategies	2.48	1.82
Teach students how to find information in various sources	2.64	1.66
Teach students how to locate materials in the library	4.10	2.59
Teach students how databases in general are structured	4.38	2.82
Teaching users how to manage information	5.03	3.13
Teach awareness of technological innovations	5.99	4.29
Other, please state and include ranking	4.36	1.94
Total Respondents	273	156

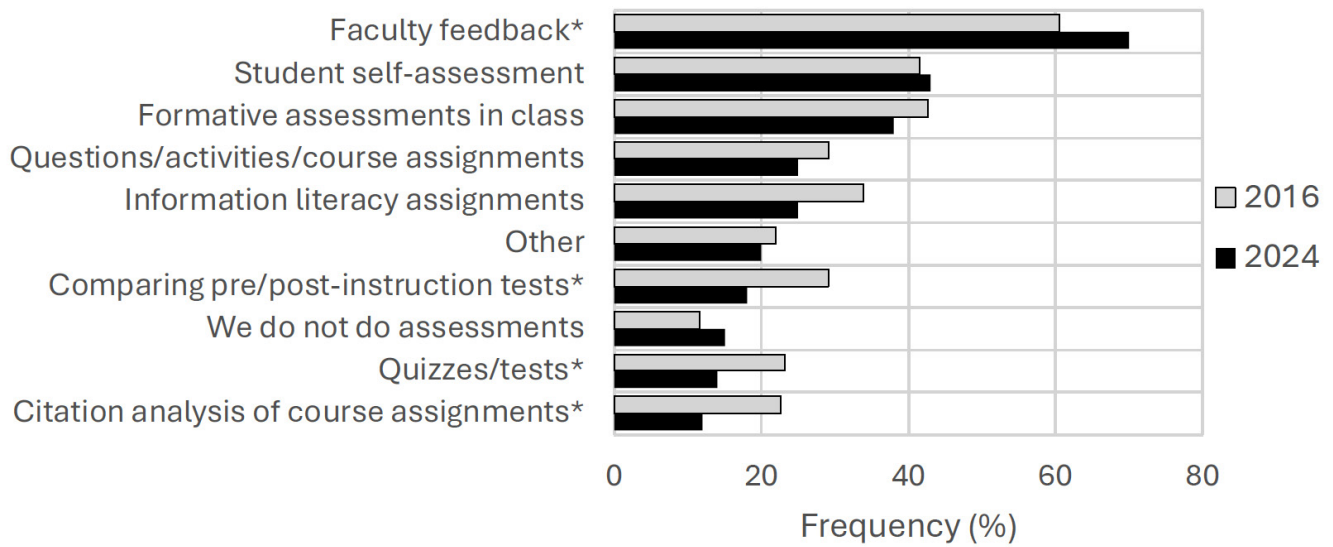
Note. Rank order is presented based on respondent's preferred instructional objective from 2016.

From 2016 to 2024, the focus of instruction was on the critical analysis of information due to the abundance and accessibility of different data types. The COVID-19 pandemic highlighted the need for students to use critical thinking about information sources. Responses to other survey items related to instructional objectives indicate that about half of the respondents similarly perceived that they were meeting their objectives in 2016 (49%, $n = 121$) and 2024 (49%, $n = 68$), while 23% ($n = 57$) in 2016 and 28% ($n = 39$) in 2024 did not know.

Figure 1 displays the differences in assessment of student learning between 2016 and 2024. The largest proportion of respondents reported that they assessed students through "faculty feedback" in 2016 (61%, $n = 152$) and 2024 (70%, $n = 98$). A chi-square test ($\chi^2(1) = 3.127$, $p = .077$) suggested that this type of assessment varied significantly between 2016 and 2024. The lowest proportion of respondents in 2016 and 2024 assessed the learning of their students "by comparing pre/post-instruction test" (29%, $n = 73$ versus 18%, $n = 25$), "through quizzes/tests" (23%, $n = 58$ vs. 14%, $n = 20$), and "through citation analysis of course assignments" (23%, $n = 57$ vs. 12%, $n = 17$), respectively.

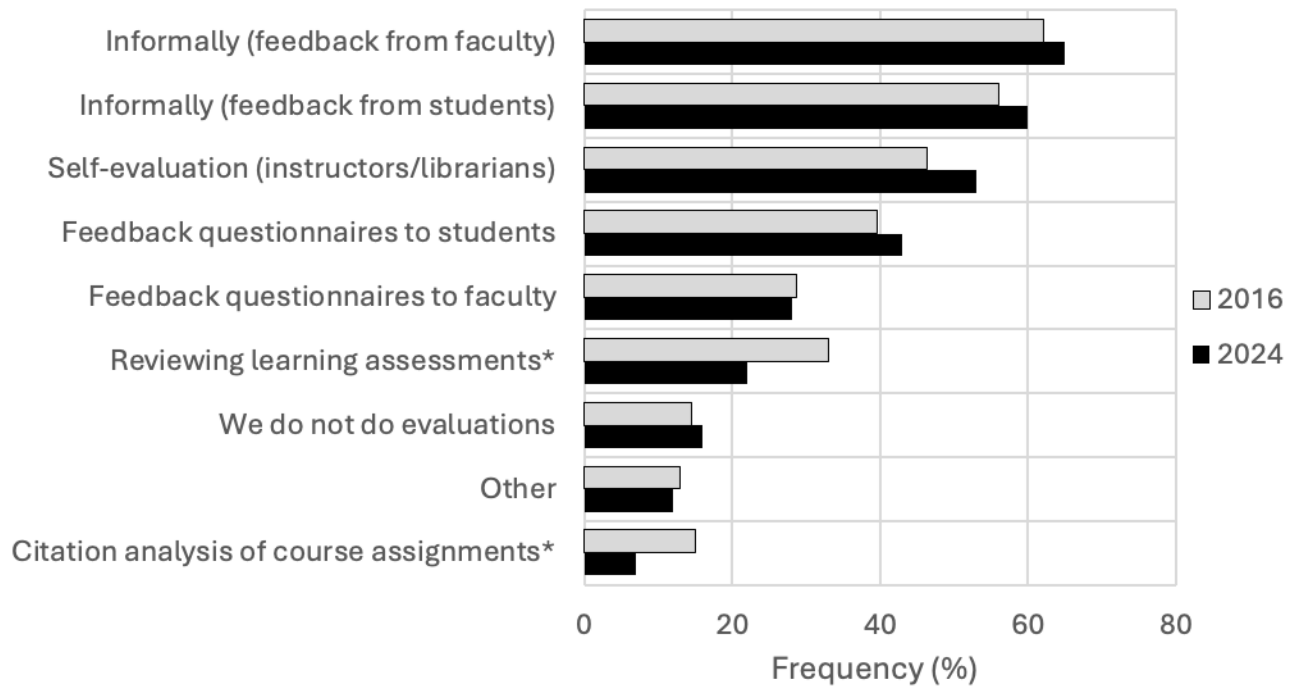
Figure 2 displays the differences in evaluations between 2016 and 2024. There were no significant differences in the largest proportion of responses, and most respondents reported informal feedback received from faculty. The lowest proportion of respondents in 2016 and 2024 evaluated instructional success "by reviewing learning assessment results" (33%, $n = 82$ versus 22%, $n = 30$) and "through citation analysis of course assignments" (15%, $n = 37$ versus 7%, $n = 10$), respectively.

Also, the smallest proportion of respondents reported that the *Framework* did not inform their instruction at all in 2016 (12%, $n = 20$) and 2024 (4%, $n = 6$). A chi-square test ($\chi^2(1) = 5.601$, $p > .018$) identified a statistically significant difference, indicating that their perception



The asterisk (*) indicates statistically significant difference ($p < .05$).

Figure 1. Assessment of Student Learning



The asterisk (*) indicates statistically significant difference ($p < .05$).

Figure 2. Evaluation of Instructional Practices

of the *Framework* differed between 2016 and 2024. Most respondents reported that the *Framework* had a significant influence on their instruction in 2016 (43%, $n = 74$) and 2024 (54%, $n = 76$); however, there was no statistical significance in this pattern. Respondents reported that the *Framework* has helped with the content and structure of instruction, and it supported the evolution of their teaching ideas and methods. However, they felt there was not enough time in one-shot sessions to teach all these concepts. The *Framework* was not adaptable for short sessions (i.e., one-shots) in which they needed to teach other fundamentals (e.g., searching, web navigation). In addition, respondents felt that students are accustomed to a Google search engine model and therefore they lack the necessary search skills for databases. Meanwhile, the *Framework* expects those skills to have been previously acquired. One respondent wrote, “the sunseting of the original information literacy standards was frustrating,” while another stated “we don’t have much time or opportunity to do ALL of them [the frames] well. I would prefer some of them also to be better defined and more skills related.”

Respondents reported limited support for instructional activities. In both 2016 and 2024, funding for instruction varied considerably between institutions. Respondents reported that when funding was available, it was assigned to technology (e.g., devices, subscriptions) for instruction. Overall, respondents reported that the amount allocated for instruction was too limited. Respondents to both the 2016 and 2024 surveys utilized similar methods to publicize their instruction, including letters (75%, $n = 187$ versus 76%, $n = 106$), professional development meetings (57%, $n = 143$ versus 58%, $n = 38$), social media (33%, $n = 82$ versus 26%, $n = 37$), flyers (17%, $n = 42$ versus 18%, $n = 25$), and personal faculty contacts (94%, $n = 234$ versus 91%, $n = 127$), all respectively. In the 2016 data, respondents were more likely to report direct personal contact with faculty to publicize instructional programs, in comparison to respondents in 2024 who reported that communication occurred often in professional development meetings. However, there was no statistical significance in this pattern in any of these methods.

Discussion and Conclusions

Respondents reported similar challenges to their instructional practice in 2016 and 2024. Respondents reported a lack of faculty engagement and sometimes respect (Becker et al., 2022; Cox et al., 2023), low student attendance and participation, limited instruction time, language barriers, and toxic work environments. Also, they highlighted excessive workloads due to understaffing, not knowing students’ learning outcomes, and the absence of adequate technological resources. One respondent commented “I can’t believe this is where we’re still at 24 years after the IL standards came out. If anything, the library has less standing and respect at the university than it did then.” These pressures, exacerbated by resource challenges led another respondent to note, “the library is also understaffed, with only one full-time librarian at each location (two campuses), which makes it much harder to promote instruction when the librarian is wearing all the hats.” Respondents reported feeling stuck and indicated that they wanted to do a better job but needed more support from their institutions to accomplish this goal. Stated one respondent, “I do not feel like it is valued by higher administration.” The expectations librarians place on themselves for ILI, as well as those placed on them by campus administrators and faculty, are clearly not matched by the limited resources and perceived respect provided. This challenge is longstanding and deeply resented. There are multiple reasons for this ongoing conundrum, including the neo-liberal environment that prioritizes short term outputs over investments in activities, such as ILI, that could have significant positive long-term impacts for students’ working and personal lives. Other

challenges include campus politics relating to credentialing (e.g., faculty generally hold PhDs, while librarians generally do not), and gendered power relations (Julien & Pecoskie, 2009).

The COVID-19 pandemic and rapid advances in technology catalyzed the adoption of online pedagogical methods and topics of focus. This is a clear indication to MLIS programs to ensure appropriate preparation for future instructional librarians. MLIS programs also need to prepare future instructional librarians for the challenges they may face in the workplace, particularly complex relationships with faculty, challenges engaging students, and limited campus support for instructional work. In addition, some librarians continue to experience the *Framework* as limited in its usefulness; therefore, a thorough understanding of the *Framework* and practical guidance on how to implement it are needed, both for future librarians, and currently practicing ones. The study points to multiple opportunities for improvement to practice, including articulating formal learning objectives, formally assessing student learning, and evaluating the success of instructional efforts. Such opportunities have been apparent for the nearly 30 years that these general surveys have been conducted in North America. Thus, this study makes clear that instructional librarians need support to meet their professional goals. Library leaders have a responsibility to ensure that preparing students to meet the academic, professional, and personal challenges awaiting them is a goal that remains at the heart of campus libraries. That goal needs support: instructional librarians need the time, the training, and the resources to meet those goals. In addition, librarians need to identify opportunities to push back against the structural barriers impeding their goals (Latham et al., 2025); invoking the *Framework* may provide such opportunities.

Instructional practices and their context should be regularly surveyed to track progress and to identify opportunities for change. There are undoubtedly variables of interest to the field which have not been included in this survey, and areas of specific interest that merit more in-depth investigation. Some of this research must include interviews with instructional librarians (e.g., Julien et al., 2022), and with the library administrators who facilitate their work to explore these findings more deeply. The perspectives of faculty, with whom librarians have complicated relationships, also need further exploration, as do the voices of students who are the intended beneficiaries of ILI. While these kinds of studies exist, they should be conducted periodically, to track progress and to identify new challenges that hinder instructional success.

Acknowledgments

The authors are grateful to the librarians who helped pretest the survey and those who took the time to share their experiences and insights by responding to the survey.

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Tracing Thematic Evolution in *College & Research Libraries*: A Co-LCSH Analysis of Book Reviews (1997–2023)

Kemal Yayla*

This study examines publication patterns and thematic developments in library and information science (LIS) through book reviews published in *College & Research Libraries* (1997–2023). Employing Co-LCSH (co-occurrence analysis of Library of Congress Subject Headings) network analysis, the findings reveal an unexpected increase in book review frequency, contrasting with declines in other fields. Additionally, a temporal lag between the emergence of new research themes and their broader representation in LIS trends underscores the reflective role of book reviews. This suggests that LIS professionals engage with contemporary research by regularly evaluating book reviews and linking theory and practice. By tracing thematic shifts, the study demonstrates how book reviews capture the intellectual evolution of LIS, as well as their continued relevance in scholarly communication. These findings enrich academic and research librarianship by illuminating the pivotal role of book reviews in bridging practical insights with the broader intellectual discourse.

Introduction

The evolution of scholarly communication in library and information science (LIS) is evident not only in research articles but also in the often-overlooked medium of book reviews. While academic journals primarily emphasize research-driven publications, nonresearch content like book reviews plays a vital role in documenting emerging research trends and bridging theoretical advancements with practical applications (Frey, 2003; Kaltenbrunner et al., 2022). However, the growing prioritization of research output has led many journals to reduce or eliminate their book review sections, potentially disregarding the unique contributions of book reviews to intellectual discourse and professional practice (Hartley et al., 2017; Hartley, 2018).

In LIS, practitioners are integral to advancing the discipline and profession through their research contributions. They enhance problem-solving and decision-making in professional contexts, critically evaluate scholarly literature, and provide specialized information services to researchers across various fields (Powell et al., 2002). Collaboration in research activities, participation in professional events, and the dissemination of findings through scholarly outputs are essential for the career progression of LIS practitioners, particularly those in academic

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roles (Given et al., 2022; Nguyen & Hider, 2018; Ramos-Eclevia et al., 2018). However, barriers to conducting and publishing research persist, highlighting a gap between the research outputs of practitioners and their academic counterparts (Clapton, 2010; Hall, 2010). Book reviews offer a distinctive perspective in this context, serving as a medium through which practitioners can engage with new ideas, methodologies, and theoretical frameworks. Unlike research articles, which often rely on author-assigned keywords, book reviews reflect broader intellectual assessments and professional responses, making them a valuable tool for tracing the thematic evolution of the field. *College & Research Libraries (C&RL)* exemplifies this, functioning as a unique platform where practitioners and researchers collaborate in advancing LIS scholarship (Terry, 1996; Chang, 2016; Lund & Wang, 2021). Despite being undervalued in academic publishing (Riley & Spreitzer, 1970), book reviews provide critical insights into the development of LIS, particularly when written by practitioners. These reviews not only document trends but also facilitate the integration of practical perspectives into scholarly discussions, offering a bridge between professional practice and academic inquiry. This study examines the thematic evolution of LIS through the innovative application of Co-LCSH (co-occurrence analysis of Library of Congress Subject Headings) analysis of book reviews published in *C&RL* from 1997 to 2023, providing a structured framework to explore how book reviews capture and reflect intellectual developments in the field.

The remainder of this paper is organized as follows: First, we present a comprehensive literature review examining the multifaceted roles of book reviews in scholarly communication as well as their significance in LIS. The methodology section details our innovative approach to analyzing book reviews through Co-LCSH networks, explaining how this method enables us to trace thematic developments over time. The results section presents findings in three key areas: descriptive statistics of publication patterns across editorial periods; conceptual changes between periods; and a detailed theme evolution map. The discussion synthesizes these findings to illuminate how book reviews have documented and influenced the intellectual trajectory of LIS, particularly in capturing the transition from traditional library-centric themes to emerging areas, such as digital transformation and social justice. We conclude by considering the implications of our findings for understanding both the evolution of LIS as a field and the continuing significance of book reviews in scholarly communication.

Literature Review

Academic book reviews fulfill various roles, including advertising new publications to readers and libraries, and introducing critical perspectives that contribute to academic discourse. They offer a platform for authors and critics alike to participate in the scholarly evaluation and critique of literary works, thereby influencing the development of their academic fields. Moreover, book reviews contribute to cultural capital by providing insightful analyses and critiques (Obeng-Odoom, 2014). Through these functions, book reviews serve as an essential map of a field's priorities, highlighting significant works and prevailing values (Nicolaisen & Frandsen, 2007). They can be classified into four main types—academic journal reviews, mainstream media reviews, commercial reviews, and reader reviews—each targeting a distinct audience (Roncevic, 2018). We have focused on academic book reviews that provide longer, more detailed analyses, catering to the intellectual requirements of specialists in particular fields (Lindholm-Romantschuk, 1998; Zinkhan & Clark, 1995).

Despite declining book review sections within academic journals (Hartley, 2018), some journals maintain these sections, acknowledging their importance as platforms for scholars

to articulate viewpoints, affirm paradigm commitments, and foster disciplinary knowledge development. Through critical assessments of books in their fields, scholars engage in dialogues that not only delineate but also advance their research domains, thereby enabling the discovery of novel insights (Hyland, 2009). Structured predominantly around the reviewer's perspective and critical appraisal of another's work, book reviews represent a uniquely personal form of academic publication (Di Leo, 2009; East, 2011), facilitating direct interaction among community members through exchanging ideas and critiques. Moreover, composing book reviews provides scholars with an expedient means to disseminate their perspectives on emerging topics or contentious issues, circumventing the protracted process of peer review and revision associated with full-length articles (Oinas & Leppälä, 2013). This is particularly invaluable in disciplines characterized by long peer-review periods.

Exploring book reviews across scientific disciplines has not occurred in isolation; it reflects a broader scholarly engagement with evaluating and disseminating knowledge. Jaakkola (2022) comprehensively delineates the expansion of book review practices, underscoring the varied motivations that drive scholars from diverse fields to engage in reviewing activities. We grouped the literature into different perspectives to demonstrate this scholarly development (see Table 1). These categories—from ethics of reviewing and practical advice to rhetorical analyses and historical studies—highlight the diverse nature of book reviews as an academic subject. This shift has not only changed how critics analyze and prioritize the parts of book reviews but has also greatly affected their structure and themes over time.

TABLE 1
Book Reviews Perspectives

Category	Studies
Ethics of Book Reviewing	(Wiley, 1993; Ashley, 2002; Byrne, 2002; Tobin, 2003)
Personal Reflections and Experiences	(Ingram & Mills, 1989; Stowe, 1991; Lehmann & Walther, 1993; Cortada, 1998; Zylinska, 1999; Lev, 2010; Oinas & Leppälä, 2013)
Rethinking Book Reviewing	(Henige, 2001; Latz & Murray, 2012; Schneider, 2003; Spink et al., 1998; Tulley & Blair, 2009)
Language, Discourse, and Rhetoric	(Bal-Gezegin, 2015; Bal-Gezegin & Bas, 2020; Birhan, 2021; Itakura & Tsui, 2011; Jalilifar & Tanavar, 2015; Motta-Roth, 1995; North, 1992; Rowland et al., 2019; Salager-Meyer et al., 2007; Tse & Hyland, 2006; Zou & Hyland, 2022)
Practical Advice	(Bilhartz, 1984; Brown, 2018; Chenail, 2010; Hartley, 2010, 2018; Kanda, 2013; Lewis, 2022; Sturm, 2022)
Comparative Studies	(Abrizah & Thelwall, 2014; Bal-Gezegin, 2015; Hartley, 2006; Kozubíková Šandová, 2019; Larrègue et al., 2019; Moreno & Suárez, 2008; Motta-Roth, 1995; Nicolaisen, 2002)
Historical Perspectives	(Black, 2011; Ellis, 2007; Flanders, 1979; Hérubel, 2020)
Genre, Functions, Motivations	(Carlo & Natowitz, 1995; Cesiri, 2016; Champion & Morris, 1973; Clark & Mai, 2000; Di Leo, 2009; East, 2011; Greene & Spornick, 1995; Hartley, 2005, 2008; Hyland & Diani, 2009; Jaakkola, 2022; Lindholm-Romantschuk, 1998; Mackiewicz, 2007; Obeng-Odoom, 2014; Orteza y Miranda, 1996; Riley & Spreitzer, 1970; Roncevic, 2018; Snizek & Fuhrman, 1979; Zinkhan & Clark, 1995)

The breadth of these categories demonstrates that academic book reviews have evolved from being merely evaluative texts to becoming a distinct object of scholarly investigation in their

own right. Apart from the viewpoints mentioned in Table 1, LIS researchers have used book reviews beyond academic discourse. For instance, Serebnick's (1981) study highlights the dependency of medium-sized public libraries on book review journals for curating their adult nonfiction collections, a sentiment echoed by subsequent research. Blake (1989) and Parker (1989) further elaborate on the indispensable role of book reviews in guiding librarians' collection management decisions. This practice leverages scholarly book reviews as a strategic tool for enhancing library collections.

Although book reviews have been acknowledged as valid scholarly output by different academic communities, they are often neglected in bibliometric analyses. This omission could potentially undermine the perceived contribution of book reviews to scholarly discourse. Nevertheless, book reviews have gained recognition as a valuable data source for assessing the scholarly impact of books (W. Liu et al., 2017; Wei & Fan, 2018). For example, Nicolaisen (2002) introduced a bibliometric methodology to evaluate the academic value of book reviews. This approach uses strategic research materials and empirical sources to clarify the phenomena under investigation. It enables academics, publishers, and editors to assess the quality of book reviews across various academic contexts. Building on this foundation, Gorraiz et al. (2014) further explore the utility of book reviews in developing book citation indexes (BKCI). They posit that book reviews are a practical selection criterion due to their simplicity and transparency. Their findings reveal that books accompanied by reviews tend to garner a higher citation count, underscoring the potential of reviews to shed light on a book's impact on the research community. Unlike peer reviews, which precede publication, book reviews are conducted post-publication, precluding any immediate influence on the book's content until subsequent editions. This characteristic enables the identification of relevant books through their reviews, a feature particularly beneficial in disciplines where books play a more central role, such as the social sciences, arts, and humanities.

In similar study, Zuccala et al. (2014) introduce the concept of "megacitation" to transform qualitative scientific book reviews into a weighted bibliometric indicator in a novel application of book reviews. Employing a manual human coding technique, the researchers analyze book reviews within the history discipline, categorizing them based on the reviewers' assessment of the author's scientific credibility (SC) and writing style (WS). Subsequently, they develop a classifier that integrates manual coding with machine learning to detect sentiment-based sentences within history book reviews. Their study demonstrates that a combination of weighted extensive citations, traditional book/journal citations, and "lib-citations" (i.e., library holdings) could be comprehensive tools for assessing a book's scholarly impact.

The earlier literature review highlights book reviews' various roles in scholarly communication, from facilitating critical discourse to functioning as a bibliometric tool to assess academic impact. Our study aims to offer a new perspective by examining the specific nature of the books reviewed in *C&RL*. We seek to investigate the connection between the subject headings of reviewed books that form themes and the interests of librarians and researchers, particularly those not directly engaged in academic publishing. To do so, we have employed a data-driven case study approach and created theme maps from the Library of Congress Subject Headings of reviewed books. We hope to illuminate how book reviews, besides their immediate academic or cultural contributions, reflect and may potentially guide the scholarly foci within LIS. This would offer new insights into the dynamics of academic knowledge dissemination and the implications of book reviews in the LIS academic ecosystem.

Data and Methodology

Web scraping as a data collection method offers significant advantages for analyzing scholarly communication patterns and tracking intellectual development within academic disciplines (Luscombe et al., 2022). Prior bibliometric analyses of book reviews have predominantly relied on indices from the Web of Science as their primary data source (Hartley et al., 2016, 2017; W. Liu et al., 2017; Wei & Fan, 2018). While these studies have primarily focused on assessing the impact and citation performance of book reviews, they often overlook the rich contextual information embedded in the full text of reviews and their associated metadata.

Our study introduces a novel methodological approach that integrates automated web scraping techniques with the analysis of LCSH. This methodology is particularly valuable because book reviews, unlike research articles, do not include author-assigned keywords, which are essential for conducting traditional co-word analyses. Instead, LCSH provides standardized and controlled vocabulary, enabling a structured thematic categorization of books and offering an effective proxy for keywords (Ferris, 2018; Cooley & Phillips, 2023). This controlled vocabulary enhances the precision of thematic analysis and information retrieval processes (Shu et al., 2017).

To operationalize this approach, we compiled a dataset from subject headings included in book reviews published in *C&RL*, which serves as a key platform for scholarly dialogue between practitioners and researchers in the LIS field (Chang, 2015; Terry, 1996). We extracted these subject headings from catalog records available on openlibrary.org, demonstrating the feasibility of leveraging catalog data for bibliometric research. This innovative methodology addresses the challenges posed by the absence of keywords in book reviews and expands the analytical possibilities for studying this unique genre within scholarly communication.

Data Collection

To compile the dataset, we systematically screened book review publications from *C&RL* between 1997 and 2023, focusing on those that included ISBN-10 and ISBN-13 codes in their titles. Following best practices in web scraping methodology (Dogucu & Çetinkaya-Rundel, 2021), we implemented a “gather-narrow-extract” framework (Anglin, 2019): initially gathering all potentially relevant book reviews, then narrowing down to those containing ISBN information using regular expressions (see Figure 1), and finally extracting specific data points for analysis.

Our data collection process comprised three distinct phases. In the first phase, initial data gathering, we developed a systematic web scraping protocol to collect book reviews from the *C&RL* website while strictly adhering to ethical guidelines. We designed the scraping algorithm to respect the site’s robots.txt file and incorporated appropriate delays between requests to minimize server load, ensuring comprehensive coverage of book reviews published during the specified timeframe. In the second phase, we employed data verification and cleaning, regular expressions (see Figure 1) to identify and extract ISBN-10 and ISBN-13 codes embedded in the review titles. This automated process facilitated efficient and reliable data extraction while maintaining data integrity. The verification process entailed ensuring data

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!r" ISBN[-:~]?((?:10|13)?[-:~]?((?:\d{3}-)?\d{1,5}-?\d{2,7}-?\d{1,7}-?[\dX]))
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Figure 1. Regular Expression of Screening of ISBN on Book Review Titles

quality through systematic identification of ISBN codes, establishing verifiable links between book reviews and catalog records, and cross-referencing extracted ISBNs with authoritative bibliographic sources to enhance accuracy. In the final phase, catalog data integration, we cross-referenced the extracted ISBNs with catalog records on openlibrary.org to obtain standardized LCSH data.

TABLE 2 Sample Data Structure Used for Co-LCSH Analysis	
ISBN	Subject
0120885530	Webometrics
0120885530	Link analysis
0124874150	Communication in science
0124874150	Communication of technical information
0124874150	Communication systems
0124874150	Research

Table 2 provides a snippet of the resulting data structure, illustrating how each book, identified by its ISBN, is linked to multiple subject headings. This step included automated matching of ISBNs with catalog entries, as well as manual review to resolve discrepancies caused by typographical errors or incorrect characters in the source data. Additionally, cases where catalog matches could not be found were carefully documented to ensure transparency. Through this systematic approach, catalog data for 848 books were successfully retrieved, corresponding to a success rate of 97.6% out of 869 identified reviews. The 21 unmatched books primarily resulted from typographical errors in the original ISBNs, books not being cataloged on <https://openlibrary.org/>, or the presence of multiple editions with different ISBNs. The resulting dataset provides a comprehensive foundation for analyzing thematic trends in LIS scholarship through book reviews. By employing a transparent, rigorous, and scalable methodology, this study offers significant insights into bibliometric analysis within the field.

Methods

Contemporary bibliometric studies increasingly employ social network analysis (SNA) to explore the intellectual structure of co-word network maps, offering new insights into scholarly communication and thematic developments (Khan & Trier, 2019; Y. Liu et al., 2016). Building on this methodological tradition, our study integrates three complementary SNA approaches: co-word analysis, structural holes analysis within co-word networks, and thematic evolution mapping. This integrated approach facilitates a comprehensive examination of thematic development in book reviews published in *C&RL*. Below, each method is described in detail.

Co-Word Analysis

This study employs co-word analysis, a sophisticated bibliometric method grounded in co-occurrence analysis, to uncover thematic patterns in book reviews. This approach is particularly effective for exploring the interconnections of concepts, ideas, and issues within a specific scientific domain, while simultaneously investigating its underlying conceptual framework (Callon et al., 1983). Unlike conventional text analysis, which assumes that keywords adequately summarize an article’s content and reveal topic connections, co-word analysis delves deeper, offering richer analytical insights (Callon et al., 1991; Leydesdorff, 1997).

Co-word analysis identifies impactful vocabulary and traces the evolution of knowledge fields by analyzing word co-occurrences and their shifts over time. It adopts both a rhetorical and sociological lens, using keywords as proxies for objective phrases that encapsulate a field’s knowledge structure (He, 1999). By examining the co-occurrence of significant word

pairs, this method extracts scientific themes without relying on predefined topics, allowing for impartial monitoring of theme interactions and changes in topical focus (Ding et al., 2001).

The underlying premise of co-word analysis suggests that the frequent appearance of terms signals distinct research topics. For example, when two keywords consistently co-occur within articles, it indicates a meaningful relationship and demonstrates their topical linkages (Callon et al., 1983; Leydesdorff & Hellsten, 2006). Such recurring patterns signify strategic thematic alliances and provide insight into the domain's conceptual structure (Muñoz-Leiva et al., 2012).

In our implementation, keywords are represented as nodes in network graphs, while the links between nodes signify connections between keywords. The frequency of co-occurrence determines the strength of these connections. Analyzing all nodes and their interconnections allows for the visualization of both the position of individual terms and the clustering of keywords within the network. This approach also facilitates temporal tracking of changes within the conceptual space, enabling the visualization of the field's intellectual structure as an evolving network (Bai et al., 2021; Ding et al., 2001; He, 1999). For instance, a term like "open access" might bridge distinct clusters, such as digital repositories and information policy, indicating its strategic role in connecting these themes.

Structural Holes

The concept of structural holes, derived from social network theory, emphasizes the informational advantages that emerge when an actor bridges otherwise unconnected groups (Burt, 1992). These structural holes represent opportunities for entities to establish critical connections between otherwise disparate network segments. Such bridging connections are particularly valuable in network analysis as they facilitate communication and the flow of information between isolated components (Burt, 2004, 2021).

To operationalize this concept, we employed NetworkX (Hagberg et al., 2008), a Python-based social network analysis library, to calculate constraint values for keywords using Burt's constraint measure. The constraint value (C) for a node ranges from 0 to 1, where higher values indicate fewer structural holes and more redundant connections. Conversely, lower constraint values suggest that a keyword serves as a bridge between otherwise disconnected themes in the co-word network. The significance of a keyword's bridging role is thus directly related to how low its constraint value is, making keywords with minimal constraint values particularly important for understanding the intellectual structure of the field.

Theme Evolution Mapping

To trace thematic development over time, we constructed a thematic evolution map that highlights focal areas from a temporal perspective. This method visualizes changes in thematic focus across four distinct periods, segmented based on the tenure of book review editors: 1997–2008, 2009–2014, 2015–2019, and 2020–2023 (Cobo et al., 2011). This segmentation enables systematic examination of how themes evolve across editorial eras and reflects changes in the intellectual priorities of the field.

For each period, we generated Co-LCSH networks using compiled catalog records. These networks were constructed using the co-word analysis method, where subject headings were treated as nodes, and their co-occurrence in catalog data formed the edges connecting them. The frequency of co-occurrence determined the strength of these connections, enabling the

identification of thematic clusters and their relationships within the network. Table 3 presents the network characteristics for each period, including the number of nodes (i.e., unique subject headings) and edges (i.e., co-occurrence relationships). Substantial variations in network size and density across periods illustrate the evolving nature of scholarly discourse. For instance, the decline in edge density from 2009–2014 to 2020–2023 suggests a trend toward greater specialization or fragmentation within the field. The co-word approach provided a detailed framework for exploring these changes, as it allowed for the identification of evolving themes and their interconnectedness over time. For visualization, we utilized Gephi (Bastian et al., 2009), a robust network visualization and community detection tool. We generated layouts using the ForceAtlas2 algorithm (Jacomy et al., 2014), with manual adjustments to optimize visual clarity.

TABLE 3
Co-LCSH Networks by Periods

Period	URL	Count of Nodes	Count of Edges
1997–2008	https://rb.gy/fzntwv	1,005	9,486
2009–2014	https://rb.gy/o8b5j4	504	3,296
2015–2019	https://rb.gy/iqh2h3	353	3,710
2020–2023	https://rb.gy/u6ox0q	309	1,643

Given the complexity of these networks, static visual representations might not effectively convey the intricate connections and evolving thematic structures. To address this, interactive network visualizations are available via the URLs listed in Table 3. These interactive graphs allow readers to explore each period's network online, offering a more dynamic and detailed examination of node relationships and structural properties. By navigating these interactive networks, readers can gain deeper insights into the thematic evolution of the field, which would be difficult to achieve through static images alone.

Thematic identification within Co-LCSH networks was achieved through modularity-based clustering, with structural hole values calculated for each node. The node with the smallest structural hole value within each connected subnetwork was designated as the theme's identifier. Themes that maintained identical structural holes across periods were labeled "thematic nexus" or "conceptual nexus," signifying persistent scholarly conversations. To construct the thematic evolution map, the identified themes for each period were arranged in chronological order to capture their temporal transitions. Each theme, represented by the node with the smallest structural hole value in its respective subnetwork, was positioned within the evolution map. The relationships among themes across periods were visualized using NetworkX (Hagberg et al., 2008) package, which facilitated the creation of directed graphs connecting themes based on their structural hole properties and thematic continuity. The resulting thematic structure was conceptualized as a bipartite graph, where vertices are partitioned into two distinct sets (e.g., U and V), and connections occur only between elements from different sets. Theme relationships were quantified using the inclusion index: dashed lines indicate similar structural holes, while continuous lines represent perfect matches between themes.

This comprehensive mapping approach provides a systematic framework for understanding the temporal evolution of themes within the LIS field, while the interactive visualizations

enable detailed exploration of thematic relationships and structural changes over time. The combination of quantitative network analysis and visual representation offers insights into both the persistence of established themes and the emergence of new scholarly conversations within the field.

Results

Descriptive Statistics

The study analyzed 869 book reviews published in *C&RL* between 1997 and 2023. The violin plot analysis (see Figure 2) reveals distinct distribution patterns across different editorial periods, highlighting the evolution from consistent to more flexible publication practices over time.

During Period 1 (1997–2008), the journal exhibited a remarkably consistent publication pattern, with a narrow distribution centered around 35 book reviews annually (min = 34, max = 36), demonstrating minimal variance. This phase represents the most stable period in the journal's book review publication history. In contrast, the subsequent periods show increasing variability in the distribution of published reviews. Period 2 (2009–2014) features a bimodal distribution, with most of the reviews clustering around 34 per year; an extreme outlier of only three reviews in 2014 suggests an anomaly in that year. Moving into Period 3 (2015–2019), the distribution becomes wider and more uniform, ranging from 24 to 34 reviews annually. This indicates greater variability in publication practices during this period. The most recent period, Period 4 (2020–2023), shows the broadest distribution range, spanning from 28 to 55 reviews. A notable peak of 55 reviews in 2022 marks a significant shift in the book review publication practices during this time. Across the entire study period, the median number of book reviews per year was 34, with a mean of 32.4 reviews.

The violin plot clearly illustrates the evolution of review distribution, transitioning from the highly concentrated pattern seen in Period 1 to the increasingly dispersed patterns in the following periods. Notably, Period 4 displays the most pronounced variation, suggesting a shift from a strictly regulated publication pattern to a more flexible approach in managing book review sections.

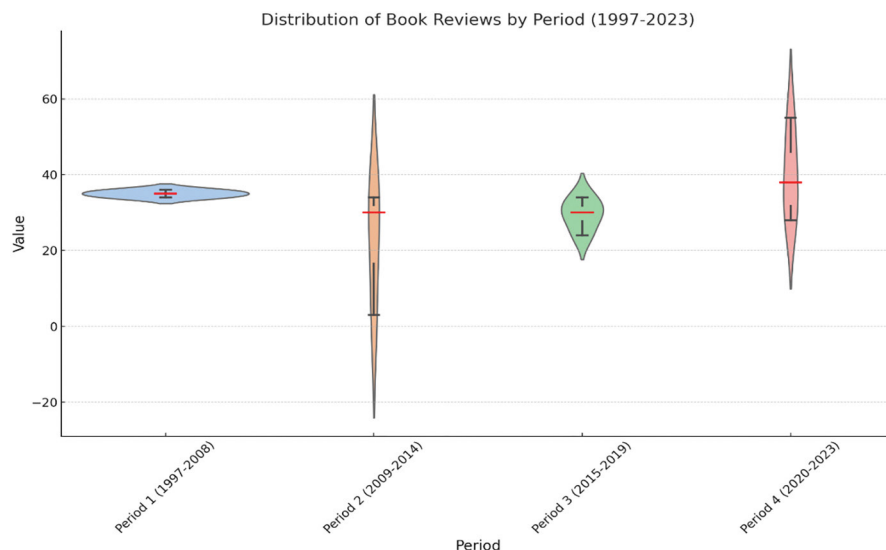


Figure 2. Book Review Publication Patterns Across Editorial Periods

Conceptual Change Between Periods

Building upon the publication pattern analysis, we examined the conceptual evolution of the field through co-word analysis, employing both degree and eigenvector centrality metrics to identify influential concepts and their relationships across the four identified periods. The network analysis reveals significant paradigmatic shifts that parallel the evolving reviewed books while highlighting distinct intellectual priorities within LIS.

Emergence of Digital Integration (1997–2008)

During this foundational period, which coincides with the journal's most stable publication patterns, the LCSH co-occurrence network reached its broadest scope (1,005 nodes, 9,486 edges). This extensive network structure reflects the field's dual focus on integrating traditional library science concepts with emerging digital paradigms. Centrality analyses identify "libraries" as the most influential term (eigenvector centrality: 1.000; degree centrality: 271), followed by "history" (eigenvector: 0.891; degree: 310), and "computers" (eigenvector: 0.799; degree: 131). These findings illustrate the coexistence of traditional and technological frameworks within the intellectual landscape of the field. Notably, field-specific terms such as "information superhighway" (eigenvector: 0.595; degree: 75) and "computers and civilization" (eigenvector: 0.474; degree: 61) exhibit high eigenvector centrality despite lower degree centrality, underscoring their strategic role in bridging traditional and digital domains. This period reflects the field's early efforts to navigate the challenges of digital integration while retaining its traditional scholarly foundations.

Technological Integration and Knowledge Framework Transformation (2009–2014)

In contrast to the previous period's broad scope, the 2009–2014 phase witnessed a contraction of the network structure (504 nodes, 3,296 edges), indicating a more focused and consolidated conceptual framework. While "libraries" maintained its central position (degree: 122; eigenvector: 0.989), the emergence of "digital libraries" (degree: 61; eigenvector: 0.499) marks a pivotal shift toward digital transformation. This transition highlights the deliberate incorporation of technological concepts into the field's intellectual discourse. Additionally, terms such as "effect of technological innovations" (degree: 66; eigenvector: 0.617) and "information literacy" (degree: 56; eigenvector: 0.514) demonstrate disproportionate centrality values, indicating their role as conceptual bridges linking traditional library science with emergent knowledge domains. These patterns suggest the evolution of LIS toward a socio-technical framework, aligning with broader trends in technological adoption and knowledge organization.

Academic Specialization and Research Focus (2015–2019)

Building upon the technological consolidation of the prior period, the 2015–2019 phase saw an intensification of the network structure (353 nodes, 3,710 edges). "Academic libraries" (degree: 145; eigenvector: 1.000) emerged as the most central node, reflecting a shift toward academic contexts and collaboration. The prominence of "case studies" (degree: 102; eigenvector: 0.776) and "research" (degree: 94; eigenvector: 0.774) underscores the growing importance of research methodologies in the field. Furthermore, the high centrality of "relations with faculty and curriculum" (degree: 86; eigenvector: 0.810) reflects the increasing emphasis on academic integration and interdisciplinary engagement. These findings indicate the field's progression

toward a research-intensive and pedagogically focused intellectual framework, characterized by an enhanced alignment with academic priorities.

Social Justice Orientation and Critical Perspectives (2020–2023)

The most recent period, marked by the greatest variability in review publication patterns, shows the network's most compact form (309 nodes, 1,643 edges) while revealing a profound conceptual transformation. Traditional library science terms exhibit diminished centrality (e.g., "libraries": degree: 44; eigenvector: 0.288), whereas socially oriented concepts gain prominence. Key terms such as "history" (degree: 96; eigenvector: 1.000), "social aspects" (degree: 82; eigenvector: 0.887), and "social justice" (degree: 43; eigenvector: 0.717) dominate the network structure. The emergence of terms such as "race relations" (degree: 40; eigenvector: 0.704) and "Black Lives Matter movement" (degree: 24; eigenvector: 0.589) reflects the field's increasing engagement with equity and justice-oriented scholarship. Meanwhile, the prominence of "feminism" (degree: 32; eigenvector: 0.611) and "archives" (degree: 43; eigenvector: 0.355) underscores the integration of critical theory and societal concerns into LIS research. This period marks a paradigm shift, aligning the field with contemporary societal challenges and advancing a justice-oriented intellectual framework.

This longitudinal analysis demonstrates the systematic evolution of the LIS field as reflected in reviewed book subject headings. The findings highlight a progression from traditional, library-centric frameworks through technological integration and academic specialization to a justice-oriented paradigm. These conceptual shifts not only align with the journal's evolving publication practices but also mirror broader societal transformations, underscoring the dynamic interplay between intellectual priorities and external influences in shaping the field.

Theme Evolution Map

To complement the analysis of conceptual change, a theme evolution map (see Figure 3) was constructed to illustrate the temporal dynamics of research themes across four distinct periods. This visualization provides insights into the persistence of foundational themes alongside the development of new research trajectories within the field.

The theme evolution map reveals several notable patterns in the intellectual landscape of LIS book reviews. In the first period (1997–2008), which represents the journal's most stable phase of publication, the largest thematic clusters are centered around "libraries" (182 members), "education" (174 members), and "history" (146 members). This period also features significant technological themes such as "computers" (72 members) and "data processing" (82 members), indicating the field's initial engagement with digital transformation, a phenomenon further substantiated by our network analysis.

The transition to the second period (2009–2014) marks a shift in thematic emphasis. While "history" (124 members) and "academic libraries" (114 members) emerge as dominant clusters, the appearance of "digital libraries" (54 members) as a distinct theme aligns with our findings on the increasing integration of technology and the reconfiguration of knowledge frameworks. Strong thematic connections between periods—most notably from "education" and "libraries" in the first period to "academic libraries" in the second—illustrate the field's shifting focus toward academic and institutional contexts.

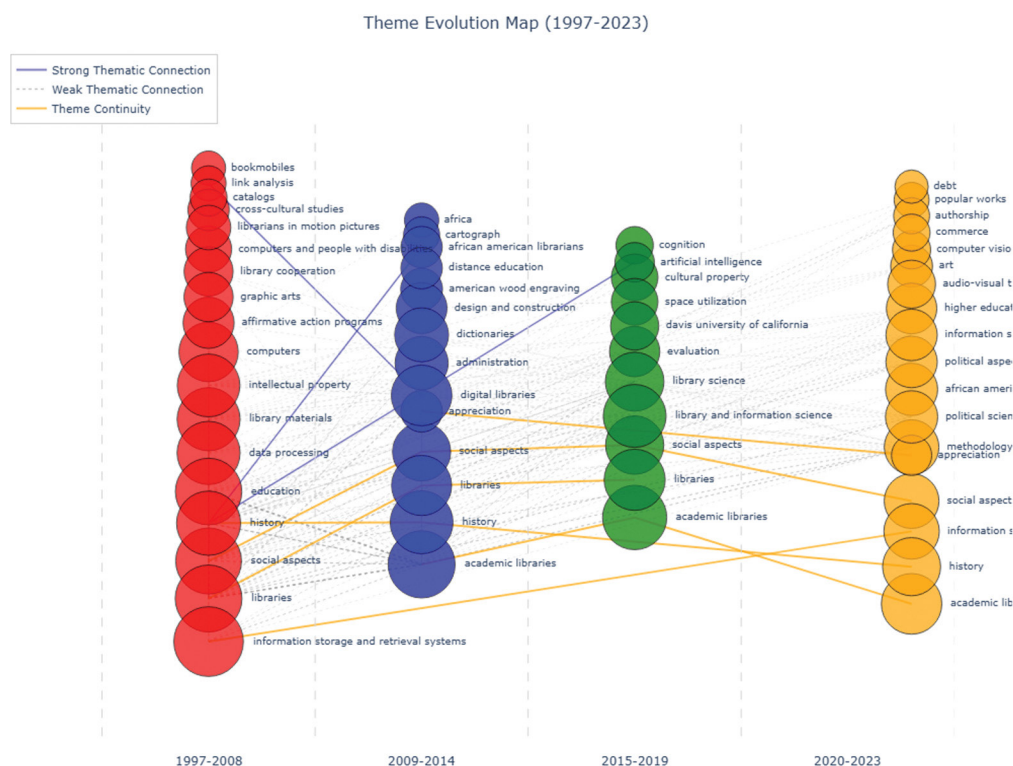


Figure 3. Theme Evolution Map (1997–2023)

Note: Interactive version: <https://t.ly/Rpwcw>

The third period (2015–2019) demonstrates a notable consolidation of themes around academic and professional practices. The emergence of new technological themes such as “artificial intelligence” and “cognition,” alongside the sustained prominence of “libraries” (90 members) and “academic libraries” (81 members), reflects the field’s growing engagement with advanced technologies. The appearance of “library and information science” (33 members) as a distinct theme signals an increasing emphasis on disciplinary reflection.

The most recent period (2020–2023) presents the most thematically diverse landscape, characterized by a proliferation of specialized and socially oriented themes. While “history” (69 members) and “academic libraries” (51 members) remain significant, genuinely new themes, such as “political science” and “African American women,” emerge. In a related but distinct trend, “social aspects”—a theme present across all four periods—gains renewed prominence, reflecting the field’s intensified engagement with social justice and critical perspectives. This thematic diversification aligns with findings from our network analysis, highlighting the field’s heightened attention to societal challenges.

The map also reveals significant patterns in both thematic connections and disconnections. Early-period themes such as “bookmobiles,” “librarians in motion pictures,” and “cross-cultural studies” appear as isolated nodes, suggesting temporal research interests that did not persist. However, other themes, such as “academic libraries,” “information storage and retrieval systems,” and “appreciation,” demonstrate notable continuity across multiple periods, albeit with varying degrees of prominence.

The theme “academic libraries,” for instance, emerges as a central concept in the second period (2009–2014) and persists as a significant focus in subsequent periods. It is worth

noting that this pattern derives not from *C&RL*'s editorial orientation toward academic librarianship but from the Library of Congress Subject Headings of the books selected for review. The sustained centrality of this theme may, therefore, reflect the consistent choices of practitioner-reviewers across all periods—a pattern that could be interpreted as indicative of enduring professional priorities within the LIS community. Meanwhile, “appreciation,” though less prominent, maintains continuity across periods, which may suggest an ongoing interest in evaluative frameworks and cultural assessment within the field. The reappearance of “information storage and retrieval systems” in the final period (2020–2023) similarly invites consideration of how foundational themes might be reconceptualized in dialogue with technological advancements, particularly the emergence of artificial intelligence and machine learning. Taken together, these patterns are suggestive of a dynamic interplay between enduring foundational concepts and the field's evolving priorities and may point to a tendency among practitioner-reviewers to engage with broader shifts in the LIS literature when selecting books for review—though further investigation would be needed to substantiate this interpretation.

The emergence of isolated themes in the final period (2020–2023), including “computer vision,” “debt,” and “commerce,” signals potential new research directions and interdisciplinary connections that have yet to be fully integrated into the field's mainstream discourse. These themes reflect the expanding scope of LIS research, as it increasingly intersects with societal challenges and technological innovations.

Thematic continuity is particularly evident in several core areas. The persistence of themes such as “social aspects,” “libraries,” and “history” across multiple periods establishes these as fundamental intellectual pillars of the field. Additionally, the recurrence of themes like “academic libraries,” “appreciation,” and “information storage and retrieval systems” demonstrates how the field successfully integrates its intellectual foundations with evolving research priorities. However, the evolution of their relative prominence and connections to emerging themes underscores the field's capacity for both intellectual stability and innovation. Strong thematic connections (depicted by solid lines) between periods remain relatively rare, indicating substantial conceptual evolution rather than mere continuation of established themes.

Building upon these thematic patterns, the map also reveals intriguing cluster size and connectivity trends. Larger but fewer thematic clusters characterize earlier periods, while later periods display smaller clusters, suggesting increasing specialization and diversification of research interests. This trend parallels the evolution observed in the network structure of co-word analysis, which transitions from broader, more inclusive themes to narrower and more specialized topics.

This temporal analysis of thematic evolution reveals the field's dynamic transformation from a traditionally focused discipline to one that actively engages with technological innovation, academic specialization, and social justice concerns while maintaining its core intellectual foundations.

Discussion and Conclusion

This study reveals several notable patterns in the evolution of book reviews within *C&RL* from 1997 to 2023, offering insights that both challenge and complement existing understanding of academic publishing trends in LIS. Our findings demonstrate significant divergence from the general decline in book reviews observed across academic journals (Hartley, 2018; Kaltenbrunner et al., 2022), particularly in the social sciences. While many journals have reduced

or eliminated their book review sections due to increasing pressure for measurable research outputs and project-based academic work, *C&RL* has maintained and even expanded its book review presence, especially in recent years.

The temporal analysis of publication patterns reveals a fascinating evolution from highly standardized practices to more flexible approaches. The initial period (1997–2008) exhibited remarkable consistency in review publications, contrasting sharply with the variable patterns observed in later periods, particularly 2020–2023. This transformation suggests an adaptive response to changing scholarly communication needs rather than submission to the broader trend of diminishing book reviews in academic journals. This resilience may be attributed to *C&RL*'s unique position as a hybrid platform facilitating dialogue between practitioners and researchers in LIS (Lund & Wang, 2021), where book reviews serve as valuable bridges between theoretical advancement and practical application.

Our thematic analysis through Co-LCSH networks reveals significant parallels with documented shifts in LIS research priorities. The evolution from traditional library-centric themes (1997–2008) through technological integration (2009–2014) to social justice orientation (2020–2023) aligns with broader transformations identified in LIS research (Järvelin & Vakkari, 2021; Song et al., 2023). However, our findings suggest a temporal lag between the emergence of new research themes and their representation in book reviews, particularly evident in the digital transformation period. This lag might indicate that book reviews serve as a stabilizing force in the field, allowing for thoughtful reflection on emerging trends before their integration into mainstream discourse.

The observed thematic progression also reflects the hybrid nature of LIS as a field where practitioners and researchers actively contribute to knowledge development. The increasing diversity of themes, particularly in recent periods, suggests that book reviews in *C&RL* serve as a vital platform for capturing both practical innovations and theoretical developments. This finding supports Han's (2020) observation of core LIS research topics while highlighting the role of book reviews in bridging the practitioner-researcher divide noted by Vakkari et al. (2022).

Particularly noteworthy is the emergence of social justice and critical perspectives as dominant themes in the most recent period (2020–2023). This shift extends beyond the technological and data-focused trends identified in previous studies (Ma & Lund, 2021; Mokhtarpour & Khasseh, 2021), suggesting that book reviews might be capturing emerging societal concerns before they become prominent in traditional research articles. This observation aligns with Vakkari's (2024) assessment of LIS's increasing fragmentation and interdisciplinary nature, while demonstrating how book reviews might serve as early indicators of new directions in the field.

The structural analysis of Co-LCSH networks reveals increasing specialization over time, with networks becoming more compact but thematically diverse. This pattern suggests that while the field has become more specialized, as noted by multiple scholars (Chang, 2018; Vakkari et al., 2022), book reviews have maintained their role in connecting various sub-disciplines within LIS. The identification of persistent thematic nexuses across periods indicates that book reviews contribute to maintaining intellectual continuity while accommodating new developments.

We should acknowledge some limitations of this study. First, while *C&RL* serves as a significant practitioner-researcher journal in LIS, relying on a single journal's data limits the generalizability of our findings to the broader field. The patterns and trends identified may

reflect editorial policies, reviewer preferences, or institutional factors specific to *C&RL* rather than representing the entire landscape of LIS book reviews. Second, our methodological approach of using LCSH presents inherent constraints. Unlike author-assigned keywords in research articles that often reflect specific research topics, LCSH terms tend to be broader and more standardized, potentially obscuring nuanced research themes or emerging topics. This standardization, while beneficial for consistency, may limit our ability to detect fine-grained thematic developments comparable to those identified in studies of research articles. Researchers should consider these limitations when interpreting our findings and their implications for understanding the evolution of LIS as a field.

Several implications emerge from these findings. First, contrary to the diminishing role of book reviews in many academic fields, their sustained presence in *C&RL* suggests that book reviews continue to serve vital functions in LIS, particularly in bridging theory and practice. Second, the temporal lag in thematic representation indicates that book reviews might offer a more measured perspective on emerging trends, potentially serving as a counterbalance to rapid shifts in research focus. Finally, recent observations of increasing thematic diversity suggest that book reviews are evolving to address broader societal concerns, expanding their traditional role as purely academic discourse. These findings contribute to our understanding of scholarly communication in LIS by highlighting the unique role of book reviews in capturing and reflecting the field's evolution. While the broader academic landscape has increasingly marginalized book reviews (Kaltenbrunner et al., 2022), our analysis suggests they remain vital tools for knowledge dissemination and professional dialogue in LIS, particularly within practitioner-researcher contexts.

Future research might explore how this sustained presence of book reviews influences the development of LIS as a field, particularly in bridging the gap between practice and research. Additionally, investigating whether similar patterns exist in other practitioner-researcher journals could provide valuable insights into the role of book reviews in professional fields more broadly.

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The Algorithmic Librarian: AI, Data Curation, and the Future of Research Collaboration

Lady Catherine R. de Leon*

This paper explores the evolving role of academic and research librarians in the age of artificial intelligence (AI), focusing on AI literacy, algorithmic accountability, and data stewardship. It examines how librarians are adapting to the technological landscape, emphasizing their role in promoting AI literacy, ethical AI practices, and interdisciplinary collaboration within academic environments. This study offers an integrated, thematic synthesis that foregrounds librarians' evolving roles as educators, ethical stewards, and research collaborators. Through a critical analysis of current literature, the paper highlights key competencies necessary for navigating the complexities of AI integration in research and education. The study also proposes recommendations for fostering AI literacy programs, enhancing data management skills, and advocating for responsible AI use, aiming to empower librarians as stewards of AI ethics and innovation. Ultimately, this research underscores the transformative potential of libraries in shaping AI-aware, ethical, and collaborative academic communities.

Background of Study

In the 21st century, the academic and research landscape is being radically reshaped by artificial intelligence (AI), data-intensive methodologies, and algorithmic systems. At the heart of this transformation are academic and research libraries, known for safeguarding scholarly knowledge, facilitating research, and cultivating information literacy. As digital technologies evolve, these libraries—and the professionals who manage them—are experiencing fundamental changes in their core functions, infrastructure, and identities.

AI-driven tools, such as generative models (e.g., ChatGPT), machine learning algorithms, and intelligent discovery systems, now influence how knowledge is produced, accessed, and validated in higher education and research environments (Cordell, 2020; Zhao et al., 2024). From automating metadata generation to enabling complex data curation and research assistance, AI systems have expanded the library's role from knowledge custodianship to dynamic research collaboration.

The emergence of the “algorithmic librarian” reflects this evolution, as librarians are increasingly seen as mediators between human researchers and automated systems. These professionals are tasked not only with deploying algorithmic tools but also with evaluating

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their implications for research integrity, access, and academic freedom (Clark et al., 2017). The influence of algorithmic infrastructures on search, discovery, and knowledge visibility underscores the need for librarians to critically engage with the ethical and epistemological issues introduced by AI.

AI's potential comes with profound ethical and social concerns. These include algorithmic opacity, misinformation, cultural bias, and environmental costs (Rainie & Anderson, 2017; Crawford, 2021; Rettberg, 2022; Ludvigsen, 2022). AI training processes often rely on exploited labor, as seen in reports of low-wage content moderators working under harsh conditions to filter training data (Perrigo, 2023). Furthermore, algorithmic systems risk reinforcing dominant worldviews, marginalizing non-Western perspectives, and exacerbating existing inequities (Rettberg, 2022).

Nonetheless, AI also presents significant opportunities for libraries to innovate—from personalized recommendation engines to enhanced discovery platforms and new models of digital literacy instruction (Deshpande et al., 2023; Motoki et al., 2023). As Hillier (2023) and Carolus et al. (2023) argue, AI integration demands robust literacy models that empower both librarians and users to interact ethically and effectively with intelligent systems.

By mapping current scholarly and professional discourse, this paper contributes to the theoretical conceptualization of the algorithmic librarian and offers actionable insights for professional development, curriculum design, and policy formation. The significance of this work lies in its dual aim: to support librarians' evolving practice amid technological disruption; and to advocate for socially responsible AI implementation in higher education.

Statement of the Problem

While AI technologies are rapidly integrated into library systems, a significant knowledge gap exists concerning the readiness of academic librarians to adapt to algorithmic and data-centric environments. There is limited literature synthesizing the emerging roles of librarians in AI-enhanced research collaborations, particularly regarding the ethical dimensions of algorithm use, issues of transparency and bias, and AI literacy in practice.

These issues highlight the need to examine how librarians are evolving in response to AI-driven changes, the challenges they face, and the competencies required.

Objectives of the Study

This study aims to:

1. Examine the emerging roles of librarians in the context of AI integration in research and knowledge production.
2. Explore how librarians are responding to challenges related to algorithmic bias, transparency, and explainability.
3. Identify frameworks and competencies that support AI literacy and digital interaction among librarians and researchers.
4. Analyze case studies and theoretical perspectives to highlight best practices in AI-supported data curation and collaborative scholarship.

Significance of the Study

The significance of this study lies in its contribution to the growing discourse on AI in libraries, offering a critical synthesis of both literature and practice. It makes a theoretical contribution by enhancing the conceptual understanding of the "algorithmic librarian," a crucial paradigm

for 21st-century knowledge workers. Furthermore, it supports professional development by guiding the design of AI literacy programs tailored specifically for librarians, enabling their informed participation in digital scholarship. In terms of ethical engagement, the study addresses challenges such as toxicity in AI and labor exploitation in AI model training, promoting socially responsible technology adoption within libraries. Lastly, the research informs policy and practice by offering insights that can shape institutional strategies for integrating AI into library systems, fostering the development of infrastructures that are innovative and ethically sound.

Scope and Delimitations

This study focuses specifically on academic and research libraries and librarians. It analyses their evolving roles in the context of AI integration, with attention to data curation, research collaboration, and digital literacy development. Rather than collecting primary data through interviews or surveys, the study uses a literature review approach. It draws from peer-reviewed articles, institutional reports, and policy documents.

Review of Related Literature

Algorithmic Literacy and Mediation

Algorithmic literacy is emerging as a core competency in academic librarianship as AI-driven systems increasingly shape access to information. While Finn (2017a, 2017b) emphasized the cultural implications of algorithmic systems, Long and Magerko (2020) framed AI literacy as the ability to critically assess and apply AI across contexts. These foundational views align with Clark et al.'s (2017) analysis of how opaque algorithms influence user behavior in discovery tools, and raise concerns echoed by Rainie and Anderson (2017), who warned that algorithmic mediation can automate credibility judgments. Rettberg (2022) added that systems like ChatGPT reinforce dominant cultural values, calling attention to the librarian's role in preserving diverse epistemologies. Together, the literature highlights not only the technical but also the sociocultural stakes of algorithmic systems, as well as the need for librarians to lead in fostering user awareness of algorithmic influence.

Data Curation and Machine Learning in Libraries

AI's reliance on large-scale data underscores librarians' expanding role in data curation and digital infrastructure. Cordell (2020) documented the integration of machine learning in tasks such as metadata generation, while Ridley (2019) advocated for explainable AI to ensure transparency in automated decisions. Crawford (2021) pointed to the environmental and ethical costs of AI, suggesting libraries should champion responsible innovation. Zhao et al. (2024) emphasized the need for librarian-led ethical guidance in generative AI use. Supporting this shift, Calzada Prado and Marzal (2013) called for integrating data and information literacy, while Lo (2023) proposed prompt engineering as a practical instructional tool. While the literature broadly supports librarians' central role in AI-era data practices, it also reveals a gap in applied models that balance automation with ethical oversight.

Competency Frameworks for AI Literacy

Efforts to define AI literacy in academic settings have produced a range of theoretical and applied frameworks. Hillier (2023) proposed a model for institutional engagement, while Carolus et al. (2023) emphasized ethical and interactional competencies through their Digital

Interaction Literacy Model. These build on earlier reconceptualizations of internet literacy by Bauer and Ahooei (2018). Dogruel et al. (2022) introduced a validated algorithmic literacy scale, offering tools for educational assessment. Existing frameworks like the ACRL's *Framework for Information Literacy in Higher Education (Framework)* (2015) have been adapted to include AI-specific competencies (Long & Magerko, 2020; Yi, 2021), with applied examples found in programs developed by Wheatley and Hervieux (2023) and Kong et al. (2021). These studies collectively underscore librarians' evolving role as educators, though further research is needed on implementation across varied institutional contexts.

Ethical, Social, and Environmental Concerns

Librarians are increasingly called to address the ethical and societal risks of AI adoption. Hagendorff (2024) mapped core ethical dilemmas in generative AI, while Motoki et al. (2023) and Deshpande et al. (2023) revealed AI's potential to perpetuate bias and toxicity. Perrigo (2023) highlighted labor exploitation in AI training pipelines, underscoring librarians' need to consider upstream ethical issues. Global frameworks cataloged by Jobin et al. (2019) and Corrêa et al. (2023) offer governance tools for institutional policy making. Fergusson et al. (2023) warned of AI's role in amplifying surveillance and misinformation, and Ludvigsen (2022) raised concerns about its environmental footprint. These sources collectively argue for librarians' active role in institutional ethics and sustainability, though concrete strategies for intervention remain underdeveloped.

Scholarly Collaboration and Redefining Librarian Roles

AI is also reshaping librarians' institutional identities, situating them as collaborators in research and policy development. Cox (2024) and Annapureddy et al. (2024) noted librarians' growing influence in AI pedagogy and digital scholarship. Kong et al. (2021) showed how librarian-led AI literacy programs foster interdisciplinary learning. Diakopoulos (2014), and Ridley and Pawlick-Potts (2021) highlighted librarians' role in mediating algorithmic systems, ensuring transparency in user interaction. Clark (2018) emphasized their contributions to algorithmic accountability, while Markauskaite et al. (2022) linked their work to emerging research infrastructures. Engagement in global AI ethics discourse (Jobin et al., 2019; Corrêa et al., 2023) and sustainability advocacy (Ludvigsen, 2022) further extends librarianship into strategic leadership domains. This evolution, however, raises questions about institutional capacity and long-term support for such expanded roles.

Methodology

The study utilizes a literature review method, focusing on peer-reviewed journal articles, institutional reports, academic blog entries, and authoritative preprints. This approach is suitable for synthesizing existing knowledge, identifying key themes, and uncovering gaps in the current literature.

Research Questions

This study is guided by the following research questions:

1. How are algorithmic systems and AI technologies influencing the roles and responsibilities of academic and research librarians?
2. What competencies and literacies are essential for librarians to effectively navigate AI-enhanced research environments?

3. What ethical and socio-political concerns arise from the integration of generative AI in scholarly communication, and how can librarians address them?
4. In what ways can librarians contribute to more inclusive, ethical, and collaborative research ecosystems through AI and data stewardship?

Data Sources and Selection Criteria

The literature selected for this review was drawn from a range of scholarly publications, professional frameworks, and global policy documents. The selection was guided by the following inclusion criteria:

1. Thematic relevance: Sources were included if they directly addressed at least one of the following core themes:
 - AI literacy and algorithmic awareness
 - Data literacy and information curation
 - Ethical and governance frameworks for AI
 - The evolving roles of librarians in digital and AI-enhanced research environments
2. Scholarly and professional authority: Preference was given to peer-reviewed journal articles, academic conference proceedings, and internationally recognized organizational reports.
3. Contemporary scope: Only publications released between 2013 and 2024 were considered to ensure contemporary relevance. Special emphasis was placed on literature produced from 2019 onward, coinciding with the rapid rise in generative AI technologies and their educational implications.
4. Librarianship and higher education focus: Works were prioritized if they contextualized AI, data, and algorithmic systems within academic and research libraries, or within the broader information literacy and digital ethics discourse in higher education.
5. Language and accessibility: Only English-language sources were included for consistency and accessibility.

Limitations

As a literature review, the study is limited by the availability and scope of existing research. It does not include primary data collection, such as surveys or interviews. Additionally, while every effort was made to include diverse viewpoints, the reliance on English-language sources may have excluded valuable non-English contributions. Despite these limitations, the methodology provides a rigorous and comprehensive foundation for examining the impact of AI on academic librarianship, guiding both theoretical discourse and practical developments.

Findings

The literature reviewed in this study highlights five key thematic areas that define the evolving roles, competencies, and ethical responsibilities of academic and research librarians in the age of artificial intelligence (AI). These findings represent a synthesis of recent scholarship, offering insight into how librarians are navigating a rapidly changing research and technological ecosystem.

Expanding Competencies in AI and Algorithmic Literacy

Librarians are increasingly positioned as educators and facilitators of AI literacy, a role that extends beyond technical fluency to encompass critical thinking, ethical awareness, and digital

agency. Annapureddy et al. (2024) proposed twelve competencies essential to generative AI literacy, including prompt design, bias detection, and accountability evaluation. Cox (2024) expanded on this by framing responsible generative AI literacy as an intersection of algorithmic, AI, and ethical literacies.

These developments build upon early efforts to foster algorithmic awareness in library practice (Clark, 2018) and are reinforced by empirical work from Dogruel et al. (2022), who developed and validated an algorithm literacy scale for assessing user competencies. Libraries have adapted the ACRL *Framework* to integrate AI-specific competencies (Long & Magerko, 2020; Yi, 2021), thus embedding algorithmic literacy into institutional learning strategies.

Instructional programs such as the workshop series designed by Wheatley and Hervieux (2023), and the AI literacy course evaluated by Kong et al. (2021), demonstrate librarians' emerging pedagogical roles in fostering AI fluency among students and faculty. Lo (2023) further operationalized this shift through the CLEAR framework, which incorporates prompt engineering into library instruction to encourage critical engagement with AI-generated information.

Data Literacy, Curation, and Research Infrastructure

The integration of AI in academic workflows has intensified the need for robust data literacy and stewardship within libraries. As AI systems rely on large volumes of structured data, librarians have assumed greater responsibility for supporting the entire data lifecycle, from acquisition and organization to ethical use and reuse. Calzada Prado and Marzal (2013) emphasized the importance of aligning data literacy with traditional information literacy, a view echoed by Cox (2024), who argues that librarians must be equipped to manage both the technical and ethical dimensions of data infrastructure.

Markauskaite et al. (2022) proposed that data fluency is a core capability for navigating AI-enhanced learning environments, positioning librarians as key support agents in facilitating data-related competencies among researchers. Lo (2023) demonstrated how librarians can teach prompt engineering to improve user interactions with AI, while Pinski and Benlian (2023) highlighted the importance of librarians in supporting ethical research data management as part of broader AI literacy efforts.

In practice, librarians are also involved in curating metadata, designing interoperable systems, and supporting open science initiatives. These roles not only enable responsible AI use but also uphold principles of transparency, reproducibility, and equitable access to data-driven research tools and outcomes.

Ethical, Social, and Environmental Dimensions of AI

As algorithmic systems become embedded in research infrastructures, librarians are emerging as ethical stewards responsible for advocating transparency, fairness, and sustainability. The literature points to a range of ethical challenges, including algorithmic bias (Motoki et al., 2023), misinformation (Hagendorff, 2024), and the amplification of harmful discourse in AI outputs (Deshpande et al., 2023). Rettberg (2022) cautioned that even multilingual AI systems like ChatGPT reflect monocultural values, while Perrigo (2023) exposed the exploitative labor conditions involved in AI dataset moderation.

These concerns underscore the need for institutional policies informed by global ethics guidelines. Jobin et al. (2019) and Corrêa et al. (2023) cataloged hundreds of AI ethics frameworks and governance documents that can guide libraries in developing locally relevant ethical

standards. Fergusson et al. (2023) emphasized the broader societal risks posed by generative AI, including surveillance and manipulation, reinforcing the urgency of librarian involvement in institutional AI governance.

Environmental concerns also emerge in the literature, with Ludvigsen (2022) highlighting the high energy costs associated with training and deploying large-scale AI models. As advocates for sustainability, librarians are uniquely positioned to raise awareness about the environmental footprint of AI and promote responsible technology procurement within academic institutions.

Information Behavior and Critical Thinking in the Age of AI

AI systems have reshaped how users search for, evaluate, and engage with information, making critical thinking and information behavior central to the librarian's instructional mission. Grizzle et al. (2021), in collaboration with UNESCO, called for media and information literacy as a foundation for global citizenship—an imperative that AI intensifies. Dogruel et al. (2022) showed that algorithmic literacy enhances users' ability to question AI-generated content, helping them recognize how algorithms influence credibility and visibility.

Pinski and Benlian (2023) proposed a reflective judgment framework as part of AI literacy, encouraging users to think beyond surface-level outputs and consider the socio-technical processes that generate them. Lo's (2023) CLEAR framework gives practical shape to these ideals, using prompt engineering as a tool for facilitating deeper user-AI interaction.

Librarians play a crucial role in fostering these competencies through workshops, classroom instruction, and integrated digital literacy programs. Their guidance enables users to critically navigate algorithmically curated environments and develop a more nuanced understanding of credibility, authorship, and knowledge authority in the age of AI.

Redefining the Role of Librarians in Research Collaboration and Innovation

The evolving information ecosystem has expanded the role of academic librarians from support staff to integral collaborators in research, pedagogy, and policy making. Librarians now co-lead AI literacy initiatives (Cox, 2024), design interdisciplinary courses (Kong et al., 2021), and partner with faculty in embedding ethical AI instruction into curricula (Annapureddy et al., 2024).

Ridley and Pawlick-Potts (2021) and Diakopoulos (2014) emphasized librarians' critical role in mediating interactions between users and algorithmic systems, ensuring transparency, accountability, and equitable access to information. Clark (2018) argued that librarians are not merely reactive but active in shaping algorithmic infrastructures that affect scholarly communication and digital discovery.

Their growing involvement in institutional planning, grant writing, and global discourse on AI ethics (Jobin et al., 2019; Corrêa et al., 2023) signals a profession in transition. Librarians are also advocating for sustainable AI practices (Ludvigsen, 2022), ethical labor conditions (Perrigo, 2023), and inclusive knowledge ecosystems (Rettberg, 2022). These developments suggest a broader redefinition of librarianship as both a strategic and ethical profession, rooted in service but empowered by leadership and innovation.

Conclusion

This study explored how academic librarians are navigating and responding to the growing presence of artificial intelligence (AI), algorithmic systems, and data-centric practices in

higher education. A thematic synthesis of current literature makes clear that the profession is undergoing a significant transformation, one that expands the traditional boundaries of librarianship into domains of digital ethics, instructional innovation, research collaboration, and AI policy development.

The findings highlight five major areas where academic librarians are leading change. First, AI and algorithmic literacy have become core instructional competencies, positioning librarians as educators who empower users to engage critically and ethically with emerging technologies. Second, the integration of AI into research has elevated the librarian's role in data stewardship, requiring fluency in data curation, metadata architecture, and responsible data use. Third, librarians are taking on ethical and environmental leadership roles, advocating for transparent AI governance and sustainable technology practices. Fourth, they are guiding users in developing critical thinking and reflective information behavior to navigate AI-generated content. Lastly, librarians are increasingly embedded in interdisciplinary research, curriculum design, and institutional policymaking, thus redefining their role as collaborative partners and strategic contributors to academic innovation.

This shift affirms that academic librarians are not merely adapting to technological change; they are actively shaping how AI is integrated into the scholarly ecosystem. Their ability to bridge technical expertise with human-centered values makes them indispensable actors in ensuring that AI is deployed in ways that are equitable, ethical, and educationally sound. As AI continues to evolve, the academic library must remain a proactive, principled space for supporting innovation, fostering digital literacies, and promoting responsible technological futures.

Recommendations

Building on the findings of this study, which underscore the transformative roles of academic librarians in AI-integrated environments, the following recommendations aim to guide institutional and professional development across key areas: competencies, ethics, research collaboration, and sustainability.

Develop and Institutionalize AI and Algorithmic Literacy Training

Academic libraries should prioritize the integration of AI and algorithmic literacy into professional development and instruction. As highlighted by Annapureddy et al. (2024), Cox (2024), and Wheatley and Hervieux (2023), these competencies are central to librarians' evolving roles. Institutions should align with existing models such as Hillier's (2023) AI Literacy Framework and Lo's (2023) CLEAR model to create structured learning opportunities. Librarians should be supported in leading AI-focused instructional programs that foster critical engagement with algorithmic bias, ethical risks, and generative technologies (Clark, 2018; Yi, 2021).

Enhance Data Literacy and Stewardship Capabilities

As emphasized by Calzada Prado and Marzal (2013) and Cox (2024), librarians must be equipped to manage the entire data lifecycle in AI-supported research. Training should encompass data curation, ethical use, preservation, and responsible sharing. Academic libraries should expand data services to support faculty and students engaged in AI-intensive research, ensuring alignment with ethical and FAIR data practices.

Commit to Ethical Leadership and Transparency in AI Practices

Librarians should take a proactive role in shaping institutional AI policies grounded in transparency, fairness, and sustainability. Librarians, as noted by Jobin et al. (2019), Diakopoulos (2014), and Fergusson et al. (2023), can serve as ethical leaders in guiding responsible AI adoption. This includes raising awareness of labor and environmental implications of AI systems (Perrigo, 2023; Ludvigsen, 2022) and promoting inclusive, accountable governance frameworks.

Foster Interdisciplinary Collaboration and AI Research Innovation

Librarians should be positioned as essential partners in interdisciplinary AI research and curriculum design. As suggested by Cox (2024) and Ridley and Pawlick-Potts (2021), libraries can bridge technical and nontechnical domains by facilitating inclusive, ethical collaboration. Institutional investment in shared AI infrastructure and librarian participation in research teams will support this role.

Promote Critical Media and Information Literacy

To address the challenges of AI-generated misinformation and opaque algorithms, libraries must embed critical AI literacy into their services. Dogruel et al. (2022) and Pinski and Benlian (2023) stress the importance of fostering users' ability to evaluate algorithmic outputs. Programs should incorporate tools like Lo's (2023) CLEAR framework and promote critical engagement with AI-generated content across disciplines (Ridley, 2019).

Advocate for Sustainable and Responsible AI Practices

Librarians should contribute to institution-wide sustainability goals by advocating for low-impact AI tools and ethical procurement policies. As Ludvigsen (2022) highlights, awareness of AI's environmental costs is critical. Libraries can lead discussions on sustainable computing, support low-carbon AI initiatives, and promote long-term ecological responsibility in digital scholarship.

These recommendations are grounded in the literature and provide a forward-looking framework to support the evolving roles of academic librarians in the algorithmic age. By implementing these strategies, academic libraries can play a central role in shaping an ethical, inclusive, and sustainable future for AI in higher education.

Disclosure Statement

No potential conflict of interest.

Declaration of Funding

No funding was received.

Disclosure on the Use of AI

The author utilized GrammarlyGo during the preparation of this work to assist with grammar checking and correction. Following the use of this tool, the author carefully reviewed and revised the content as necessary, assuming full responsibility for the final version of the published article.

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A Complete Guide to Creative Technology Spaces in Academic Libraries: Media Labs, Makerspaces, and More, Emily

Thompson, Vanessa Rodriguez, Eric Johnson, Kelsey Sheaffer,

and Oscar K. Keyes, ALA Editions, 2025. 224 pp. Softcover, \$69.99. 9798892553117.



A Complete Guide to Creative Technology Spaces in Academic Libraries offers a practical and accessible resource for academic libraries developing or sustaining makerspaces, media labs, and other creative technology environments. Drawing on the authors' professional experience, the book addresses the organizational, spatial, and service-related challenges that accompany these initiatives, positioning itself squarely as a guide for practitioners rather than a theoretical intervention.

The authors define creative technology spaces broadly as “any space in a library that encourages patrons to create something beyond the traditional research paper” (xi). This inclusive framing allows the book to speak to a wide range of institutional contexts, from libraries with established media labs to those exploring smaller-scale or emerging services. Rather than privileging high-cost technologies or trend-driven models, the authors emphasize adaptability, scalability, and alignment with local goals, reinforcing the idea that creative technology work can build on existing library infrastructure and expertise.

The volume is organized around the practical stages of planning, implementing, and sustaining creative technology spaces. Early chapters focus on assessing readiness and articulating purpose, with particular attention on institutional context. In Chapter 1, “Taking Stock,” the authors observe that creative technology initiatives typically emerge either through administrative direction or staff-driven advocacy, describing these as “top-down” and “bottom-up” approaches, respectively (3). This distinction grounds the discussion in familiar organizational dynamics and underscores the importance of understanding internal decision-making structures before expanding services.

Subsequent chapters focus on operational considerations, including space design, equipment selection, staffing, programming, and policy development. Rather than offering prescriptive solutions, the authors highlight trade-offs shaped by budget, labor capacity, and user demand. Questions of access—who may use creative technology spaces and under what conditions—are treated as locally determined policy decisions, influenced by staffing levels, training requirements, and institutional mission. While the book acknowledges that some libraries extend access beyond enrolled students, it provides limited guidance on serving external patrons, leaving issues such as liability, scheduling, and cost recovery largely unexamined.

Sustainability is a recurring theme throughout the text and represents one of the book's strongest contributions. The authors address ongoing funding needs, equipment maintenance and replacement, and the labor required to keep creative technology services functional over time. Staffing receives sustained attention, particularly the challenges of training, documentation, and reliance on student employees. By emphasizing realistic service models and clear workflows, the book encourages libraries to plan for long-term upkeep rather than short-term launches.

Partnerships are also positioned as central to the success of creative technology spaces. The authors encourage collaboration with academic departments, IT units, and teaching and

learning centers to align services with curricular and institutional priorities. Although this discussion focuses primarily on internal campus relationships, it reinforces the role of the library as a collaborative partner rather than a standalone service provider. Guidance on encouraging curricular integration emphasizes alignment with existing learning outcomes and assignments, suggesting that faculty adoption follows from demonstrated relevance rather than explicit persuasion strategies.

Challenges and limitations surface implicitly throughout the book rather than as a formal “lessons learned” section. Issues such as underestimating labor demands, managing high user expectations, and preventing service creep emerge through recommendations for clearer policies and sustainable workflows. This approach keeps the focus on solutions, although readers seeking detailed case studies of failed or restructured makerspaces may find the treatment understated.

The book’s clear organization, direct writing style, and use of examples and checklists enhance its usability as a reference tool. While it does not engage deeply with theoretical or critical perspectives on technology and learning, its primary value lies in supporting effective planning, management, and assessment of creative technology services within academic libraries.

Overall, *A Complete Guide to Creative Technology Spaces in Academic Libraries* is a useful addition to the professional literature on academic library services. Its emphasis on organizational context, sustainability, and day-to-day decision-making makes it particularly relevant for librarians and administrators responsible for developing or managing creative technology spaces. As a pragmatic and adaptable guide, it offers a realistic roadmap for libraries seeking to integrate creative production into their services in a deliberate and manageable way. — *Michelle Mussuto, Head of Acquisitions, Collection Management, and Evaluation Unit, California State University, Chico*

Artificial Intelligence for Academic Libraries, Clifford B. Anderson and Douglas H. Fisher, Routledge, 2025. 236 pp. Softcover, \$51.99. 9781032680354.



Artificial Intelligence for Academic Libraries is an insightful examination of the literature on artificial intelligence (AI) in academic libraries and as applied to information science. Instead of presenting AI as merely a technical development, the authors place it within the broader intellectual, ethical, and professional landscape of academic librarianship. The perspective presented in this book distinguishes it from many publications on AI, which mostly treat it as a technological breakthrough.

Anderson and Fisher provide an in-depth, comprehensive review of AI within library services, scientific communication, and information literacy. The book introduces deliberative AI as a historically dominant paradigm relevant to future AI development, expanding a discourse often limited to large language models and generative models. It also examines the relationship between AI and academic scientific practices, particularly regarding issues of citation, intellectual honesty, and academic norms; it also highlights the limitations of AI systems in recognizing intellectual influence. Additionally, the authors address the broader social implications of AI, including responsible practices, environmental dimensions, and libraries' roles in its responsible use.

The authors balance their arguments between academic authority and accessibility, making it suitable for a wide audience without requiring specialized expertise in artificial intelligence. To support readers, the authors deliberately present the material in depth while avoiding excessive technicality. The authors also provide clear explanations of concepts—such as machine learning, neural networks, and various paradigms—supported by references to prior and recent research. Their interdisciplinary expertise bridges library science and computer science, enabling explanations of technical issues and addressing professional concerns in academic libraries.

Anderson and Fisher situate AI within a broader academic framework and present different views on AI's development and impact. The authors track AI's historical evolution, showing how deliberative and connectionist paradigms emerged, competed, and changed over time. This historical perspective helps readers see AI's development as a long intellectual journey rather than a sudden leap. The book addresses philosophical debates about artificial intelligence, covering questions of machine intelligence, cognition, and the limits of computational reasoning. Including these perspectives encourages readers to assess AI claims critically. The book also covers contemporary controversies, including algorithmic bias, misinformation, copyright concerns, and environmental impacts. Through these examinations, the authors present both the opportunities and risks of AI, framing it as a powerful innovation that needs careful consideration.

This book is structured in a systematic progression that guides readers from basic theory to more advanced applications and future perspectives of artificial intelligence in academic libraries. This book is divided into 10 chapters that collectively provide a thorough understanding of artificial intelligence and machine learning within academic librarianship. The structure of this book emphasizes not only the technological aspects of AI but also the philosophical, ethical, and professional implications for library and information science practitioners.

Additionally, each chapter concludes with a section titled “Points for Reflection and Discussion,” designed to stimulate critical engagement and further exploration of the issues.

The first three chapters of the book discuss the foundational aspects of AI and introduce the historical, theoretical, and conceptual basics. Chapter 1 provides an overview of artificial intelligence, tracing its evolution and distinguishing major AI paradigms. It explains categories such as narrow, general, and mid-level AI, as well as operational approaches like deliberative, reflexive, and hybrid systems. Chapter 2 focuses on deliberative AI, emphasizing symbolic systems, expert systems, general reasoning, and the rise of machine learning. Chapter 3 shifts to connectionist approaches, highlighting neural networks, deep learning, and the evolution of language models, including Word2Vec, word embeddings, and large language models.

The middle chapters outline the ethical and social considerations of AI. Chapter 4 introduces major philosophical debates, including the Turing Test and the Chinese Room argument, to encourage critical assessment of machine intelligence and clarify common misconceptions. Building on this, Chapter 5 addresses the conscientious applications and social implications of AI—such as security, algorithmic bias, misinformation, disinformation, and the environmental impact of large-scale computing—as well as librarians’ responsibilities when interacting with AI. Chapter 6 explores intellectual property issues, including copyright, plagiarism, academic standards, and collaboration between humans and AI in the production of academic knowledge.

The final section shifts to advanced developments and AI’s future in academic libraries. Chapter 7 introduces the concept of hybrid AI systems combining reflective and deliberative capabilities, suggesting these may shape future AI. It also considers reasoning, intersystem communication, retrieval-augmented generation, and layered AI architecture. Chapter 8 details robust conversational AI, covering open-domain questions, query bias detection, contextual learning, and advanced retrieval mechanisms. Chapter 9 addresses professional development for librarians, emphasizing new competencies such as AI collaboration, safety and alignment, grant-supported research, and programming and math skills. Chapter 10 completes the book with a forward-looking perspective on AI integration in libraries, proposing future scenarios in technology, social adaptation, and the evolving role of libraries as knowledge curators in an AI-driven environment.

Through comprehensive consideration of AI, this book is highly relevant and suitable for academic librarians and students in library and information science programs. With a strong conceptual orientation and an emphasis on professional reflection, this book helps readers understand the technological, ethical, and professional implications of developments in artificial intelligence in the academic environment. Additionally, observations on the responsible use of AI, scientific communication, and information literacy make the book valuable to interdisciplinary researchers, including those in information science, digital humanities, and technology studies. Thus, this book serves not only as an academic resource, but also as a professional development reference for librarians and researchers who wish to deepen their understanding of artificial intelligence, as well as its potential applications in library services and broader scholarly practices. — *Arya Wijaya Pramodha Wardhana, Lecturer, Universitas Airlangga, Indonesia* (ORCID <https://orcid.org/0000-0002-7189-5978>)